

7.1.4: Water Conservation facilities available in the institute

7.1.4: Water Conservation facilities available in the Institution

- **Rainwater Harvesting**
- **Borewell Recharging**
- **Construction of Tanks and Bunds**
- **Wastewater Recycling**
- **Maintenance of water bodies and distribution system in the campus**

7.1.4: Water conservation facilities available in the Institution

Any other relevant information

- Rainwater Harvesting System

6.3 Rainwater Harvesting System Design

Rainwater harvesting system includes various components namely rainwater drain surface, rainwater infiltration well, rainwater storage, or recharging structure. In the presented study, the concrete road will act as a rainwater drain surface. Rainwater filtration is done by infiltration well. Rainwater storage or recharging lake will be used to store and recharge the lake. Plan view of recharging or storage lake is presented in fig. 6.3.1. The recharging lake capacity is computed and it is 5155.70 Cu.m. The recharging lake capacity computation is presented in table 6.3.1.

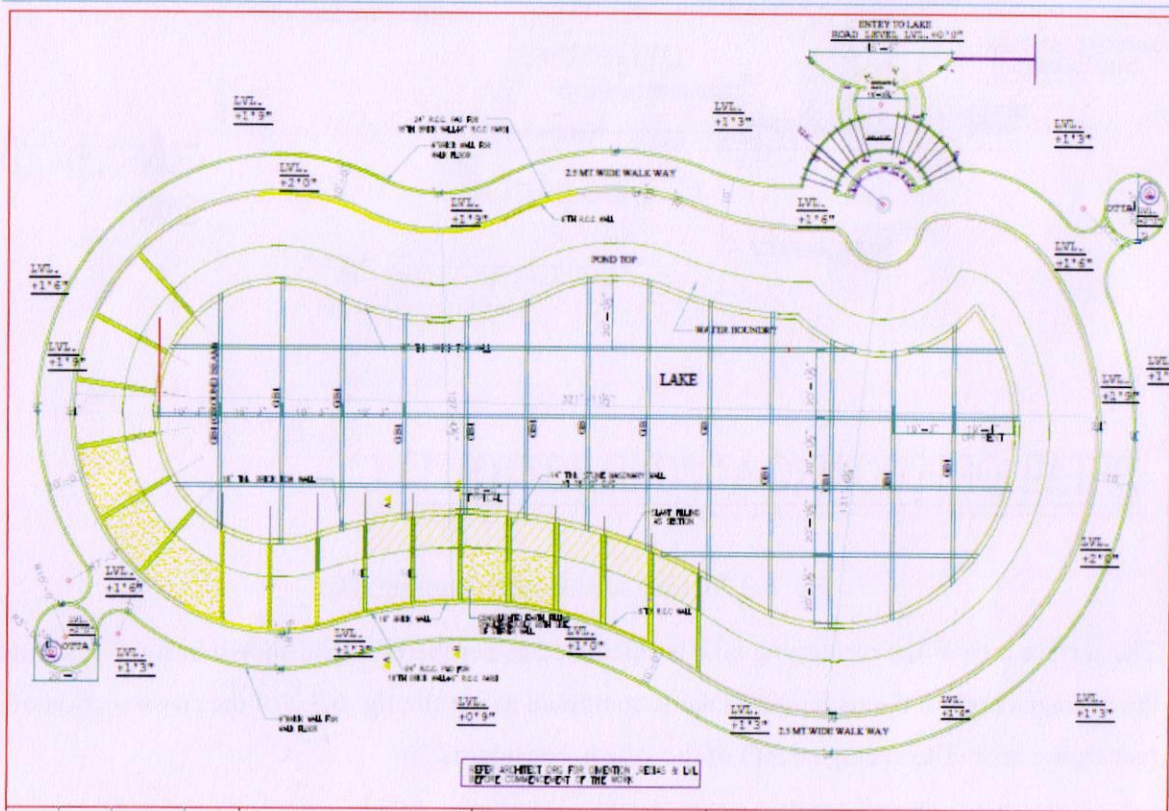


Fig. 6.3.1 Plan view of recharging the lake

Table 6.3.1 Capacity calculation of recharging the lake

Sr. No	The surface area of the recharge lake	The average depth of recharge lake (m)	The capacity of recharge lake (Cum)	Remark
1	1718.57	3	5155.70	Refer to C/S drawing of recharging Lake

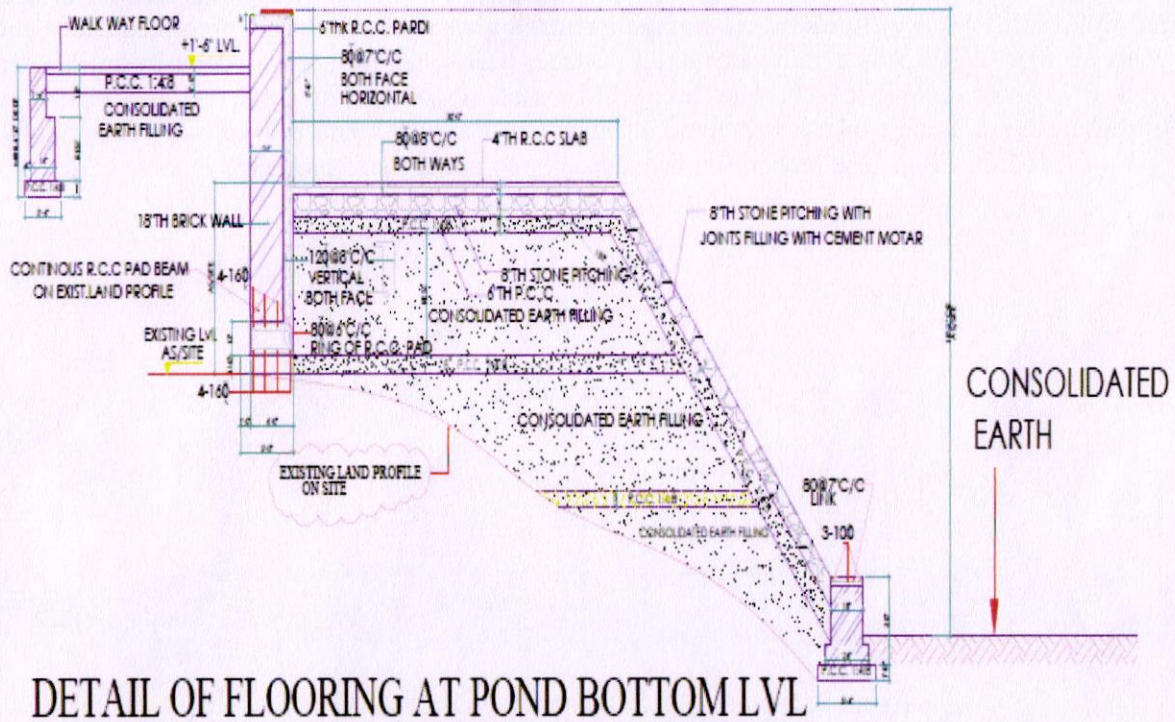


Fig. 6.3.2 Cross-section of recharging lake

The surface area of the recharging lake is calculated as per the blue grid shown in fig. 6.3.1. And the average depth of the recharging lake is computed as per the fig. 6.3.2 of the cross-section of recharging lake. The average depth of the lake is considered 3m.

6.2 Runoff Calculation

Rajkot city falls under the Saurashtra region. Saurashtra region included Kutch, Morbi, Rajkot, Jamnagar, Junagadh, Porbandar, Amreli, and Bhavnagar districts. The majority of rainfall fall under the monsoon period ie June to October. Daily rainfall data and annual rainfall are collected for the four consecutive years of 2014 to 2017 from the Ultratech Cement Limited, Gujarat Cement Works, Kovaya, Rajula, Amreli, Gujarat which is presented in table 6.2.1. More than 9 mm rainfall in a day is considered as rainy and according to rainy days are calculated for respectively years. Divide annual rainfall by the number of rainy days of that year. However, it will give one day's average rainfall for four consecutive years. Then the arithmetic average of these four one-day average rainfall values is computed ie. Average one-day rainfall; is presented in table 6.2.2. This average one-day rainfall depth is used to compute daily surface runoff generated from Marwadi University Campus. Campus areas divide into two different surface types namely, green area and non-green area. The surface runoff coefficient is considered 0.90 for the non-green area and the green area 0.60 as per reference take from the book entitled "Hydrology and Water Resources Engineering By S K Garg, pp No 173 to 174, 70% area impervious (Paved). The computed surface runoff is presented is in table 6.2.3.

Table 6.2.1 Dailly rainfall data for the year 2014-2017

Date	Rainfall for the year 2014 (mm)			Rainfall for the year 2015 (mm)			Rainfall for the year 2016 (mm)			Rainfall for the year 2017 (mm)		
	On date	YTD	Rainy day	On date	YTD	Rainy day	On date	YTD	Rainy day	On date	YTD	Rainy day
01-Jun	0	0		0	0		0	0		0	0	
02-Jun	0	0		0	0		0	0		0	0	
03-Jun	0	0		0	0		0	0		0	0	
04-Jun	0	0		0	0		0	0		0	0	
05-Jun	0	0		0	0		0	0		5	5	



Date	Rainfall for the year 2014 (mm)			Rainfall for the year 2015 (mm)			Rainfall for the year 2016 (mm)			Rainfall for the year 2017 (mm)		
06-Jun	0	0		0	0		0	0		0	5	
07-Jun	0	0		20	20	1	0	0		0	5	
08-Jun	0	0		0	20		0	0		5	10	
09-Jun	0	0		0	20		0	0		18	28	1
10-Jun	0	0		22	42	1	0	0		5	33	
11-Jun	0	0		0	42		0	0		0	33	
12-Jun	0	0		0	42		0	0		0	33	
13-Jun	0	0		73	115	1	0	0		0	33	
14-Jun	0	0		8	123		0	0		0	33	
15-Jun	14	14	1	4	127		0	0		0	33	
16-Jun	13	27	1	0	127		0	0		0	33	
17-Jun	3	30		0	127		0	0		0	33	
18-Jun	9	39	1	1	128		0	0		0	33	
19-Jun	0	39		1	129		0	0		0	33	
20-Jun	0	39		11	140	1	0	0		8	41	
21-Jun	0	39		29	169	1	0	0		0	41	
22-Jun	0	39		96	265	1	0	0		0	41	
23-Jun	0	39		270	535	1	0	0		0	41	
24-Jun	0	39		37	572	1	3	3		0	41	
25-Jun	0	39		0	572		19	22	1	72	113	1
26-Jun	0	39		1	573		7	29		0	113	
27-Jun	0	39		0	573		2	31		0	113	
28-Jun	0	39		0	573		0	31		0	113	
29-Jun	0	39		0	573		4	35		17.2	130	1
30-Jun	0	39		0	573		15	50	1	9.2	139	1
01-Jul	0	39		0	573		149	199	1	50.1	190	1
02-Jul	0	39		0	573		31	230	1	0	190	
03-Jul	4	43		0	573		6.3	236		0	190	
04-Jul	0	43		0	573		0.5	237		0	190	
05-Jul	0	43		0	573		0	237		0	190	
06-Jul	0	43		0	573		0	237		0	190	
07-Jul	0	43		0	573		0	237		3	193	
08-Jul	0	43		0	573		2	239		0	193	
09-Jul	0	43		0	573		1	240		4	197	
10-Jul	0	43		0	573		0	240		0	197	
11-Jul	48	91	1	0	573		0	240		0	197	
12-Jul	51	142	1	0	573		0	240		9.2	206	1



Date	Rainfall for the year 2014 (mm)			Rainfall for the year 2015 (mm)			Rainfall for the year 2016 (mm)			Rainfall for the year 2017 (mm)		
13-Jul	0	142		0	573		0	240		5.3	211	
14-Jul	0	142		0	573		5	245		26	237	1
15-Jul	24	166	1	0	573		0	245		32	269	1
16-Jul	25	191	1	0	573		6	251		0	269	
17-Jul	26	217	1	0	573		1	252		0	269	
18-Jul	69	286	1	0	573		15	267	1	0	269	
19-Jul	0	286		0	573		1	268		0	269	
20-Jul	0	286		0	573		5	273		5	274	
21-Jul	0	286		0	573		1	274		63	337	1
22-Jul	0	286		45	618	1	0	274		21	358	1
23-Jul	29	315	1	0	618		0	274		0	358	
24-Jul	4	319		16	634	1	0	274		0	358	
25-Jul	0	319		0	634		0	274		0	358	
26-Jul	0	319		42	676	1	1	275		6.4	364	
27-Jul	0	319		11	687	1	7	282		1	365	
28-Jul	4	323		1	688		0	282		3	368	
29-Jul	9	332	1	0	688		14	296	1	23	391	1
30-Jul	17	349	1	0	688		10	306	1	0	391	
31-Jul	5	354		0	688		37	343	1	3	394	
01-Aug	9	363	1	0	688		1.2	344		0	394	
02-Aug	0	363		0	688		1	345		0	394	
03-Aug	1	364		0	688		6	351		0	394	
04-Aug	0	364		0	688		24	375	1	0	394	
05-Aug	3	367		0	688		11	386	1	0	394	
06-Aug	1	368		0	688		15	401	1	0	394	
07-Aug	9	377	1	0	688		11	412	1	0	394	
08-Aug	6	383		1	689		25	437	1	0	394	
09-Aug	0	383		0	689		52	489	1	0	394	
10-Aug	0	383		0	689		0	489		3	397	
11-Aug	5	388		0	689		0	489		4	401	
12-Aug	1	389		0	689		1	490		8	409	1
13-Aug	4	393		0	689		0	490		0	409	
14-Aug	0	393		0	689		0	490		0	409	
15-Aug	6	399		0	689		0	490		0	409	
16-Aug	0	399		0	689		0	490		0	409	
17-Aug	0	399		0	689		0	490		0	409	
18-Aug	0	399		0	689		0	490		0	409	

Date	Rainfall for the year 2014 (mm)			Rainfall for the year 2015 (mm)			Rainfall for the year 2016 (mm)			Rainfall for the year 2017 (mm)		
19-Aug	0	399		0	689		0	490		0	409	
20-Aug	0	399		0	689		0	490		29	438	1
21-Aug	0	399		0	689		0	490		10	448	1
22-Aug	0	399		0	689		0	490		0	448	
23-Aug	0	399		0	689		0	490		0	448	
24-Aug	10	409	1	0	689		6	496		0	448	
25-Aug	4	413		0	689		16	512	1	26	474	1
26-Aug	0	413		0	689		0	512		0	474	
27-Aug	0	413		0	689		0	512		12	486	1
28-Aug	18	431	1	0	689		3	515		22	508	1
29-Aug	6	437		0	689		0	515		43	551	1
30-Aug	48	485	1	0	689		1	516		4	555	
31-Aug	0	485		0	689		0	516		2	557	
01-Sep	4	489		0	689		0	516		0	557	
02-Sep	0	489		0	689		0	516		0	557	
03-Sep	52	541	1	0	689		0	516		0	557	
04-Sep	51	592	1	0	689		0	516		0	557	
05-Sep	0	592		0	689		3	519		0	557	
06-Sep	0	592		0	689		7	526		0	557	
07-Sep	0	592		0	689		2	528		0	557	
08-Sep	0	592		0	689		0	528		0	557	
09-Sep	0	592		0	689		0	528		0	557	
10-Sep	6	598		0	689		0	528		0	557	
11-Sep	13	611	1	0	689		0	528		0	557	
12-Sep	1	612		22	711	1	0	528		0	557	
13-Sep	8	620		0	711		0	528		0	557	
14-Sep	0	620		0	711		0	528		0	557	
15-Sep	0	620		0	711		38	566	1	0	557	
16-Sep	0	620		0	711		30	596	1	0	557	
17-Sep	0	620		0	711		74	670	1	56	613	1
18-Sep	0	620		76	787	1	85	755	1	16	629	1
19-Sep	0	620		53	840	1	28	783	1	0	629	
20-Sep	0	620		87	927	1	2	785		0	629	
21-Sep	0	620		123	1050	1	0	785		0	629	
22-Sep	0	620		0	1050		1	786		0	629	
23-Sep	0	620		0	1050		0	786		0	629	
24-Sep	0	620		0	1050		0	786		0	629	



Date	Rainfall for the year 2014 (mm)			Rainfall for the year 2015 (mm)			Rainfall for the year 2016 (mm)			Rainfall for the year 2017 (mm)		
	25-Sep	0	620		0	1050		0	786		0	629
26-Sep	0	620		0	1050		0	786		0	629	
27-Sep	0	620		0	1050		0	786		0	629	
28-Sep	0	620		0	1050		0	786		0	629	
29-Sep	0	620		0	1050		0	786		0	629	
30-Sep	0	620		0	1050		0	786		0	629	
01-Oct	0	620		0	1050		0	786		0	629	
02-Oct	0	620		0	1050		13	799	1	0	629	
03-Oct	0	620		0	1050		24	823	1	0	629	
04-Oct	0	620		0	1050		14	837	1	0	629	
05-Oct	0	620		0	1050		1	838		0	629	
06-Oct	0	620		0	1050		5	843		0	629	
07-Oct	0	620		0	1050		11	854	1	0	629	
08-Oct	4	624		0	1050		0	854		0	629	
09-Oct	0	624		0	1050		0	854		0	629	
10-Oct	0	624		0	1050		0	854		0	629	
11-Oct	0	624		0	1050		0	854		84	713	1
12-Oct	0	624		0	1050		0	854		9	722	
13-Oct	0	624		0	1050		0	854		0	722	
14-Oct	0	624		0	1050		0	854		0	722	
15-Oct	0	624		0	1050		0	854		0	722	
16-Oct	0	624		0	1050		0	854		0	722	
17-Oct	0	624		0	1050		0	854		0	722	
18-Oct	0	624		0	1050		0	854		0	722	
19-Oct	0	624		0	1050		0	854		0	722	
20-Oct	0	624		0	1050		0	854		0	722	
21-Oct	0	624		0	1050		0	854		0	722	
22-Oct	0	624		0	1050		0	854		0	722	
23-Oct	0	624		0	1050		0	854		0	722	
24-Oct	0	624		0	1050		0	854		0	722	
25-Oct	0	624		0	1050		0	854		0	722	
26-Oct	0	624		0	1050		0	854		0	722	
27-Oct	0	624		0	1050		0	854		0	722	
28-Oct	0	624		0	1050		0	854		0	722	
29-Oct	0	624		0	1050		0	854		0	722	
30-Oct	0	624		0	1050		0	854		0	722	
31-Oct	0	624		0	1050		0	854		0	722	

Date	Rainfall for the year 2014 (mm)			Rainfall for the year 2015 (mm)			Rainfall for the year 2016 (mm)			Rainfall for the year 2017 (mm)		
01-Nov	0	624		0	1050		0	854		0	722	
02-Nov	0	624		0	1050		0	854		0	722	
03-Nov	0	624		0	1050		0	854		0	722	
04-Nov	0	624		0	1050		0	854		0	722	
05-Nov	0	624		0	1050		0	854		0	722	
06-Nov	0	624		0	1050		0	854		0	722	
07-Nov	0	624		0	1050		0	854		0	722	
08-Nov	0	624		0	1050		0	854		0	722	
09-Nov	0	624		0	1050		0	854		0	722	
10-Nov	0	624		0	1050		0	854		0	722	
11-Nov	0	624		0	1050		0	854		0	722	
12-Nov	0	624		0	1050		0	854		0	722	
13-Nov	0	624		0	1050		0	854		0	722	
14-Nov	0	624		0	1050		0	854		0	722	
15-Nov	0	624		0	1050		0	854		0	722	
16-Nov	0	624		0	1050		0	854		0	722	
17-Nov	0	624		0	1050		0	854		0	722	
18-Nov	0	624		0	1050		0	854		0	722	
19-Nov	0	624		0	1050		0	854		0	722	
20-Nov	0	624		0	1050		0	854		0	722	
21-Nov	0	624		0	1050		0	854		0	722	
22-Nov	0	624		0	1050		0	854		0	722	
23-Nov	0	624		0	1050		0	854		0	722	
24-Nov	0	624		0	1050		0	854		0	722	
25-Nov	0	624		0	1050		0	854		0	722	
26-Nov	0	624		0	1050		0	854		0	722	
27-Nov	0	624		0	1050		0	854		0	722	
28-Nov	0	624		0	1050		0	854		0	722	
29-Nov	0	624		0	1050		0	854		0	722	
30-Nov	0	624		0	1050		0	854		0	722	
01-Dec	0	624		0	1050		0	854		0	722	
02-Dec	0	624		0	1050		0	854		0	722	
03-Dec	0	624		0	1050		0	854		0	722	
04-Dec	0	624		0	1050		0	854		15	737	1
05-Dec	0	624		0	1050		0	854		1	738	
06-Dec	0	624		0	1050		0	854		0	738	
07-Dec	0	624		0	1050		0	854		0	738	

Date	Rainfall for the year 2014 (mm)			Rainfall for the year 2015 (mm)			Rainfall for the year 2016 (mm)			Rainfall for the year 2017 (mm)		
	08-Dec	0	624		0	1050		0	854		0	738
09-Dec	0	624		0	1050		0	854		0	738	
Total	69		20	270		17	149		24	84		22

Table 6.2.2 Average one-day rainfall calculation


	Year 2014	Unit	Year 2015	Unit	Year 2016	Unit	Year 2017	Unit
Annual Rainfall	624	mm	1050	mm	854	mm	738	mm
	31.2	mm	61.76	mm	35.58	mm	33.55	mm
One Day Average Rainfall	3.12	cm	6.18	cm	3.56	cm	3.35	cm
Average one-day rainfall	4.05 cm by arithmetic mean method							
	0.04 m							

Table 6.2.3 Daily runoff calculation for the Marwadi University campus

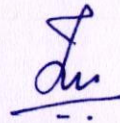
Type of surface	Average one-day rainfall (m)	The surface area of the Marwadi campus (sqm)	Runoff coefficient	Runoff (Cum)	Remarks
Non green /Impervious surface	0.04	54283.82	0.9	1954.22	Hydrology and Water Resources Engineering By S K Garg, pp No 173 to 174, 70% area impervious (Paved)
Green surface	0.04	32623.18	0.65	848.20	
Total				2802.42	Cum

Marwadi Universal Education Private Limited

ANALYSIS REPORT : RAIN WATER				
Test Report No / Ref.No. :- TA-440				
Name of Customer		Marwadi University		
Address of Customer		Rajkot - Morbi Highway, Gauridad.		
Environmental Condition		Satisfactory		
Date of Sample Collection		22-07-2021		
Nature of Sample		Colour : Colour Less		
Sample Collected By		Mr. Jyupil Joshi		
Date of analysis starts		23-07-2021		
Analysis conclude on		24-07-2021		
Sr. No.	Parameters	Units	Test Method	Rain Water
1	pH	mg/l	APHA 23rd Ed.,2017, 4500-H+B	5.9
2	TDS	mg/l	APHA 23RD Ed. 2540 C (Pg. No.2-69)	95
3	Chlorides	mg/l	APHA 23RD Ed. 4500-Cl- B (Pg. No.4-75)	34
4	Total Hardness	mg/l	APHA 23rd Ed. Method 2510-B	31
*NOTE 1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified. 3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing. 4. This office is not responsible for the authenticity for the samples not collected by our officials. 5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only. 6. Permissible Limits: as per Schedule VI of EPA Rules-1986 *ND : Not Detected, BDL : Below Detection Limit				


Testing Incharge




Quality Manager

Marwadi Universal Education Private Limited

ANALYSIS REPORT : RAIN WATER

Test Report No / Ref.No. :- TA-440

Name of Customer Marwadi University

Address of Customer Rajkot - Morbi Highway, Gauridad.

Environmental Condition Satisfactory

Date of Sample Collection 25-08-2021

Nature of Sample Colour : Colour Less

Sample Collected By Mr. Jyupil Joshi

Date of analysis starts 26-08-2021

Analysis conclude on 27-08-2021

Sr. No.	Parameters	Units	Test Method	Rain Water
1	pH	mg/l	APHA 23rd Ed.,2017, 4500-H+B	5.3
2	TDS	mg/l	APHA 23RD Ed. 2540 C (Pg. No.2-69)	102
3	Chlorides	mg/l	APHA 23RD Ed. 4500-CI- B (Pg. No.4-75)	38
4	Total Hardness	mg/l	APHA 23rd Ed. Method 2510-B	34

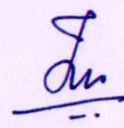
*NOTE

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4. This office is not responsible for the authenticity for the samples not collected by our officials.
5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.
6. Permissible Limits: as per Schedule VI of EPA Rules-1986

*ND : Not Detected, BDL : Below Detection Limit



Testing Incharge



Quality Manager

Marwadi Universal Education Private Limited

ANALYSIS REPORT : RAIN WATER

Test Report No / Ref.No. :- TA-440


Name of Customer	Marwadi University
Address of Customer	Rajkot - Morbi Highway, Gauridad.
Environmental Condition	Satisfactory
Date of Sample Collection	14-09-2021
Nature of Sample	Colour : Colour Less
Sample Collected By	Mr. Jyupil Joshi
Date of analysis starts	15-09-2021
Analysis conclude on	16-09-2021

Sr. No.	Parameters	Units	Test Method	Rain Water
1	pH	mg/l	APHA 23rd Ed.,2017, 4500-H+B	5.1
2	TDS	mg/l	APHA 23RD Ed. 2540 C (Pg. No.2-69)	98
3	Chlorides	mg/l	APHA 23RD Ed. 4500-Cl- B (Pg. No.4-75)	35
4	Total Hardness	mg/l	APHA 23rd Ed. Method 2510-B	36

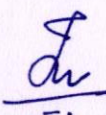
***NOTE**

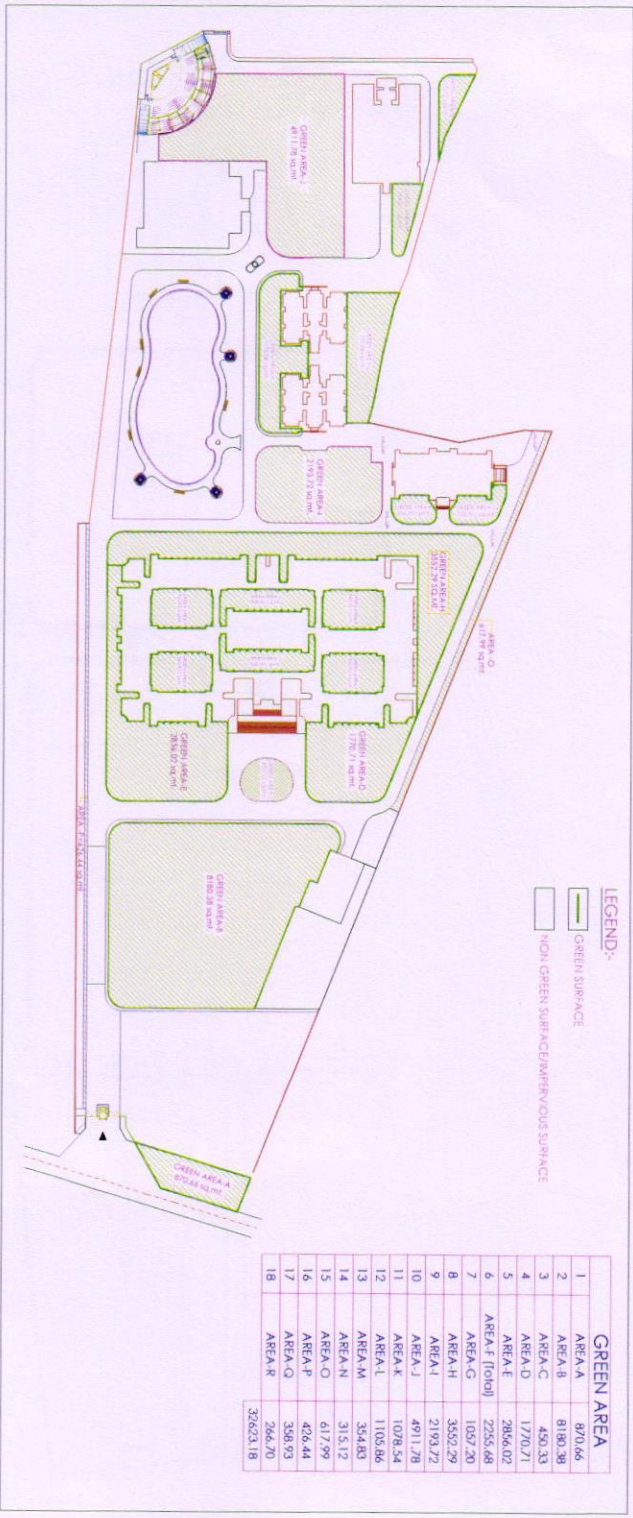
1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.
2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.
3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.
4. This office is not responsible for the authenticity for the samples not collected by our officials.
5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.
6. Permissible Limits: as per Schedule VI of EPA Rules-1986

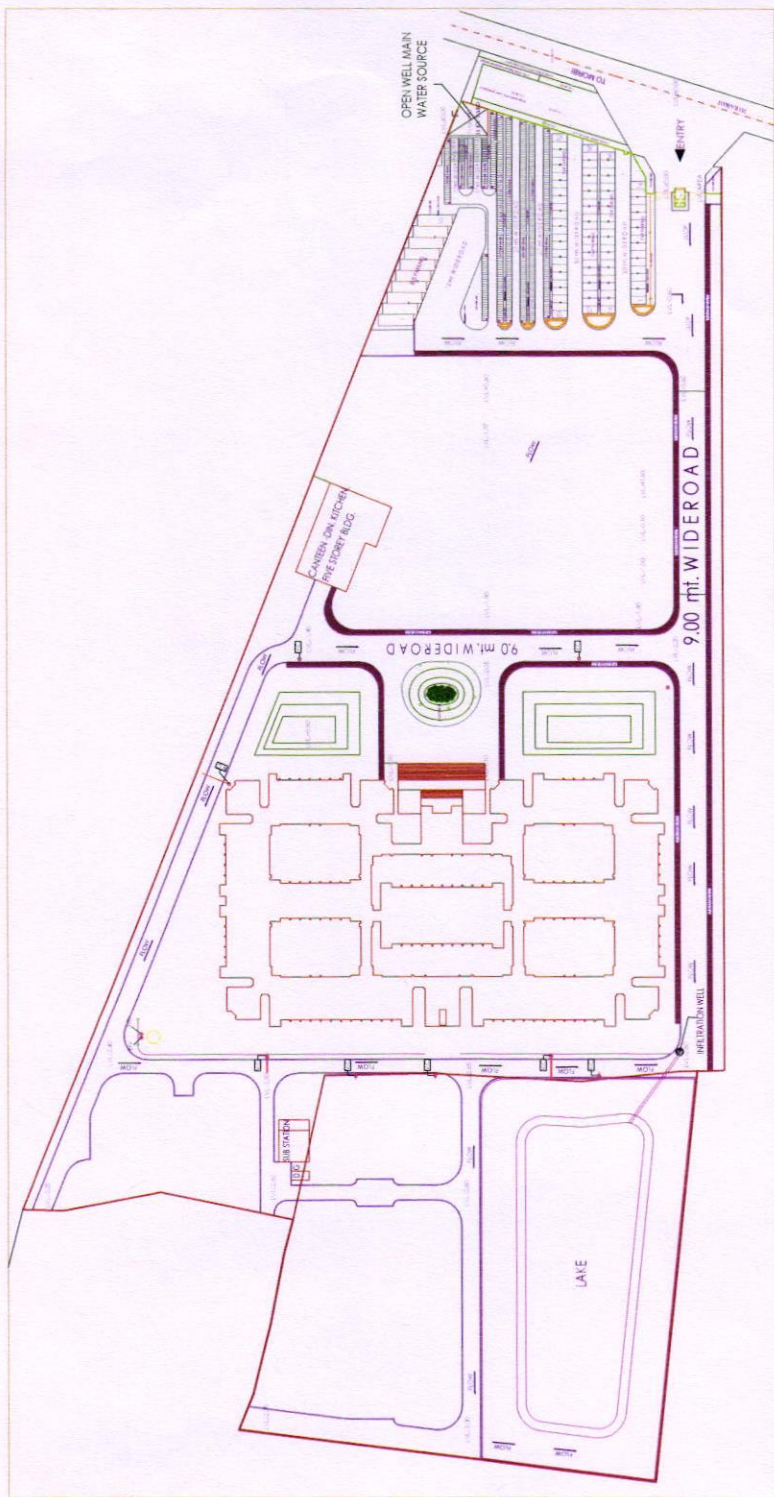
*ND : Not Detected, BDL : Below Detection Limit


Testing Incharge



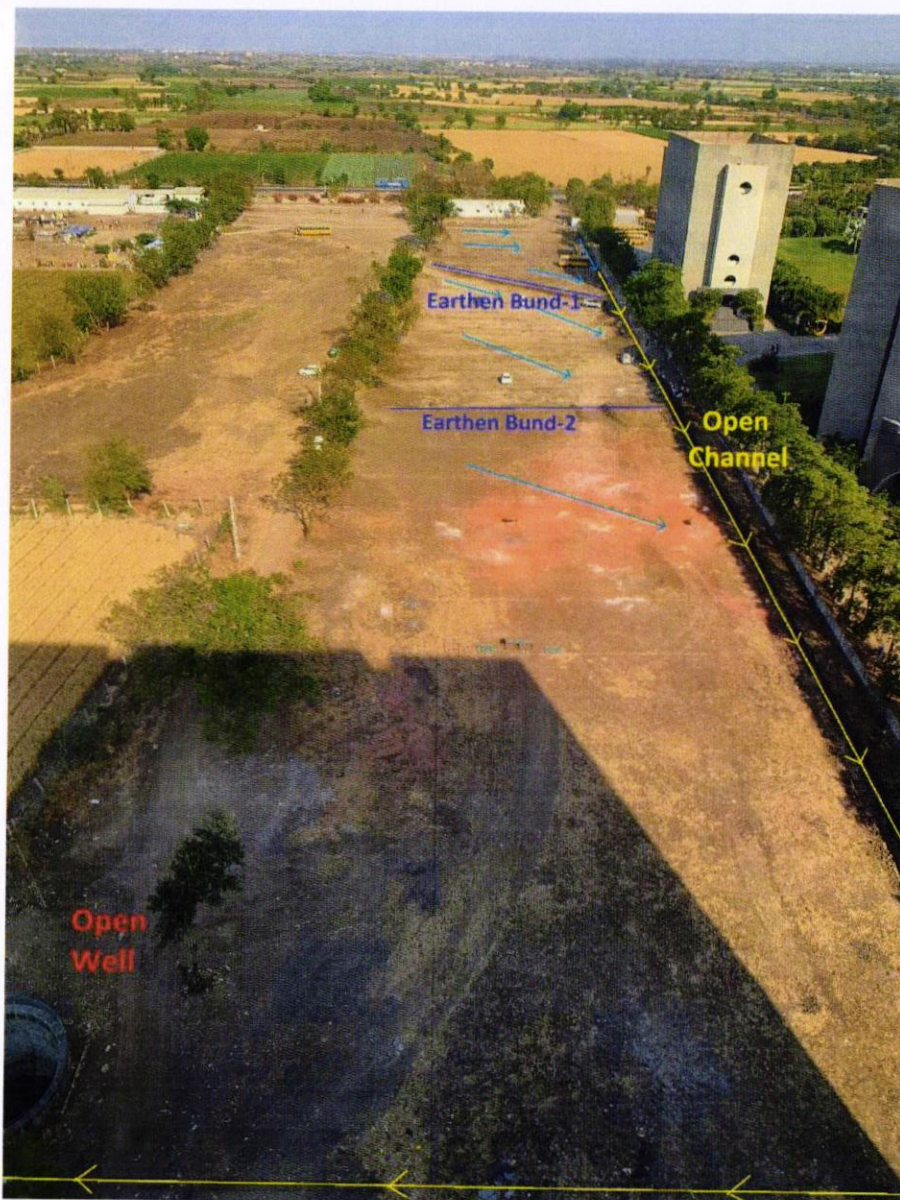

Quality Manager





Rainwater Harvesting through Earthen Bunds and Open Channel

To channelized the water in the area of the campus, earthen bunds are created as shown in picture. There is open well in North-West corner of the wadi and natural slope of the ground distributed in two different directions. Two Earthen bunds are created to channelize the rainwater and divert them towards the open channel shown in the picture. This open channel leads to the open well for the recharging.



200 m³ Sewage Treatment Plant on Campus

The treatment facility available in the Marwadi University, Rajkot consists of Fluidized Media reactor (FMR) where a floating media of various shapes and sizes are used. The main objective of adding the media is to assign bigger surface area for bacteria to grow therefore maximum possible bacterial population in a limited volume can be ascertained. The FMR media material allows biomass concentration of 20-40 Kgs/m³ material. The FMR consists of combination of biomass in attached as well as suspended form. High concentration of biomass enables reduction of aeration tank and in turn reduction in overall cost. Volume of the media shall vary from 6-25% based on the concentration of organic matter.

The wastewater generated from the University is having high turbidity so in order to clean the turbid water the FMR is installed which has not only controlled the turbidity but has also reduced the other parameters like Biochemical Oxygen Demand & Chemical Oxygen Demand.

The grey water is recycled to be used for the green plantation in the campus area. The figure 1-6 shows the installed Fluidized bed reactor in the Marwadi University

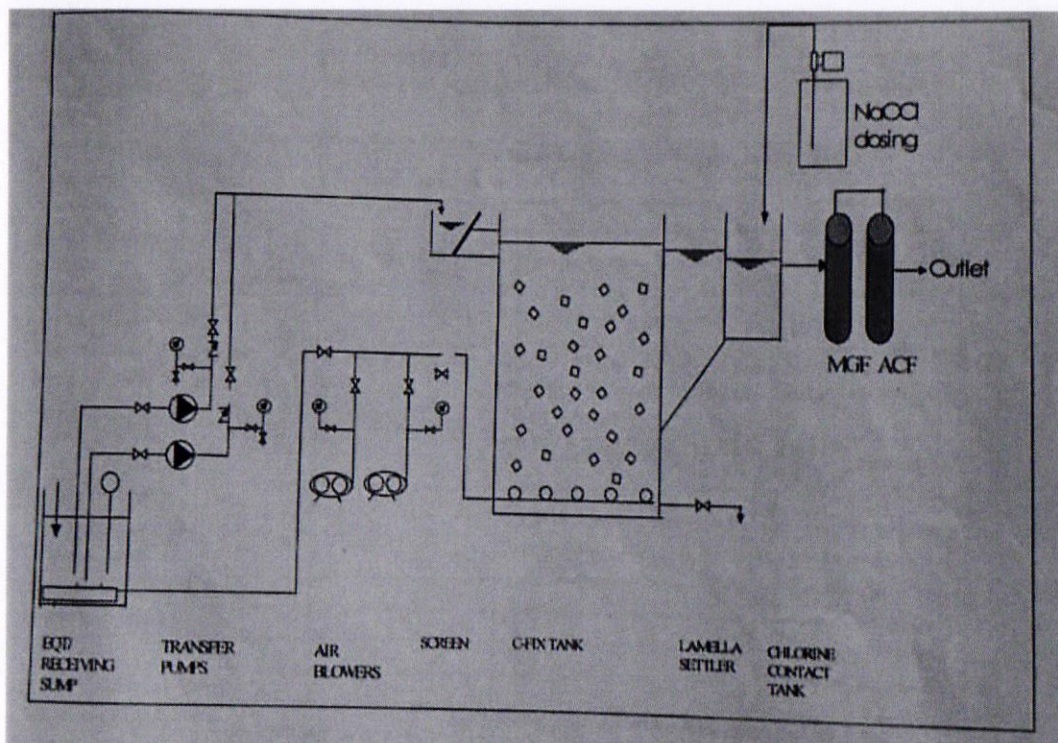


Fig. 1: The schematic diagram of the plant

nyadef
 Registrar
 Marwadi University



ANALYSIS REPORT : STP WATER OUTLET

Test Report No / Ref.No. :- TA-440

Date: 14-05-2022

Name of Customer	Marwadi University
Address of Customer	Rajkot - Morbi Highway, Gauridad.
Date of Sample Collection	5/7/2022
Sample Collected By	Mr. Kalpesh Parmar
Sample Tested By	Mr. Raj Chapala, Mr. Avon Dobariya & Mr. Jitesh Joshi
Date of analysis starts	5/8/2022
Analysis conclude on	5/13/2022

Sr. No.	Parameters	Units	Test Method	Acceptable Limit	9:00 AM	1:00 PM	3:30 PM	7:00 PM
1	pH	-	APHA 23rd Ed.,2017,4500-H+B	6.5-8.5 ^a	6.39	6.69	6.74	6.44
2	BOD	mg/L	APHA 23rd Ed. Method 2540-C	30 ^b	146	142	132	134
3	COD	mg/L	APHA 23rd Edition 2130B	100 ^b	258	252	244	248
4	TSS	mg/L	APHA 23RD Edition 2540 D	5 ^b	939.8	323	142.6	300.6
5	Turbidity	FNU	APHA 23rd Edition 2130-B		418	16.6	22	24.1
6	Oil and Grease	mg/L	APHA 23RD Edition 5520 G	10 ^b	191	200.33	116.66	230
7	Ammonical Nitrogen	mg/L	APHA 23RD Edition 4500-NH3 C	5 ^a	26.21	28.67	22.74	21.73

***NOTE**

1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.,BDL= Below Detection Limit, MDL = Minimum Detection
2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.
3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.
4. This office is not responsible for the authenticity for the samples not collected by our officials.
5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.
6. Permissible Limits: as per Schedule VI of EPA Rules-1986

*ND : Not Detected, BDL : Below Detection Limit, -- : Not Applicable

Testing Incharge

Team Leader



MARWADI EDUCATION FOUNDATIONRajkot - Morbi Highway, Near Gauridad,
Tal. Dist : Rajkot - 360003, Gujarat, India

GST No.:24AACTM2114K1ZV

**WORK ORDER**

TECHNOGAS SYSTEMS PVT LTD		Po No.	41000571
B-17 Maruti Industrial Estate, Bombay Conductor road Phase -1 GIDC Vavta		WO Date	10-04-2021
Ahmedabad-382445 Tel : -, Cell : 99090 18271 E-Mail: naimish.mehta@technogassystems.com GST No.:24AACCT0944K1ZD		Reference No. (PR)	2958
		PreApproval No.	2447
		Department	CIVIL-CONSTRUCTION
		Location	
		WO Ref.No.	17530

Subject : Purchase Order of supply / Service for STP INSTALLATION AND COMMISSIONING WORK AGAINST PR NO.2958

With reference to your offer referred to above, in response to our enquiry, We are pleased to place the purchase order for supplying us the following materials as per the specifications, delivery schedules, payment terms and conditions mentioned in our enquiry form and agreed upon in your offer letter.

Sr. No.	Item Code	HSN Code	Item Description	Qty	UOM	Unit Price INR	Disc (%)	Taxable Amt. INR	CGST (%)	CGST Amt.	SGST (%)	SGST Amt.	Amount (INR)
1	CI03899	9987	Check and service all electro mechanical equipment e.g. pumps, air blowers, etc. Replace bearings and mechanical seals of all pumps and air blowers where applicable. Parts required, if any will be charged extra at actual, Only labour charge	1	AU	15000.00	8.00	13800.00	9.00	1242.00	9.00	1242.00	16284.00
2	CI03900	9987	Providing and fixing Replace all instruments e.g. pressure gauge, temperature gauge, pressure switches etc.	1	SET	24000.00	8.00	22080.00	9.00	1987.20	9.00	1987.20	26054.40
3	CI03901	9987	Check and repair existing control panel wiring and make it operational including all material and labor	1	AU	35000.00	8.00	32200.00	9.00	2898.00	9.00	2898.00	37996.00
4	CI03902	9987	Service all valves, replace gaskets, all pipeline connection and make it leak proof and operational, Relay cables properly above cable trays, wherever required and possible	1	AU	12000.00	8.00	11040.00	9.00	993.60	9.00	993.60	13027.20
5	CI03903	9987	Check and fix aeration diffusers inside tank and also equalization tank, Only labour charge, Parts required, if any will be charged extra at actual.	1	AU	5500.00	8.00	5060.00	9.00	455.40	9.00	455.40	5970.80



With reference to your offer referred to above, in response to our enquiry, We are pleased to place the purchase order for supplying us the following materials as per the specifications, delivery schedules, payment terms and conditions mentioned in our enquiry form and agreed upon in your offer letter.

Sr. No.	Item Code	HSN Code	Item Description	Qty	UOM	Unit Price INR	Disc (%)	Taxable Amt. INR	CGST (%)	CGST Amt.	SGST (%)	SGST Amt.	Amount (INR)
6	CI03905	9987	Commissioning and testing of STP system to run at max capacity for max. up to 30 Days . provide technical consultancy for obtaining maximum efficiency of plant. Supervision at site in General shift for assisting commissioning activities. Overall responsibility to achieve desired results as per GPCB . Including maintain record of chemicals During the commissioning ,Including maintain log book of STP operation during commissioning.	1	AU	90000.00	8.00	82800.00	9.00	7452.00	9.00	7452.00	97704.00
Total Basic Value												181500.00	
Total Discount												14520.00	
Total CGST												15028.20	
Total SGST												15028.20	
Total GST Amount												30056.40	
Rupees One Lakh Ninety Seven Thousand Thirty Six and Paise Forty Only												Total Order Value	197036.40

Terms & Conditions :

Incoterms :

Payment Terms : As per Purchase Order Terms & Conditions

- Prices Basis: At MEFGI Site
- Payment: 25% advance & 75% after receipt of materials / invoice / work completion, site engineer conformation whichever would be later: Payment will be made by RTGS/NEFT or A/C Payee's Cheque only.
- Taxes as applicable to contract works at the prevailing rate in the state of Gujarat will be deducted from the payment.
- Work completion within 2-3 month after receipt of work order.
- This Work order is including materials and labour cost.
- Qty variation +/- 5% acceptable.
- Only finished work should be measured and paid at actual basis.
- Transportation charges included in Total Order Value
- Forwarding, Loading & Unloading charges from Supplier office/ware house to site are of included in Total Order Value.
- If work would not be completed within the timeline, per week 1.5% compensation of total Order value would be deducted.
- Defect liability period will be 18 month of entire work (Materials and Labour) from the date of final bill certification . In defect liability period you will immediately attend and rectify the defect within 7 days from the date of notice of defect, without any additional cost.
- All relevant I.S. / B.I.S /amendments/guidelines shall be scrupulously followed for carrying out the work.
- The Service provider shall make good any defect or damage to any part of the work carried out which may be noticed within Defects Notification period after handing over of the scheme by the Service provider.
- The Service provider has to take the Workmen Compensation Policy for the work entrusted to him and a copy of the same shall be presented to Employer within a week after signing the agreement
- The rates shall remain firm and fixed till the whole of the assigned job is completed in all respects and no escalation whatsoever is admissible in this regard.
- You shall abide by all rules and regulations of all acts of Government/Local body/statutory authorities pertinent to the execution of this contract.
- The payable rates shall hold good for execution of works at all heights, depths, lifts, leads, shapes and sizes unless otherwise specifically mentioned in the description of item in the work order.
- You shall be responsible for proper coordination with other agencies operating at the site of work so that work may be carried out concurrently, if necessary, without any hindrance. The Engineer-in-charge shall resolve disputes, if any, in this regard, and his decision shall be final and binding.
- You shall be solely responsible for damages to works of other agencies if any, committed by you and you shall make good the losses incurred/claimed by other agencies
- Drains, pipes, cables, overhead wires and similar services encountered in the course of execution of works shall be guarded from being damaged by you at your own cost. Should you damage any mains, pipes, cables or lines (whether above or below ground etc), whether or not shown on the drawings, you shall make good or bear the cost of making good the same without delay to the full satisfaction of the Engineer-in-charge
- It shall be solely your responsibility to provide, operate and maintain all necessary construction / Fabrication / erection equipments, scaffoldings and safety gadgets, cranes and other lifting tackles, tools and appliances to perform the work in a workmanlike and efficient manner and complete all the assigned jobs as per time schedule. In case any of these equipments are Provided by EMPLOYER, to enable smooth working, this shall not absolve you of your responsibility to operate and maintain them in top condition
- You shall take every care for cleaning the working site from time to time for easy access to work site and also from safety point of view. House keeping shall be your primary responsibility and shall not occur by default.
- EMPLOYER., reserves the right to cancel this 'Work Order' at any time for any reason whatsoever and in such an event, you shall not be entitled to any compensation on any account whatsoever.
- You shall adhere to safe construction practices and guard against hazardous and unsafe working conditions to the full satisfaction of the Engineer-in-charge
- You shall be solely responsible for the safety of your employees, workmen and liability of their total security and safety wholly rests with you. EMPLOYER shall in any event be not responsible for the same. You shall also be solely responsible for all other damage to any property arising out of and incidental to your negligent or defective workmanship
- In the event of any accident causing injury resulting into partial or total disability or even causing death, you shall be totally responsible and shall absolve EMPLOYER from all damages or expenses related to it.
- In case of indiscipline, misbehavior with consultant, client or any EMPLOYER's representative by any of your employees, the same shall result in immediate discharging of the concerned employee from the site of works. We shall not be responsible for any cost or damages in that eventuality.
- Serviceable materials left surplus with you after completion of the work, other than waste and cut pieces, which will not be taken back being unserviceable, shall be returned by you to our Project Stores in sound condition at your cost. To ascertain whether an item to be returned is 'serviceable' or 'unserviceable', the decision of the Project Manager shall be final and binding on you.



Flushing water demand fulfilled by treated water

Total Capacity of Treated Water tank = 200 cum

Total Capacity of Treated Water tank = 200,000 Litre/day

Daily Usage

Per Capita Usage of Flush Water in Hostel = 35 Litre/day

No. of Users = 2000

Per Capita Usage of Flush Water in Main Building = 15 Litre/day

No. of Users = 5000

Total Usage = 1,45,000 Litre/day

Hence, the demand of flush water is fulfilled by treated water from STP.

Remaining treated water is used for gardening purpose.



GPS Map Camera



Rajkot, GJ, India

Rajkot, Rajkot, 360003, GJ, India

Lat 22.367409, Long 70.794315

02/22/2023 02:39 PM GMT+05:30

Note : Captured by GPS Map Camera



Rajkot, GJ, India

Rajkot, Rajkot, 360003, GJ, India

Lat 22.367511, Long 70.794269

02/22/2023 02:40 PM GMT+05:30

Note : Captured by GPS Map Camera

GPS Map Camera



GREEN AUDIT REPORT

2017-2018

Marwadi University

Rajkot-Morbi Road, Rajkot – 360003
Gujarat, India

Submitted By

Green Audit Team

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ACKNOWLEDGEMENT



Green Audit Assessment Team thanks to the Dean, Marwadi University, Rajkot for assigning the task of Green Audit of the university campus to us. We appreciate the cooperation that we got from all the faculties and students during the entire process. Our special thanks to Prof. (Dr.) Yogesh Kosta, Provost and Shri Naresh Jadeja, Registrar of the university for their warm support and encouragement from the very beginning till the end of the process.

The entire team is very grateful to the management of Marwadi University for their continuous support and motivation to take various innovative and challenging assignments.

Dr. Tarak Vora
Team Leader
Green Audit Team
Marwadi University. Rajkot

DISCLAIMER

Green Audit Team Has prepare this report on the basis of primary data collected from the different areas of the university. All reasonable care has been taken in its preparation: details contained in this report have been compiled in good faith based on information gathered.

Date: 25/03/2018

Prepared by:
Green Audit Team

1. BRIEF ABOUT MARWADI UNIVERSITY

In 2007-08 the availability of world class academic facilities in the Saurashtra region were sparse; which encouraged Marwadi Group, Rajkot to launch Marwadi Education Foundation's Group of Institutes, offering Technical and Professional UG & PG courses and programs such as B.E, MBA and MCA. Marwadi Education Foundation's Group of Institutions (MEFGI) was incepted as a major organ of Marwadi Education Foundation's Group of Institutions in 2008, under the Bombay Public Trust Act 1950. Marwadi Education Foundation's Group of Institutions is a body promoted by Marwadi Shares & Finance Limited; a major stock broking company in India & Chandarana Intermediaries Brokers Pvt. Ltd. Since its inception Marwadi Education Foundation's Group of Institutions were affiliated with Gujarat Technological University.

Commitment to provide best and industry relevant education received an overwhelming trust from the society and in order to blend Engineering with Science and support them through Management and Law disciplines and have multi disciplinary course offerings in Science, Commerce, Arts, Health and Management, Marwadi Education Foundation proposed to establish "Marwadi University" in the Year 2016. Marwadi University bill was introduced and passed in Gujarat Assembly and Marwadi University was established under Gujarat Private Universities act no. 9 of 2016 on 9th May, 2016.

2. VISION & MISSION OF MARWADI UNIVERSITY

2.1 VISION OF THE UNIVERSITY

Our vision is to address challenges facing our society and planet through sterile education that builds capacity of our students and empower them through their innovative thinking practice and character building that will ultimately manifest to boost creativity and responsibility utilizing the limited natural resources to meet with the challenges of the 21st century

2.2 MISSION OF THE UNIVERSITY

- ✓ To produce creative, responsible and informed professionals.
- ✓ To produce individuals who are digital-age literates, inventive thinkers, effective communicators and highly productive.
- ✓ To deliver cost-effective quality education.
- ✓ To offer world-class, cross-disciplinary education in strategic sectors of economy through well devised and synchronized delivery structure and system, designed to tickle the creative intelligence and enhance the productivity of individuals.
- ✓ To provide a conducive environment that enables and promotes individuals to creatively interact, coordinate, disseminate and examine change, opinion as well as concept that will enable students to experience higher level of learning acquired through ceaseless effort that lead to the development of character, confidence, values and technical skills.

3. GREEN AUDIT

Modernization and industrialization are the two important outputs of the twentieth century that have made human life more luxurious and comfortable. They are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources, and finally making our mother Earth ugly and inhospitable. The time has come to wake up, unite and combat together for a sustainable environment.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, universities, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly university.

3.1 GOALS OF GREEN AUDIT

- The objective of carrying out Green Audit is securing the environment and cut down the threats posed to human health.
- To make sure that rules and regulations are taken care of to save environment.
- To avoid the interruptions in environment that are more difficult to handle and whose correction requires higher cost.
- The long-term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issues.

3.2 BENEFITS OF GREEN AUDIT

- It would help to protect the environment in and around the campus.
- Recognize the cost saving methods through waste minimization and management.
- Point out the prevailing and fourth coming impacts on environment.
- Recognize the cost-saving methods through waste minimizing and managing.
- Empower the organizations to frame a better environmental performance.
- Developing an environmental ethic and value systems in youngsters.
- It portrays a good image of an institution which helps building better relationships with the group of interested parties.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the University.

4. ENVIRONMENTAL POLICY OF THE UNIVERSITY

Marwadi University, Rajkot always believes in maintaining its own standard in matter of environment and quality consciousness. It has taken number of initiatives to protect its own environment with a pollution free campus.

To create a green cover, Eco-friendly atmosphere, pure oxygen at the university campus, a plantation program is organized every year with active participation from the university community and visitors. Green Audit Team owns responsibility to preserve the work carried out on the campus related to the environment.

This also helps in ensuring that the Environmental Policy is enacted, enforced, and reviewed using various environmental awareness programs.

ENVIRONMENTAL POLICY

Both the teaching and Non-teaching staff of Marwadi University Rajkot are committed for carrying out its activity for sustainable development. This we will achieve through the following :-

- i. To educate students and staff on how to appropriately utilize water effectively.
- ii. To put the campus' "Rain Water Harvesting" to use.
- iii. To make the most of the solar energy generated by the solar panels on the roofs of educational buildings.
- iv. To use ICT as much as possible while using paper as little as possible. It will contribute to the "Paperless Office" initiative.
- v. Using vermin-compost on the campus to turn solid waste into fertiliser.
- vi. To lessen the campus' noise pollution.
- vii. To protect and nurture the Flora and Fauna on the campus
- viii. To maintain green campus.
- ix. To use treated waste water for flushing and gardening purpose.
- x. To use recycle the waste material and make them usable.

5. CONSTITUTION FOR GREEN AUDIT

The Green Audit is carried out as per the environmental policy of the Green audit checklist. The aim of the audit is to check the existing practices and provide advice for the development of environmental policy and practice in the areas of:

- ✓ Waste management
- ✓ Management water conservation and management
- ✓ Tree plantations
- ✓ Bio-diversity and threatened/ endangered species
- ✓ Preservations Energy use and conservations
- ✓ Eco-friendly campus
- ✓ Green environment and clean campus

MEMBERS OF GREEN AUDIT TEAMS

Sr. No.	Name of Auditor	Designation
1	Dr. Tarak Vora	Team Leader
2	Dr. Abhishek Gupta	Member
3	Dr. Archana Sharma	Member
4	Dr. Nitinkumar Singh	Member
5	Dr. Hirendrasinh Padhiyar	Member
6	Mrs. Bhavna Thummar	Member
7	Mr. Raj Chapala	Member
8	Mr. Jyupil Joshi	Member
9	Mr. Devesh Poorey	Member
10	Mr. Kalpesh Chandarana	Member

6. OBJECTIVES OF THE STUDY

The green audit's primary goal is to support environmental management and conservation on college campuses. According to the relevant laws, rules, and standards, the audit's goal is to identify, measure, explain, and prioritise the framework for environmental sustainability. The following are the primary goals of doing a green audit:

- ✓ To secure the environment and cut down the threats posed to human health by analysing 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 status report on environmental compliance

7. METHODOLOGY

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

➤ Water management

- ✓ Raw Water
- ✓ Drinking Water
- ✓ Waste Water
- ✓ Sewage Water
- ✓ Rain Storm Drain Water

➤ Energy Conservation

- ✓ Petrol
- ✓ Diesel
- ✓ LPG
- ✓ Electricity

➤ Waste management

- ✓ Domestic waste management

8. FOCUS AREA OF AUDIT

To match with the objective of the green audit, following areas are kept under the scope of the audit.

1. Water management
2. Air Pollution Management
3. Noise Pollution Management
4. Green belt area & Bio-diversity

8.1 WATER MANAGEMENT

Water is a valuable natural resource for all living organisms. It is freely available depending on the climate and topographic features of a region. Water is a precious natural national resource available with a fixed quantum. The availability of water is decreasing due to the increasing population of the nation; as per capita availability of utilized water is going down.

Even though it is naturally present, drinking water that is portable is not easily available for human consumption. Just 3% of the water on our planet, which covers 70% of its surface, is fresh water. The world's 1.1 billion inhabitants are experiencing a water crisis. Water issue is greatly impacted by water pollution and waste. An alarming amount of water is being contaminated. Water contamination can cause a variety of illnesses or even death. Because of this, it's crucial to make sure that drinking water is sterile, clean, and free of germs and illnesses. Also, it's crucial to manage, protect, and conserve water resources so that they may be used sustainably. The use and quality of water on the university campus are being studied by our institution. Water auditing is done to assess raw water intake facilities and identify facilities for water treatment and reuse. The concerned auditor looks at the appropriate approach that may be used to balance the supply and demand for water.

USES AND MANAGEMENT

SOURCE OF WATER

Sr. No.	Resource	Quantity
1	GWI (Narmada Water)	-----
2	No of Open Well	02
3	No of Bore-well	03
4	Water reserve - Underground Tank	4 Lakhs

WATER USERS IN CAMPUS

Sr. No.	Person in different section	Strength (No. of person – Approx.)
1	Staff	400
2	Hostel Boarders	1360
3	Residential Family Members	54
4	Visitors	2000
5	Construction Labour	175

The visitors of the college vary with respect to different activities conducted in the college campus. During admission and different competitive exam conducted in the college campus. The total number of visitors of the university increases up to 2000 on such day.

WATER CONSUMPTION IN DIFFERENT ACTIVITY IN COLLEGE CAMPUS

Activity	Water used per activity (in Litter)	No. of times Activity performed in a day	Average water used Person/Day	No. of people using water	Total water consumption per Day
Hand and face wash	4-6 L	4	16-24L	1500	3000
Drinking Water	0.2-0.4L	6	1.2-2.4L	1500	2700
Toilet Flush	8-10L	4	32-40L	1500	54000
Bath	30-40 L	1	30-40 L	1500	52500
Cooking & Washing In resident	150-250L	2	300-500L	54	21600
Cooking Hostel	10-15L	4	40-60L	1500	75000
Total					235800

WATER QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : DRINKING WATER								
Test Report No / Ref.No. :- TA-121						Date: 10-3-2018		
Name of Customer		Marwadi University, Rajkot						
Address of Customer		Rajkot - Morbi Highway, Gauridad.						
Environmental Condition		Ambient						
Date of Sample Collection		5/3/2018						
Nature of Sample		Colour: Colour less						
Sample Quantity		100 ml						
Packing Type		Plastic bottle						
Type of Sampling		Grab						
Sample Collected By		Mr. Kalpesh Parmar						
Date of analysis starts		6/3/2018						
Analysis conclude on		10/3/2018						
Sr. No.	Parameters	Units	Test Method	Permissible Limit	Main Building A-Wing	Main Building B-Wing	PG Building	Law Building
1	pH	-	APHA 23rd Ed.,2017,4500-H+B	6.5 - 8.5	7.48	7.38	7.06	7.33
2	TDS	mg/L	APHA 23rd Ed. Method 2540-C	500	85.6	164	76	181
3	Turbidity	FNU	APHA 23rd Edition 2130-B (Page No.2-13)	1	0.49	0.44	0.52	0.83
4	Conductivity	µs/cm	APHA 23 rd Ed. Titration Method 2510-B	200-800	208.6	328	202.4	362
5	Chloride	mg/L	APHA 23rd Ed 4500-Cl- B (Page No.4-75)	250	46	59	41	48
6	Total Hardness	mg/L	APHA 23rd Ed. Method 2510-B	200	68	108	64	152
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied, BDL= Below Detection Limit, MDL = Minimum Detection Limit</p> <p>2. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>3. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>4. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>5. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, - : Not Applicable</p>								

End of Report

Dr. Nitin Kumar Singh
Testing Incharge

Dr. Tarak Vora
Quality Manager

OBSERVATIONS IN REGARD OF WATER USAGES AND CONSERVATION PLAN

1. Treated water is used for flushing through dual plumbing system installed in all the buildings.
2. The garden is watered using sprinklers and drip irrigation system installed throughout the campus.
3. Drinking water quality is being tested regularly as per plan.
4. Rainwater harvesting is done in the lake created in the campus.

8.2 AIR POLLUTION MANAGEMENT

The university has consistently run programmes to raise staff, student, and societal awareness of the need to preserve and conserve the environment. Moreover, programmes and rallies on different environmental and health-related topics are organised in order to raise awareness. Students and professors at the university participate in NSS/NCC-related events, however the audit team was unable to locate any display boards promoting environmental conservation on the campus grounds.

A) MASS TRANSPORTATION FACILITY

As such campus is not generating any air pollution by its own activity except it has its own transportation department. Faculties and students of the university are motivated to use mass transportation system. Faculties are given some advantages for use of the bus facility provided by the university.

AIR QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : AMBIENT AIR					
Name of Customer		Marwadi University			
Address of Customer		Rajkot - Morbi Highway, Gauridad.			
Environmental Condition		Satisfactory			
Date of Sample Collection		28-07-2017			
Nature of Sample		Colour : Colour Less			
Sample Collected By		Jyupil Joshi			
Sample Tested By		Raj Chapala			
Date of analysis starts		28-07-2017			
Analysis conclude on		7/30/2017			
Sr. No.	Parameters	Units	Test Method	Permissible Limit	MAIN BUILDING
1	PM ₁₀	(µg/m ³)	IS 5182 (Part 23) (1999, Reaffirmed 2010)	100	55.65
2	PM _{2.5}	(µg/m ³)	NAAQMS/36/2012-13	60	19.45
3	SO ₂	(µg/m ³)	IS 5182 (Part 2)	80	1.34
4	NO _x	(µg/m ³)	IS 5182 (Part 6)	80	1.87
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.,BDL= Below Detection Limit, MDL = Minimum</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, -- : Not Applicable</p>					

Testing Incharge

Team Leader

8.3 NOISE POLLUTION MANAGEMENT

A) SILENCE ZONES IN THE UNIVERSITY

For awareness of the need to preserve silence at the institution, several display boards have been put up in the library and other locations.

B) NOISE CONTROL IN THE UNIVERSITY

The institution has enacted a no honking policy that forbids the use of any noise on campus, including honking.

On college campuses, noise pollution is maintained to a minimum and designated quiet zones are established in places like the library and classrooms.

NOISE LEVEL ASSESSMENT REPORT

ANALYSIS REPORT : NOISE			
Name of Customer		Marwadi University	
Address of Customer		Rajkot - Morbi Highway, Gauridad.	
Environmental Condition		Satisfactory	
Date of Sample Collection		01-12-2017	
Sr. No.	Location	Permissible limit	Day (dB-A)
1	Main Gate	65	63
2	PG Building		52
3	Hostel Aera		50
4	Main Canteen		54
5	New Canteen		55
<p>*NOTE</p> <ol style="list-style-type: none"> 1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified. 3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing. 4. This office is not responsible for the authenticity for the samples not collected by our officials. 5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only. 6. Permissible Limits: as per Schedule VI of EPA Rules-1986 <p>*ND : Not Detected, BDL : Below Detection Limit</p>			

Testing Incharge

Team Leader

8.4 GREEN BELT AREA & BIO-DIVERSITY

The Green Belt Area is intended to preserve the environment and enhance the visual value of the college grounds. To guarantee that the structures adhere to green standards, the college's green area consists of the campus's vegetation, greenery, and sustainability. Also, by implementing various environmental awareness programmes, this aids in ensuring that the Environmental Policy is adopted, implemented, and evaluated.

OBSERVATIONS

The campus is close to over 40 different types (species) of flora and animals. Via the NSS unit, several tree planting initiatives are held during the months of July and August on college campuses and in the nearby communities. This initiative aids in promoting an eco-friendly atmosphere that gives the institute pure oxygen and raises awareness among the communities. The planting initiative comprises a variety of native decorative and therapeutic plants. The occurrence of similar species planted, such as "NEEM," is noted rather than sustaining biodiversity. Neem, Indian Blackberry Tree, Flame Tree, Mango Tree, Jack Fruit Tree, Teak, and Spanish Cherry Plant are the predominant species in the green belt.

9. EXECUTIVE SUMMARY & RECOMMENDATIONS


The university has created a green environmental policy and is working to promote sustainable growth on the campus. The university has created a team of academics and students that works to preserve biodiversity on the campus and contributes to efforts to reduce pollution in society. The university intends to add environmental management and protection to its curriculum. The university has given faculty and students workshops and trainings on environmental awareness.


RECOMMENDATIONS


1. Composting of bio degradable waste to be scientifically done
2. Water usage reduction techniques to be used
3. Tree plantation shall be done to maintain biodiversity as well as artificial nesting shall be installed.
4. D. G. stack monitoring/Exhaust gas analysis shall be done.
5. The Biodiversity is to be maintained while considering the plantation in future
6. The selection of trees species to be based on environmental conservation and carbon sequestration value


ANNEXURE I : LIST OF TREES & PLANTS SPOTTED IN & AROUND MU

A survey was carried out to find plant diversity in the campus of Marwadi University. The survey was focused on the diversity of plants and trees on the basis of their classification and economic importance.


Species Type	Shrub	
Botanical Name	<i>Rauvolfia tetraphylla</i>	
Synonyms	<i>Rauvolfia canescens</i> L., <i>Rouvolfia tomentosa</i> Jacq., <i>Rauvolfia tetraphylla</i> L.	
Common Name	Bara Chand	
Family	Apocynaceae	
Local Names	• Gujarati : Sarpagandha	


Species Type	Shrub	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	Touch me not	
Common Name	Ail	
Family	Fabaceae - Mimosoideae	
Local Names	Gujarati : Iajawni	

Species Type	Tree	
Botanical Name	<i>Bauhinia variegata</i>	
Synonyms	<i>Bauhinia candida</i> Roxb.	
Common Name	Mountain ebony, Kachnar	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Kachnar	
	• Sanskrit Kancharan (white)	


Species Type	Tree	
Botanical Name	<i>Bixa orellana</i>	
Synonyms	<i>Bixa orellana</i> L.	
Common Name	Sindhuri	
Family	Bixaceae	
Local Names	• Marathi : Shenduri	


Species Type	Tree
--------------	------

Botanical Name	<i>Butea monosperma</i>	
Synonyms	<i>Butea frondosa</i> Koenig ex Roxb., <i>Erythrina monosperma</i> Lam., <i>Butea monosperma</i> L.	
Common Name	Palas	
Family	Fabaceae-Papilionioideae	
Local Names	• Marathi : Palas, khakra	
	• Gujarati : Khaakhro	
	• Hindi : Palash	


Species Type	Tree	
Botanical Name	<i>Eucalyptus globulus</i>	
Synonyms	<i>Eucalyptus gigantea</i> Dehn., <i>Eucalyptus glauca</i> DC., <i>Eucalyptus perfoliata</i> Desf., <i>Eucalyptus pulverulenta</i> Link	
Common Name	Australian gum Tree, Eucalyptus	
Family	Myrtaceae	
Local Names	• Marathi : Nilgiri	
	• Gujarati : Nilgiri	


Species Type	Tree
--------------	------

Botanical Name	<i>Nyctanthes arbo-tristis</i>	
Synonyms	<i>Bruschia macrocarpa</i> Bertol., <i>Nyctanthes arbor-tristis</i> var. <i>dentata</i> Hort.ex Moldenke, <i>Nyctanthes dentata</i> Blume, <i>Nyctanthes tristis</i> Salisb., <i>Parilium arbor-tristis</i> Gaertn., <i>Scabrita triflora</i> L.	
Common Name	Night jasmine, Harshingar	
Family	Nyctanthaceae	
Local Names	• Sanskrit : Parijata	
	• Gujarati : Paarijaat	


Species Type	Tree	
Botanical Name	<i>Peltophorum pterocarpum</i>	
Synonyms	<i>Caesalpinia gleniei</i> Thwaites, <i>Caesalpinia inermis</i> Roxb., <i>Inga pterocarpa</i> DC., <i>Peltophorum ferrugineum</i> (Decne) Benth., <i>Peltophorum inerme</i> (Roxb.) Llanos, <i>Peltophorum roxburghii</i> (G.Don) Degener, <i>Poiciana roxburghii</i> G.Don	
Common Name	Yellow gold mohur	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Gujarati : Taamraparni	


Species Type	Tree
--------------	------


Botanical Name	<i>Cocos nucifera</i>	
Common Name	Coconut palm	
Family	Arecaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Naral • Gujarati :Nariyeli 	


Species Type	Tree	
Botanical Name	<i>Ficus religiosa</i>	
Synonyms	Urostigma religiosum (L.) Gasparri	
Common Name	Bot-Tree, Pipal	
Family	Moraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pimpal 	


Species Type	Tree
--------------	------


Botanical Name	<i>Mangifera indica</i> L.	
Synonyms	<i>Mangifera indica</i> L.	
Common Name	Aam	
Family	Anacardiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Amba 	


Species Type	Tree	
Botanical Name	<i>Murraya Koenigii</i>	
Synonyms	<i>Bergera koenigii</i> L., <i>Chalcas koenigii</i> (L.) Kurz, <i>Murraya foetidissima</i> Teijsm. & Binnend, <i>Murraya koenigii</i> (L.) Spreng	
Common Name	Indian curry leaf Tree, Mitha neem	
Family	Rutaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : kadhi patta • Gujarati: Mitho Limdo 	


Species Type	Tree	
Botanical Name	<i>Saraca indica</i>	
Common Name	Asoka	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : ashok	
	• Gujarati : Ashok	


Species Type	Tree	
Botanical Name	<i>Tamarindus indica</i>	
Synonyms	<i>Tamarindus occidentalis</i> Gaertn., <i>Tamarindus officinalis</i> Hook.	
Common Name	Tamarind Tree, Imli	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Chinch	
	• Gujarati : Khaati Amli	


Species Type	Herb	
Botanical Name	<i>Aloe barbadensis</i>	
Synonyms	<i>Aloe abyssinica</i> Lam., <i>Aloe chinensis</i> Baker, <i>Aloe indica</i> Royle, <i>Aloe littoralis</i> Koenig ex Baker, <i>Aloe vera</i> (L.) Burm.f., <i>Aloe vulgaris</i> Lam., <i>Alpinia allhugas</i> Roscoe, <i>Aloe barbadensis</i> Mill.	
Common Name	Aloe	
Family	Liliaceae	
Local Names	<ul style="list-style-type: none"> • Marathi :Korphad • Gujarati : Ghrutakumari 	


Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kaasundro 	


Species Type	Herb	
Botanical Name	<i>Catharanthus roseus</i>	
Synonyms	<i>Lochnera rosea</i> (L.) Reichb., <i>Vinca rosea</i> L., <i>Catharanthus roseus</i> (L.) G. Don	
Common Name	Sadabahar	
Family	Apocynaceae	
Local Names	• Marathi : Sadaphuli	


Species Type	Herb	
Botanical Name	<i>Cymbopogon citratus</i>	
Synonyms	<i>Andropogon citratus</i> DC., <i>Cymbopogon citratus</i> (DC.) Stapf	
Common Name	Lemon grass, Gandh-ghas	
Family	Poaceae	
Local Names	• Gujarati : Lili-cha	


Species Type	Herb	
Botanical Name	<i>Elettaria cardamomum</i>	
Common Name	Elaichi	
Family	Scitamineaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : elaichi 	


Species Type	Herb	
Botanical Name	<i>Mentha piperita</i>	
Common Name	Peppermint	
Family	Lamiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pudina • Gujarati : Pudino 	


Species Type	Herb	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	<i>Mimosa pudica</i> L.	
Common Name	Touch-me-not	
Family	Fabaceae-Mimosoideae	
Local Names	• Marathi : Lajwanti	
	• Gujarati : Lajaamni	


Species Type	Herb	
Botanical Name	<i>Ocimum basilicum</i>	
Common Name	Babui tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Sabja, tulas	
	• Gujarati : Damro	


Species Type	Herb	
Botanical Name	<i>Ocimum sanctum</i>	
Synonyms	<i>Ocimum inodurum</i> Burm.	
Common Name	Tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Krishna Tulas	
	• Gujarati : Vishnu Tulsi	


Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : isabgula	


Species Type	Herb	
Botanical Name	<i>Rauvolfia serpentina</i>	
Synonyms	<i>Ophioxylon album</i> Gaertn., <i>Ophioxylon serpentium</i> L., <i>Ophioxylon trifoliatum</i> Gaertn., <i>Rauvolfia trifoliata</i> (Gaertn.) Baill., <i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	
Common Name	Sarpagandha, chota chand	
Family	Apocynaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Sarpagandha • Sanskrit: Sarpagandha 	


Species Type	Herb	
BotanicalName	<i>Solanum surattense</i>	
Synonyms	<i>Solanum mccanni</i> Sant., <i>Solanum xanthocarpum</i> Schrad. & Wendl.	
CommonName	Kantakari, Kateli	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kantkari 	


Species Type	Herb	
Botanical Name	<i>Swertia chirata</i>	
Common Name	Kiryata	
Family	Gentianaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : chirata 	


Species Type	Herbs	
Botanical Name	<i>Zingiber officinale</i>	
Common Name	Adrak	
Family	Zingiberaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Adrak • Gujarati : adu 	


Species Type	<i>Shrub</i>	
Botanical Name	<i>Withania somnifera</i>	
Synonyms	<i>Physalis flexuosa</i> L., <i>Physalis somnifera</i> L., <i>Withania somnifera</i> (L.) Dunal.	
Common Name	Ashwagandha	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Ashwagandha • Gujarati : Ashwagandha 	


Species Type	<i>Herb</i>	
Botanical Name	<i>Kalanchoe pinnata</i>	
Synonyms	<ul style="list-style-type: none"> • Bryophyllum pinnatum (Lam.) Oken. • Bryophyllum calycinum Salisb. • Cotyledon pinnata Lam. 	
Family	Crassulaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : patthar-chatti • Sanskrit : 	

Species Type	Climber	
Botanical Name	<i>Asparagus racemosus</i>	
Synonyms	<i>Asparagus racemosus</i> Willd	
Common Name	Satavari	
Family	Liliaceae	
Local Names	• Marathi : Shatavari	
	• Gujarati : Shatavari	


Species Type	Shrub	
Botanical Name	<i>Adhatoda vasica</i>	
Synonyms	<i>Adhatoda vasica</i> Nees	
Common Name	Malabar nut	
Family	Acanthaceae	
Local Names	• Marathi :	
	• Gujarati :	


Species Type	Tree	
Botanical Name	<i>Pongamia pinnata</i>	
Common Name	Indian beach	
Family	Fabaceae-Papilionioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Karanj • Gujarati : Karanj 	


Species Type	Climber	
Botanical Name	<i>Tylophora indica</i>	
Synonyms	<i>Asclepias asthmatica</i> L. f., <i>Cynanchum bracteatum</i> Thunb., <i>C. indicum</i> Burm. f., <i>Hoya hirsuta</i> Moon. <i>Tylophora asthmatica</i> (L.f.) Wight & Arn.	
Common Name	Indian ipecacuanha	
Family	Asclepiadaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Damvel • Gujarati : Damvel 	


Species Type	Climber	
Botanical Name	<i>Piper longum</i>	
Synonyms	<i>Chavica roxburghii</i> Miq., <i>Piper longum</i> L.	
Common Name	Indian long pepper, Pipal	
Family	Piperaceae	
Local Names	• Marathi : Lendi pimpli	
	• Gujarati :	


Species Type	Herb	
Botanical Name	<i>Bacopa monnieri</i>	
Synonyms	<i>Bacopa monniera</i> (L.) Wettst., <i>Gratiola monniera</i> L., <i>Herpestis monniera</i> Benth., <i>Herpestis monniera</i> (L.) HBK., <i>Lysimachia monnieri</i> L., <i>Moniera cuneifolia</i> Michx.	
Common Name	Thyme-leaved Gratiola , Jal Brahmi	
Family	Scrophulariaceae	
Local Names	• sanskrit : Brahmi	
	• Gujarati :	


Species Type	Herb	
Botanical Name	<i>Eclipta alba</i>	
Common Name	Bhangra	
Family	Asteraceae	
Local Names	• sanskruit : Bhrungaraj	
	• Gujarati : Bhaangro	
	• Hindi : Bhringraj	
	• Marathi : Maka (White)	

Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : Isabgol	

Species Type	Climber	
Botanical Name	<i>Mucuna pruriens</i>	
Synonyms	<i>Carpopogon niveum</i> Roxb., <i>Carpopogon pruriens</i> Roxb., <i>Dolichos pruriens</i> L., <i>Mucuna nivea</i> (Roxb.) DC., <i>Mucuna prurita</i> Hook., <i>Stizolobium pruriens</i> (L.) Medikus	
Common Name	Kawach	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Khaj-kujli - Black • Gujarati : Kaucha 	

Species Type	Herb	
Botanical Name	<i>Trachyspermum ammi</i>	
Common Name	Carum Ajwain	
Family	Apiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Owaa • Gujarati : Kaucha 	

Species Type	Tree	
BotanicalName	<i>Punica granatum</i>	
Synonyms	<i>Punica granatum</i> L.	
CommonName	Anar	
Family	Lythraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Dalimb • Gujarati : Daadam 	

Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Kaasundro • Gujarati : Kaasundro 	

ANNEXURE-II : LIST OF BIRDS SPOTTED IN & AROUND MU

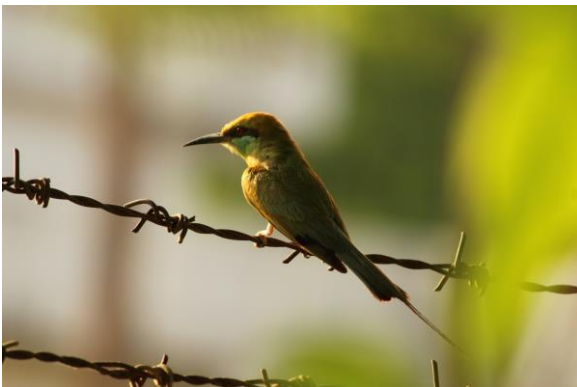
A survey was carried out to find the animal diversity in the campus of Marwadi University Rajkot. The survey focused on the diversity of birds, butterfly, Amphibia.



Common name: Purple sunbird
Scientific name : *Cinnyris asiaticus*



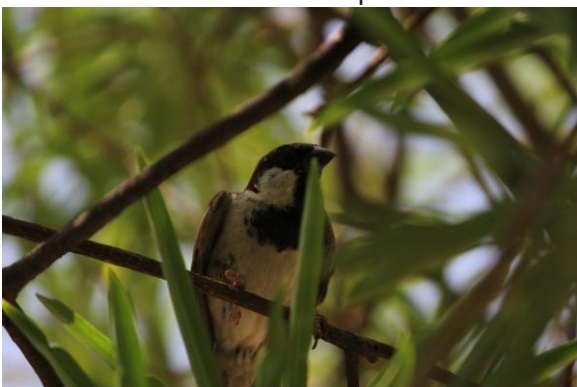
Common name: Common tailorbird
Scientific name : *Orthotomus sutorius*



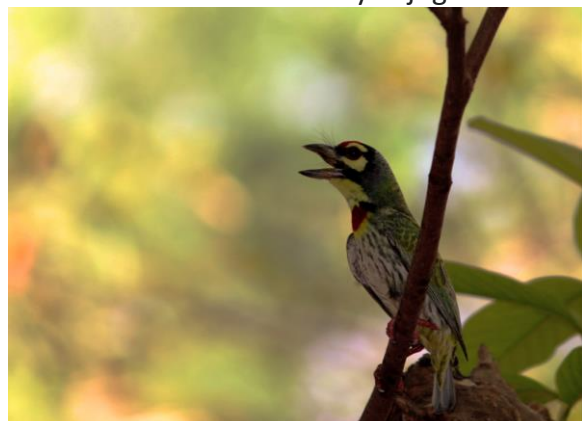
Common name: Asian green bee-eater
Scientific name : *Merops orientalis*



Common name: olive-backed sunbird
Scientific name : *Cinnyris jugularis*



Common name: house sparrow
Scientific name : *Passer domesticus*



Common name: coppersmith barbet
Scientific name : *Psilopogon haemacephalus*



Common name: Bulbul
Scientific name : Pycnonotidae



Common name: laughing dove
Scientific name : Streptopelia senegalensis



Common name: Little egret
Scientific name : Egretta garzetta



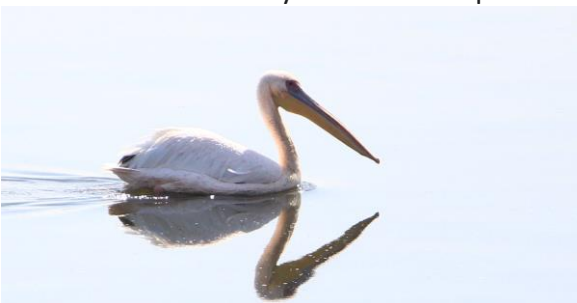
Common name: Oriental darter
Scientific name : Anhinga melanogaster



Common name: Painted stork
Scientific name : Mycteria leucocephala



Common name:
Scientific name :



Common name: billed pelican
Scientific name : Pelecanus philippensis



Common name: Parrots
Scientific name : Psittaciformes



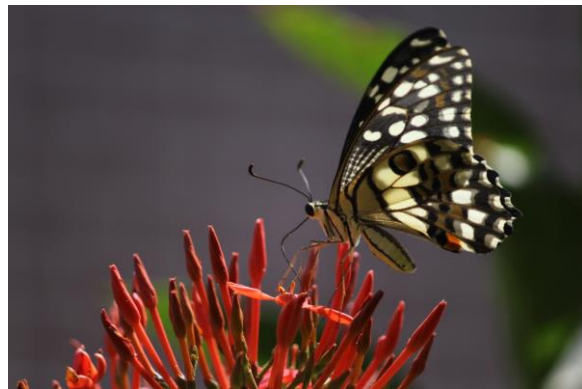
Common name: Robber flies
Scientific name : Asilidae



Common name: Dragonfly
Scientific name : Anisoptera



Common name:
Scientific name :



Common name:California sister
Scientific name :Adelpha bredowii



Common name:
Scientific name :



Common name: common tiger
Scientific name : Danaus genutia



Common name: Spotted Joker
Scientific name : *Byblia ilithyia*



Common name: Blue tiger
Scientific name : *Tirumala limniace*



Common name: Signature Spider
Scientific name : *Argiope anasuja*



Common name: button spider
Scientific name : *Latrodectus umbukwane*

ANNEXURE-III : LIST OF RAPTILES SPOTTED IN & AROUND MU



Scientific name: *Rattus rattus*
Common Name : House Rat



Scientific name: *Calotes versicolor* Common
Name : Indian Garden Lizard



Scientific name: *Hoplobatrachus tigerinus*
Common Name : Indian Bull Frog



Scientific name: *Naja naja*
Common Name : Indian Cobra



Marwadi
University
Marwadi Chandarana Group

GREEN AUDIT REPORT

2018-2019

Marwadi University

Rajkot-Morbi Road, Rajkot – 360003
Gujarat, India

Submitted By

Green Audit Team

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The entire team is very grateful to the management of Marwadi University for their continuous support and motivation to take various innovative and challenging assignments.

Dr. Tarak Vora
Team Leader
Green Audit Team
Marwadi University. Rajkot

DISCLAIMER

Green Audit Team Has prepare this report on the basis of primary data collected from the different areas of the university. All reasonable care has been taken in its preparation: details contained in this report have been compiled in good faith based on information gathered.

Date: 25/03/2019

Prepared by:
Green Audit Team

1. BRIEF ABOUT MARWADI UNIVERSITY

In 2007-08 the availability of world class academic facilities in the Saurashtra region were sparse; which encouraged Marwadi Group, Rajkot to launch Marwadi Education Foundation's Group of Institutes, offering Technical and Professional UG & PG courses and programs such as B.E, MBA and MCA. Marwadi Education Foundation's Group of Institutions (MEFGI) was incepted as a major organ of Marwadi Education Foundation's Group of Institutions in 2008, under the Bombay Public Trust Act 1950. Marwadi Education Foundation's Group of Institutions is a body promoted by Marwadi Shares & Finance Limited; a major stock broking company in India & Chandarana Intermediaries Brokers Pvt. Ltd. Since its inception Marwadi Education Foundation's Group of Institutions were affiliated with Gujarat Technological University.

Commitment to provide best and industry relevant education received an overwhelming trust from the society and in order to blend Engineering with Science and support them through Management and Law disciplines and have multi disciplinary course offerings in Science, Commerce, Arts, Health and Management, Marwadi Education Foundation proposed to establish "Marwadi University" in the Year 2016. Marwadi University bill was introduced and passed in Gujarat Assembly and Marwadi University was established under Gujarat Private Universities act no. 9 of 2016 on 9th May, 2016.

2. VISION & MISSION OF MARWADI UNIVERSITY

2.1 VISION OF THE UNIVERSITY

Our vision is to address challenges facing our society and planet through sterile education that builds capacity of our students and empower them through their innovative thinking practice and character building that will ultimately manifest to boost creativity and responsibility utilizing the limited natural resources to meet with the challenges of the 21st century

2.2 MISSION OF THE UNIVERSITY

- ✓ To produce creative, responsible and informed professionals.
- ✓ To produce individuals who are digital-age literates, inventive thinkers, effective communicators and highly productive.
- ✓ To deliver cost-effective quality education.
- ✓ To offer world-class, cross-disciplinary education in strategic sectors of economy through well devised and synchronized delivery structure and system, designed to tickle the creative intelligence and enhance the productivity of individuals.
- ✓ To provide a conducive environment that enables and promotes individuals to creatively interact, coordinate, disseminate and examine change, opinion as well as concept that will enable students to experience higher level of learning acquired through ceaseless effort that lead to the development of character, confidence, values and technical skills.

3. GREEN AUDIT

Modernization and industrialization are the two important outputs of the twentieth century that have made human life more luxurious and comfortable. They are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources, and finally making our mother Earth ugly and inhospitable. The time has come to wake up, unite and combat together for a sustainable environment.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, universities, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly university.

3.1 GOALS OF GREEN AUDIT

- The objective of carrying out Green Audit is securing the environment and cut down the threats posed to human health.
- To make sure that rules and regulations are taken care of to save environment.
- To avoid the interruptions in environment that are more difficult to handle and whose correction requires higher cost.
- The long-term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issues.

3.2 BENEFITS OF GREEN AUDIT

- It would help to protect the environment in and around the campus.
- Recognize the cost saving methods through waste minimization and management.
- Point out the prevailing and fourth coming impacts on environment.
- Recognize the cost-saving methods through waste minimizing and managing.
- Empower the organizations to frame a better environmental performance.
- Developing an environmental ethic and value systems in youngsters.
- It portrays a good image of an institution which helps building better relationships with the group of interested parties.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the University.

4. ENVIRONMENTAL POLICY OF THE UNIVERSITY

Marwadi University, Rajkot always believes in maintaining its own standard in matter of environment and quality consciousness. It has taken number of initiatives to protect its own environment with a pollution free campus.

To create a green cover, Eco-friendly atmosphere, pure oxygen at the university campus, a plantation program is organized every year with active participation from the university community and visitors. Green Audit Team owns responsibility to preserve the work carried out on the campus related to the environment.

This also helps in ensuring that the Environmental Policy is enacted, enforced, and reviewed using various environmental awareness programs.

ENVIRONMENTAL POLICY

Both the teaching and Non-teaching staff of Marwadi University Rajkot are committed for carrying out its activity for sustainable development. This we will achieve through the following :-

- i. To educate students and staff on how to appropriately utilize water effectively.
- ii. To put the campus' "Rain Water Harvesting" to use.
- iii. To make the most of the solar energy generated by the solar panels on the roofs of educational buildings.
- iv. To use ICT as much as possible while using paper as little as possible. It will contribute to the "Paperless Office" initiative.
- v. Using vermin-compost on the campus to turn solid waste into fertiliser.
- vi. To lessen the campus' noise pollution.
- vii. To protect and nurture the Flora and Fauna on the campus
- viii. To maintain green campus.
- ix. To use treated waste water for flushing and gardening purpose.
- x. To use recycle the waste material and make them usable.

5. CONSTITUTION FOR GREEN AUDIT

The Green Audit is carried out as per the environmental policy of the Green audit checklist. The aim of the audit is to check the existing practices and provide advice for the development of environmental policy and practice in the areas of:

- ✓ Waste management
- ✓ Management water conservation and management
- ✓ Tree plantations
- ✓ Bio-diversity and threatened/ endangered species
- ✓ Preservations Energy use and conservations
- ✓ Eco-friendly campus
- ✓ Green environment and clean campus

MEMBERS OF GREEN AUDIT TEAMS

Sr. No.	Name of Auditor	Designation
1	Dr. Tarak Vora	Team Leader
2	Dr. Abhishek Gupta	Member
3	Dr. Archana Sharma	Member
4	Dr. Nitinkumar Singh	Member
5	Dr. Hirendrasinh Padhiyar	Member
6	Mrs. Bhavna Thummar	Member
7	Mr. Raj Chapala	Member
8	Mr. Jyupil Joshi	Member
9	Mr. Devesh Poorey	Member
10	Mr. Kalpesh Chandarana	Member

6. OBJECTIVES OF THE STUDY

The green audit's primary goal is to support environmental management and conservation on college campuses. According to the relevant laws, rules, and standards, the audit's goal is to identify, measure, explain, and prioritise the framework for environmental sustainability. The following are the primary goals of doing a green audit:

- ✓ To secure the environment and cut down the threats posed to human health by analysing 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 status report on environmental compliance

7. METHODOLOGY

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

➤ **Water management**

- ✓ Raw Water
- ✓ Drinking Water
- ✓ Waste Water
- ✓ Sewage Water
- ✓ Rain Storm Drain Water

➤ **Energy Conservation**

- ✓ Petrol
- ✓ Diesel
- ✓ LPG
- ✓ Electricity

➤ **Waste management**

- ✓ Domestic waste management

8. FOCUS AREA OF AUDIT

To match with the objective of the green audit, following areas are kept under the scope of the audit.

1. Water management
2. Air Pollution Management
3. Noise Pollution Management
4. Green belt area & Bio-diversity

8.1 WATER MANAGEMENT

Water is a valuable natural resource for all living organisms. It is freely available depending on the climate and topographic features of a region. Water is a precious natural national resource available with a fixed quantum. The availability of water is decreasing due to the increasing population of the nation; as per capita availability of utilized water is going down.

Even though it is naturally present, drinking water that is portable is not easily available for human consumption. Just 3% of the water on our planet, which covers 70% of its surface, is fresh water. The world's 1.1 billion inhabitants are experiencing a water crisis. Water issue is greatly impacted by water pollution and waste. An alarming amount of water is being contaminated. Water contamination can cause a variety of illnesses or even death. Because of this, it's crucial to make sure that drinking water is sterile, clean, and free of germs and illnesses. Also, it's crucial to manage, protect, and conserve water resources so that they may be used sustainably. The use and quality of water on the university campus are being studied by our institution. Water auditing is done to assess raw water intake facilities and identify facilities for water treatment and reuse. The concerned auditor looks at the appropriate approach that may be used to balance the supply and demand for water.

USES AND MANAGEMENT

SOURCE OF WATER

Sr. No.	Resource	Quantity
1	GWI (Narmada Water)	-----
2	No of Open Well	02
3	No of Bore-well	03
4	Water reserve - Underground Tank	4 Lakhs

WATER USERS IN CAMPUS

Sr. No.	Person in different section	Strength (No. of person – Approx.)
1	Staff	410
2	Hostel Boarders	1400
3	Residential Family Members	50
4	Visitors	2000
5	Construction Labour	150

The visitors of the college vary with respect to different activities conducted in the college campus. During admission and different competitive exam conducted in the college campus. The total number of visitors of the university increases up to 2000 on such day.

WATER CONSUMPTION IN DIFFERENT ACTIVITY IN COLLEGE CAMPUS

Activity	Water used per activity (in Litter)	No. of times Activity performed in a day	Average water used Person/Day	No. of people using water	Total water consumption per Day
Hand and face wash	4-6 L	4	16-24L	1500	3000
Drinking Water	0.2-0.4L	6	1.2-2.4L	1500	2700
Toilet Flush	8-10L	4	32-40L	1500	54000
Bath	30-40 L	1	30-40 L	1500	52500
Cooking & Washing In resident	150-250L	2	300-500L	54	21600
Cooking Hostel	10-15L	4	40-60L	1500	75000
Total					235800

WATER QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : DRINKING WATER								
Test Report No / Ref.No. :- TA-172						Date: 10-9-2018		
Name of Customer		Marwadi University, Rajkot						
Address of Customer		Rajkot - Morbi Highway, Gauridad.						
Environmental Condition		Ambient						
Date of Sample Collection		5/3/2018						
Nature of Sample		Colour: Colour less						
Sample Quantity		100 ml						
Packing Type		Plastic bottle						
Type of Sampling		Grab						
Sample Collected By		Mr. Kalpesh Parmar						
Date of analysis starts		6/9/2018						
Analysis conclude on		10/9/2018						
Sr. No.	Parameters	Units	Test Method	Permissible Limit	Main Building A-Wing	Main Building B-Wing	PG Building	Law Building
1	pH	-	APHA 23rd Ed.,2017,4500-H+B	6.5 - 8.5	7.82	7.25	7.08	7.22
2	TDS	mg/L	APHA 23rd Ed. Method 2540-C	500	48	122	125	128
3	Turbidity	FNU	APHA 23rd Edition 2130-B(Page No.2-13)	1	0.89	0.56	0.88	0.78
4	Conductivity	µs/cm	APHA 23 rd Ed. Titration Method 2510-B	200-800	222	352	333.5	387
5	Chloride	mg/L	APHA 23rd Ed 4500-Cl- B (Page No.4-75)	250	78	85	49	85
6	Total Hardness	mg/L	APHA 23rd Ed. Method 2510-B	200	88	101	58	188
<small> *NOTE: 1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied,BDL= Below Detection Limit, MDL = Minimum Detection Limit 2. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing. 3. This office is not responsible for the authenticity for the samples not collected by our officials. 4. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat jurisdiction only. 5. Permissible Limits as per Schedule VI of EPA Rules-1986. *ND : Not Detected, BDL : Below Detection Limit, -- : Not Applicable </small>								

End of Report

Dr. Nitin Kumar Singh
Testing Incharge

Dr. Tarak Vora
Quality Manager

OBSERVATIONS IN REGARD OF WATER USAGES AND CONSERVATION PLAN

1. Treated water is used for flushing through dual plumbing system installed in all the buildings.
2. The garden is watered using sprinklers and drip irrigation system installed throughout the campus.
3. Drinking water quality is being tested regularly as per plan.
4. Low flow water fixtures are installed in bathroom and toilets.
5. Rainwater harvesting is done in the lake created in the campus.

8.2 AIR POLLUTION MANAGEMENT

The university has consistently run programmes to raise staff, student, and societal awareness of the need to preserve and conserve the environment. Moreover, programmes and rallies on different environmental and health-related topics are organised in order to raise awareness. Students and professors at the university participate in NSS/NCC-related events.

A) MASS TRANSPORTATION FACILITY

As such campus is not generating any air pollution by its own activity except it has its own transportation department. Faculties and students of the university are motivated to use mass transportation system. Faculties are given some advantages for use of the bus facility provided by the university.

AIR QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : AMBIENT AIR					
Name of Customer		Marwadi University			
Address of Customer		Rajkot - Morbi Highway, Gauridad.			
Environmental Condition		Satisfactory			
Date of Sample Collection		29-08-2018			
Nature of Sample		Colour : Colour Less			
Sample Collected By		Jyupil Joshi			
Sample Tested By		Raj Chapala			
Date of analysis starts		30-08-2018			
Analysis conclude on		9/1/2018			
Sr. No.	Parameters	Units	Test Method	Permissible Limit	MAIN BUILDING
1	PM ₁₀	(µg/m ³)	IS 5182 (Part 23) (1999, Reaffirmed 2010)	100	52.47
2	PM _{2.5}	(µg/m ³)	NAAQMS/36/2012-13	60	24.36
3	SO ₂	(µg/m ³)	IS 5182 (Part 2)	80	1.51
4	NO _x	(µg/m ³)	IS 5182 (Part 6)	80	2.15
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. BDL= Below Detection Limit, MDL = Minimum</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, -- : Not Applicable</p>					

Testing Incharge

Team Leader

STACK EMISSION ASSESSMENT REPORT

ANALYSIS REPORT : STACK : DG SET					
Test Report No / Ref.No. :- TA-167				Date:- 15-08-2018	
Name of Customer		Marwadi University, Rajkot			
Address of Customer		Rajkot - Morbi Highway, Gauridad.			
Temperature		31°C			
Weather Condition		Satisfactory			
Date of Sample Collection		14-08-2018			
Nature of Sample		Colour : Colour Less			
Sample Collected By		Dr. Tarak Vora, Mr. Jitesh Joshi & Mr. Jyupil Joshi			
Date of analysis starts		14-08-2018			
Analysis conclude on		15-08-2018			
Sr. No.	Parameters	Units	Test Method	Permissible Limit	DG Set
Stack Height In Meter					10
1	PM	mg/Nm ³	IS 11255 (Part 1)	150	37.84
2	SO₂	ppm	IS 11255 (Part 2)	100	17.21
3	NO_x	ppm	IS 11255 (Part 7)	50	26.76
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit</p>					

End of Report

Dr. Nitin Kumar Singh
Testing Incharge

Dr. Tarak Vora
Quality Manager

8.3 NOISE POLLUTION MANAGEMENT

A) SILENCE ZONES IN THE UNIVERSITY

For awareness of the need to preserve silence at the institution, several display boards have been put up in the library and other locations.

B) NOISE CONTROL IN THE UNIVERSITY

The institution has enacted a no honking policy that forbids the use of any noise on campus, including honking.

On college campuses, noise pollution is maintained to a minimum and designated quiet zones are established in places like the library and classrooms.

C) DG SET FOR POWER BACK-UP

Every time there is a power outage because of load shedding or maintenance on the college campus, the college uses its DG backup system. Noise monitoring of the stack of DG set is being done on regular basis.

NOISE LEVEL ASSESSMENT REPORT

ANALYSIS REPORT : NOISE			
Name of Customer		Marwadi University	
Address of Customer		Rajkot - Morbi Highway, Gauridad.	
Environmental Condition		Satisfactory	
Date of Sample Collection		02-12-2018	
Sr. No.	Location	Permissible limit	Day (dB-A)
1	Main Gate	65	63
2	PG Building		56
3	Hostel Aera		58
4	Main Canteen		57
5	New Canteen		50
<p>*NOTE</p> <ol style="list-style-type: none"> 1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified. 3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing. 4. This office is not responsible for the authenticity for the samples not collected by our officials. 5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only. 6. Permissible Limits: as per Schedule VI of EPA Rules-1986 <p>*ND : Not Detected, BDL : Below Detection Limit</p>			

Testing Incharge

Team Leader

8.4 GREEN BELT AREA & BIO-DIVERSITY

The Green Belt Area is intended to preserve the environment and enhance the visual value of the college grounds. To guarantee that the structures adhere to green standards, the college's green area consists of the campus's vegetation, greenery, and sustainability. Also, by implementing various environmental awareness programmes, this aids in ensuring that the Environmental Policy is adopted, implemented, and evaluated.

OBSERVATIONS

The campus is close to over 45 different types (species) of flora and animals. Via the NSS unit, several tree planting initiatives are held during the months of July and August on college campuses and in the nearby communities. This initiative aids in promoting an eco-friendly atmosphere that gives the institute pure oxygen and raises awareness among the communities. The planting initiative comprises a variety of native decorative and therapeutic plants. The occurrence of similar species planted, such as "NEEM," is noted rather than sustaining biodiversity. Neem, Indian Blackberry Tree, Flame Tree, Mango Tree, Jack Fruit Tree, Teak, and Spanish Cherry Plant are the predominant species in the green belt.

9. EXECUTIVE SUMMERY & RECOMMENDATIONS

The university has created a green environmental policy and is working to promote sustainable growth on the campus. The university has created a team of academics and students that works to preserve biodiversity on the campus and contributes to efforts to reduce pollution in society. The university intends to add environmental management and protection to its curriculum. The university has given faculty and students workshops and trainings on environmental awareness. Low flow water fixtures are installed in the campus.


It is also verified that the initiatives on almost all the recommendations of the previous year have been taken by the university which are found satisfactory.

RECOMMENDATIONS

1. Composting of bio degradable waste to be scientifically done.
2. World Environment Day to be celebrated in college premises every year on 5th June and whole college students and staff shall get involved and take OATH for ENVIRONMENT.
3. Use of bicycle in campus to be promoted.
4. Energy saving awareness shall be done by displaying the boards at appropriate place.
5. To use Common or public Vehicle instead individual vehicle to conserve fossil fuel.
6. Watering schedule to be planned according the season.
7. Additional energy meters to be placed to track water and energy usage by building and department.
8. Analyze treated water of STP on regular basis.
9. To have waste management system in place.


ANNEXURE I : LIST OF TREES & PLANTS SPOTTED IN & AROUND MU


A survey was carried out to find plant diversity in the campus of Marwadi University. The survey was focused on the diversity of plants and trees on the basis of their classification and economic importance.


Species Type	Tree	
Botanical Name	<i>Bauhinia purpurea</i>	
Common Name	Butterfly Tree, geranium Tree	
Family	Fabaceae Caesalpinioideae	
Local Names	• Gujarati: Hadayparni	
	• Sanskrit : Kanchanar (red)	


Species Type	Tree	
Botanical Name	<i>Azadirachta indica</i>	
Synonyms	<i>Antelaea indica</i> (L.) Adelb., <i>Melia azadirachta</i> L., <i>Melia indica</i> (A. Juss.) Brandis	
Common Name	Neem	
Family	Meliaceae	
Local Names	• Hindi :	Neem
	• Gujarati :	Limbado , Kadavo Limbado
	• Sanskrit :	Nimba


Species Type	Tree	
Botanical Name	Khaya senegalensis	
Common Name	Senegal Mahogany, African Mahogany, Senegal Khaya	
Family	Meliaceae	
Local Name	• Gujarati: Khaya	


Species Type	Tree	
Botanical Name	Spathodea campanulata	
Common Name	<i>African tulip tree</i>	
Family	Bignoniaceae	
Local Names	• Gujarati: Tulip tree	


Species Type	Tree	
Botanical Name	Samanea saman	
Common Name	Saman, Pukul Lima, Cow Tamarind, Hujan-Hujan, East Indian Walnut, Monkey, rain tree	
Family	Fabaceae (alt. Mimosaceae), legume family	
Local Names	<ul style="list-style-type: none"> • Gujarati: <i>Shirish</i>, • Sanskrit :<i>Shiriisha</i> 	

Species Type	Tree	
Botanical Name	<i>Terminalia mantaly</i>	
Common Name	Madagascar Almond, Umbrella Tree	
Family	Combretaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: African tree 	


Species Type	Shrub	
Botanical Name	<i>Rauvolfia tetraphylla</i>	
Synonyms	<i>Rauvolfia canescens</i> L., <i>Rouvolfia tomentosa</i> Jacq., <i>Rauvolfia tetraphylla</i> L.	
Common Name	Bara Chand	
Family	Apocynaceae	
Local Names	• Gujarati : Sarpagandha	


Species Type	Shrub	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	Touch me not	
Common Name	Ail	
Family	Fabaceae - Mimosoideae	
Local Names	Gujarati : Iajawni	


Species Type	Tree	
Botanical Name	<i>Bauhinia variegata</i>	
Synonyms	<i>Bauhinia candida</i> Roxb.	
Common Name	Mountain ebony, Kachnar	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Kachnar	
	• Sanskrit Kancharan (white)	


Species Type	Tree	
BotanicalName	<i>Bixa orellana</i>	
Synonyms	<i>Bixa orellana</i> L.	
CommonName	Sindhuri	
Family	Bixaceae	
Local Names	• Marathi : Shenduri	


Species Type		Tree
Botanical Name		Butea mon
Synonyms		<i>Butea fron monosperm</i>
Common Name		Palas
Family		Fabaceae-l
Local Names	•	• Marathi
	•	• Gujarati
	•	• Hindi


Species Type	Tree	
Botanical Name	<i>Eucalyptus globulus</i>	
Synonyms	<i>Eucalyptus gigantea</i> Dehn., <i>Eucalyptus glauca</i> DC., <i>Eucalyptus perfoliata</i> Desf., <i>Eucalyptus pulverulenta</i> Link	
Common Name	Australian gum Tree, Eucalyptus	
Family	Myrtaceae	
Local Names	• Marathi : Nilgiri	
	• Gujarati : Nilgiri	


Species Type	Tree	
Botanical Name	<i>Nyctanthes arbo-tristis</i>	
Synonyms	<i>Bruschia macrocarpa</i> Bertol., <i>Nyctanthes arbor-tristis</i> var. <i>dentata</i> Hort.ex Moldenke, <i>Nyctanthes dentata</i> Blume, <i>Nyctanthes tristis</i> Salisb., <i>Parilium arbor-tristis</i> Gaertn., <i>Scabrita triflora</i> L.	
Common Name	Night jasmine, Harshingar	
Family	Nyctanthaceae	
Local Names	<ul style="list-style-type: none"> • Sanskrit : Parijata • Gujarati : Paarijaat 	


Species Type	Tree	
Botanical Name	<i>Peltophorum pterocarpum</i>	
Synonyms	<i>Caesalpinia gleniei</i> Thwaites, <i>Caesalpinia inermis</i> Roxb., <i>Inga pterocarpa</i> DC., <i>Peltophorum ferrugineum</i> (Decne) Benth., <i>Peltophorum inerme</i> (Roxb.) Llanos, <i>Peltophorum roxburghii</i> (G.Don) Degener, <i>Poiciana roxburghii</i> G.Don	
Common Name	Yellow gold mohur	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Taamraparni 	


Species Type	Tree	
Botanical Name	<i>Cocos nucifera</i>	
Common Name	Coconut palm	
Family	Arecaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Naral • Gujarati :Nariyeli 	


Species Type	Tree	
Botanical Name	<i>Ficus religiosa</i>	
Synonyms	Urostigma religiosum (L.) Gasparrini	
Common Name	Bot-Tree, Pipal	
Family	Moraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pimpal 	


Species Type	Tree	
Botanical Name	<i>Mangifera indica</i> L.	
Synonyms	<i>Mangifera indica</i> L.	
Common Name	Aam	
Family	Anacardiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Amba 	


Species Type	Tree	
Botanical Name	<i>Murraya Koenigii</i>	
Synonyms	<i>Bergera koenigii</i> L., <i>Chalcas koenigii</i> (L.) Kurz, <i>Murraya foetidissima</i> Teijsm. & Binnend, <i>Murraya koenigii</i> (L.) Spreng	
Common Name	Indian curry leaf Tree, Mitha neem	
Family	Rutaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : kadhi patta • Gujarati: Mitho Limdo 	


Species Type	Tree	
Botanical Name	<i>Saraca indica</i>	
Common Name	Asoka	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : ashok	
	• Gujarati : Ashok	


Species Type	Tree	
Botanical Name	<i>Tamarindus indica</i>	
Synonyms	<i>Tamarindus occidentalis</i> Gaertn., <i>Tamarindus officinalis</i> Hook.	
Common Name	Tamarind Tree, Imli	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Chinch	
	• Gujarati : Khaati Amli	


Species Type	Herb	
Botanical Name	<i>Aloe barbadensis</i>	
Synonyms	<i>Aloe abyssinica</i> Lam., <i>Aloe chinensis</i> Baker, <i>Aloe indica</i> Royle, <i>Aloe littoralis</i> Koenig ex Baker, <i>Aloe vera</i> (L.) Burm.f., <i>Aloe vulgaris</i> Lam., <i>Alpinia allhugas</i> Roscoe, <i>Aloe barbadensis</i> Mill.	
Common Name	Aloe	
Family	Liliaceae	
Local Names	<ul style="list-style-type: none"> • Marathi :Korphad • Gujarati : Ghrutakumari 	


Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kaasundro 	


Species Type	Herb	
Botanical Name	<i>Catharanthus roseus</i>	
Synonyms	<i>Lochnera rosea</i> (L.) Reichb., <i>Vinca rosea</i> L., <i>Catharanthus roseus</i> (L.) G. Don	
Common Name	Sadabahar	
Family	Apocynaceae	
Local Names	• Marathi : Sadaphuli	


Species Type	Herb	
Botanical Name	<i>Cymbopogon citratus</i>	
Synonyms	<i>Andropogon citratus</i> DC., <i>Cymbopogon citratus</i> (DC.) Stapf	
Common Name	Lemon grass, Gandh-ghas	
Family	Poaceae	
Local Names	• Gujarati : Lili-cha	


Species Type	Herb	
Botanical Name	<i>Elettaria cardamomum</i>	
Common Name	Elaichi	
Family	Scitamineaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : elaichi 	


Species Type	Herb	
Botanical Name	<i>Mentha piperita</i>	
Common Name	Peppermint	
Family	Lamiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pudina • Gujarati : Pudino 	


Species Type	Herb	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	<i>Mimosa pudica</i> L.	
Common Name	Touch-me-not	
Family	Fabaceae-Mimosoideae	
Local Names	• Marathi : Lajwanti	
	• Gujarati : Lajaamni	


Species Type	Herb	
Botanical Name	<i>Ocimum basilicum</i>	
Common Name	Babui tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Sabja, tulas	
	• Gujarati : Damro	


Species Type	Herb	
Botanical Name	<i>Ocimum sanctum</i>	
Synonyms	<i>Ocimum inodurum</i> Burm.	
Common Name	Tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Krishna Tulas	
	• Gujarati : Vishnu Tulsi	


Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : isabgula	


Species Type	Herb	
Botanical Name	<i>Rauvolfia serpentina</i>	
Synonyms	<i>Ophioxylon album</i> Gaertn., <i>Ophioxylon serpentium</i> L., <i>Ophioxylon trifoliatum</i> Gaertn., <i>Rauvolfia trifoliata</i> (Gaertn.) Baill., <i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	
Common Name	Sarpagandha, chota chand	
Family	Apocynaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Sarpagandha • Sanskrit: Sarpagandha 	


Species Type	Herb	
BotanicalName	<i>Solanum surattense</i>	
Synonyms	<i>Solanum mccanni</i> Sant., <i>Solanum xanthocarpum</i> Schrad. & Wendl.	
CommonName	Kantakari, Kateli	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kantkari 	


Species Type	Herb	
Botanical Name	<i>Swertia chirata</i>	
Common Name	Kiryata	
Family	Gentianaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : chirata 	


Species Type	Herbs	
Botanical Name	<i>Zingiber officinale</i>	
Common Name	Adrak	
Family	Zingiberaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Adrak • Gujarati : adu 	


Species Type	<i>Shrub</i>	
Botanical Name	<i>Withania somnifera</i>	
Synonyms	<i>Physalis flexuosa</i> L., <i>Physalis somnifera</i> L., <i>Withania somnifera</i> (L.) Dunal.	
Common Name	Ashwagandha	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Ashwagandha • Gujarati : Ashwagandha 	


Species Type	<i>Herb</i>	
Botanical Name	<i>Kalanchoe pinnata</i>	
Synonyms	<ul style="list-style-type: none"> • Bryophyllum pinnatum (Lam.) Oken. • Bryophyllum calycinum Salisb. • Cotyledon pinnata Lam. 	
Family	Crassulaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : patthar-chatti • Sanskrit : 	

Species Type	Climber	
Botanical Name	<i>Asparagus racemosus</i>	
Synonyms	<i>Asparagus racemosus</i> Willd	
Common Name	Satavari	
Family	Liliaceae	
Local Names	• Marathi : Shatavari	
	• Gujarati : Shatavari	


Species Type	Shrub	
Botanical Name	<i>Adhatoda vasica</i>	
Synonyms	<i>Adhatoda vasica</i> Nees	
Common Name	Malabar nut	
Family	Acanthaceae	
Local Names	• Marathi :	
	• Gujarati :	


Species Type	Tree	
Botanical Name	<i>Pongamia pinnata</i>	
Common Name	Indian beach	
Family	Fabaceae-Papilionioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Karanj • Gujarati : Karanj 	


Species Type	Climber	
Botanical Name	<i>Tylophora indica</i>	
Synonyms	<i>Asclepias asthmatica</i> L. f., <i>Cynanchum bracteatum</i> Thunb., <i>C. indicum</i> Burm. f., <i>Hoya hirsuta</i> Moon. <i>Tylophora asthmatica</i> (L.f.) Wight & Arn.	
Common Name	Indian ipecacuanha	
Family	Asclepiadaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Damvel • Gujarati : Damvel 	


Species Type	Climber	
Botanical Name	<i>Piper longum</i>	
Synonyms	<i>Chavica roxburghii</i> Miq., <i>Piper longum</i> L.	
Common Name	Indian long pepper, Pipal	
Family	Piperaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Lendi pimpli • Gujarati : 	


Species Type	Herb	
Botanical Name	<i>Bacopa monnieri</i>	
Synonyms	<i>Bacopa monniera</i> (L.) Wettst., <i>Gratiola monniera</i> L., <i>Herpestis monniera</i> Benth., <i>Herpestis monniera</i> (L.) HBK., <i>Lysimachia monnieri</i> L., <i>Moniera cuneifolia</i> Michx.	
Common Name	Thyme-leaved Gratiola , Jal Brahmi	
Family	Scrophulariaceae	
Local Names	<ul style="list-style-type: none"> • sanskrit : Brahmi • Gujarati : 	


Species Type	Herb	
Botanical Name	<i>Eclipta alba</i>	
Common Name	Bhangra	
Family	Asteraceae	
Local Names	• sanskruit : Bhrungaraj	
	• Gujarati : Bhaangro	
	• Hindi : Bhringraj	
	• Marathi : Maka (White)	

Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : Isabgol	

Species Type	Climber	
Botanical Name	<i>Mucuna pruriens</i>	
Synonyms	<i>Carpopogon niveum</i> Roxb., <i>Carpopogon pruriens</i> Roxb., <i>Dolichos pruriens</i> L., <i>Mucuna nivea</i> (Roxb.) DC., <i>Mucuna prurita</i> Hook., <i>Stizolobium pruriens</i> (L.) Medikus	
Common Name	Kawach	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Khaj-kujli - Black • Gujarati : Kaucha 	

Species Type	Herb	
Botanical Name	<i>Trachyspermum ammi</i>	
Common Name	Carum Ajwain	
Family	Apiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Owaa • Gujarati : Kaucha 	

Species Type	Tree	
BotanicalName	<i>Punica granatum</i>	
Synonyms	<i>Punica granatum</i> L.	
CommonName	Anar	
Family	Lythraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Dalimb • Gujarati : Daadam 	

Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Kaasundro • Gujarati : Kaasundro 	

ANNEXURE-II : LIST OF BIRDS SPOTTED IN & AROUND MU

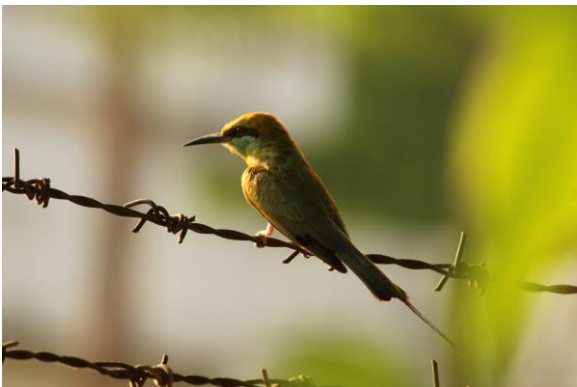
A survey was carried out to find the animal diversity in the campus of Marwadi University Rajkot. The survey focused on the diversity of birds, butterfly, Amphibia.



Common name: Purple sunbird
Scientific name : *Cinnyris asiaticus*



Common name: Common tailorbird
Scientific name : *Orthotomus sutorius*



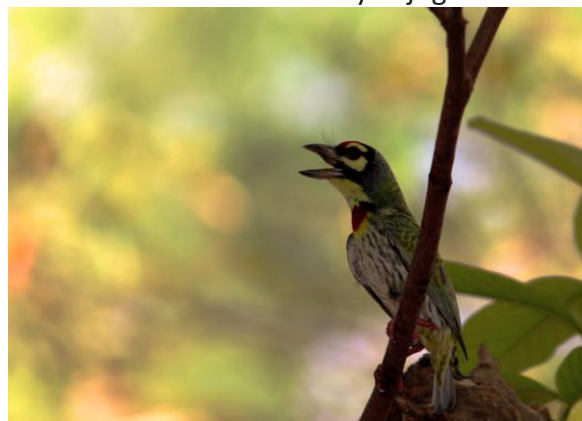
Common name: Asian green bee-eater
Scientific name : *Merops orientalis*



Common name: olive-backed sunbird
Scientific name : *Cinnyris jugularis*



Common name: house sparrow
Scientific name : *Passer domesticus*



Common name: coppersmith barbet
Scientific name : *Psilopogon haemacephalus*



Common name: Bulbul
Scientific name : Pycnonotidae



Common name: laughing dove
Scientific name : Streptopelia senegalensis



Common name: Little egret
Scientific name : Egretta garzetta



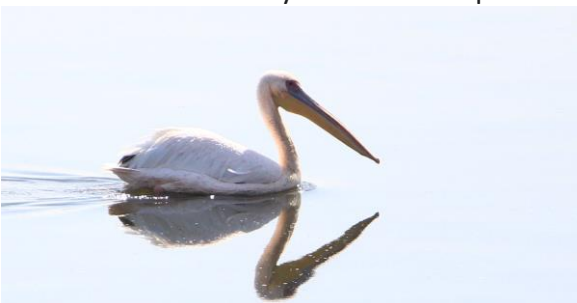
Common name: Oriental darter
Scientific name : Anhinga melanogaster



Common name: Painted stork
Scientific name : Mycteria leucocephala



Common name:
Scientific name :



Common name: billed pelican
Scientific name : Pelecanus philippensis



Common name: Parrots
Scientific name : Psittaciformes



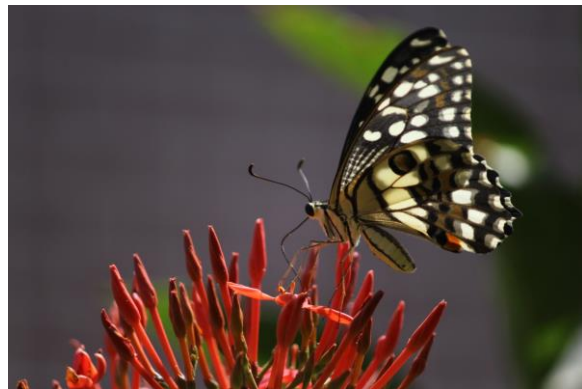
Common name: Robber flies
Scientific name : Asilidae



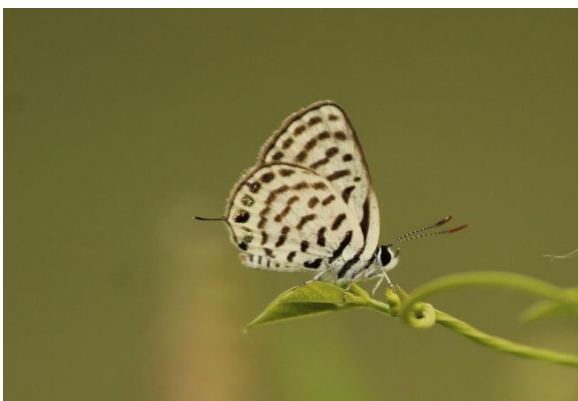
Common name: Dragonfly
Scientific name : Anisoptera



Common name:
Scientific name :



Common name:California sister
Scientific name :Adelpha bredowii



Common name:
Scientific name :



Common name: common tiger
Scientific name : Danaus genutia



Common name: Spotted Joker
Scientific name : *Byblia ilithyia*



Common name: Blue tiger
Scientific name : *Tirumala limniace*



Common name: Signature Spider
Scientific name : *Argiope anasuja*



Common name: button spider
Scientific name : *Latrodectus umbukwane*

ANNEXURE-III : LIST OF RAPTILES SPOTTED IN & AROUND MU



Scientific name: *Rattus rattus*
Common Name : House Rat



Scientific name: *Calotes versicolor* Common
Name : Indian Garden Lizard



Scientific name: *Hoplobatrachus tigerinus*
Common Name : Indian Bull Frog



Scientific name: *Naja naja*
Common Name : Indian Cobra



Marwadi
University
Marwadi Chandarana Group

GREEN AUDIT REPORT

2019-2020

Marwadi University

Rajkot-Morbi Road, Rajkot – 360003
Gujarat, India

Submitted By

Green Audit Team

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ACKNOWLEDGEMENT



Green Audit Assessment Team thanks to the Dean, Marwadi University, Rajkot for assigning the task of Green Audit of the university campus to us. We appreciate the cooperation that we got from all the faculties and students during the entire process. Our special thanks to Prof. (Dr.) Sandeep Sancheti, Provost and Shri Naresh Jadeja, Registrar of the university for their warm support and encouragement from the very beginning till the end of the process.

We are also thankful to the testing and consultancy cell for provided various test report done by them to match requirement of this audit & helping us in collecting different data and analyzing them.

The entire team is very grateful to the management of Marwadi University for their continuous support and motivation to take various innovative and challenging assignments.

Dr. Tarak Vora
Team Leader
Green Audit Team
Marwadi University. Rajkot

DISCLAIMER

Green Audit Team Has prepare this report on the basis of primary data collected from the different areas of the university. All reasonable care has been taken in its preparation: details contained in this report have been compiled in good faith based on information gathered.

Date: 25/03/2020

Prepared by:
Green Audit Team

1. BRIEF ABOUT MARWADI UNIVERSITY

In 2007-08 the availability of world class academic facilities in the Saurashtra region were sparse; which encouraged Marwadi Group, Rajkot to launch Marwadi Education Foundation's Group of Institutes, offering Technical and Professional UG & PG courses and programs such as B.E, MBA and MCA. Marwadi Education Foundation's Group of Institutions (MEFGI) was incepted as a major organ of Marwadi Education Foundation's Group of Institutions in 2008, under the Bombay Public Trust Act 1950. Marwadi Education Foundation's Group of Institutions is a body promoted by Marwadi Shares & Finance Limited; a major stock broking company in India & Chandarana Intermediaries Brokers Pvt. Ltd. Since its inception Marwadi Education Foundation's Group of Institutions were affiliated with Gujarat Technological University.

Commitment to provide best and industry relevant education received an overwhelming trust from the society and in order to blend Engineering with Science and support them through Management and Law disciplines and have multi disciplinary course offerings in Science, Commerce, Arts, Health and Management, Marwadi Education Foundation proposed to establish "Marwadi University" in the Year 2016. Marwadi University bill was introduced and passed in Gujarat Assembly and Marwadi University was established under Gujarat Private Universities act no. 9 of 2016 on 9th May, 2016.

2. VISION & MISSION OF MARWADI UNIVERSITY

2.1 VISION OF THE UNIVERSITY

Our vision is to address challenges facing our society and planet through sterile education that builds capacity of our students and empower them through their innovative thinking practice and character building that will ultimately manifest to boost creativity and responsibility utilizing the limited natural resources to meet with the challenges of the 21st century.

2.2 MISSION OF THE UNIVERSITY

- ✓ To produce creative, responsible and informed professionals.
- ✓ To produce individuals who are digital-age literates, inventive thinkers, effective communicators and highly productive.
- ✓ To deliver cost-effective quality education.
- ✓ To offer world-class, cross-disciplinary education in strategic sectors of economy through well devised and synchronized delivery structure and system, designed to tickle the creative intelligence and enhance the productivity of individuals.
- ✓ To provide a conducive environment that enables and promotes individuals to creatively interact, coordinate, disseminate and examine change, opinion as well as concept that will enable students to experience higher level of learning acquired through ceaseless effort that lead to the development of character, confidence, values and technical skills.

3. GREEN AUDIT

Modernization and industrialization are the two important outputs of the twentieth century that have made human life more luxurious and comfortable. They are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources, and finally making our mother Earth ugly and inhospitable. The time has come to wake up, unite and combat together for a sustainable environment.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, universities, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly university.

3.1 GOALS OF GREEN AUDIT

- The objective of carrying out Green Audit is securing the environment and cut down the threats posed to human health.
- To conduct a survey to know the ground reality about green practices.
- To make sure that rules and regulations are taken care of to save environment.
- To avoid the interruptions in environment that are more difficult to handle and whose correction requires higher cost.
- The long-term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issues.
- To Identify strengths and weaknesses in green practices.

3.2 BENEFITS OF GREEN AUDIT

- It would help to protect the environment in and around the campus.
- Recognize the cost saving methods through waste minimization and management.
- Empower the organization to frame a better environmental performance.
- Point out the prevailing and fourth coming impacts on environment.
- Recognize the cost-saving methods through waste minimizing and managing.
- Ensures conformity with the applicable laws.
- Empower the organizations to frame a better environmental performance.
- Developing an environmental ethic and value systems in youngsters.
- It portrays a good image of an institution which helps building better relationships with the group of interested parties.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the University.
- It will help to build a positive impression through green initiatives for the upcoming NAAC visit.

4. ENVIRONMENTAL POLICY OF THE UNIVERSITY

Marwadi University, Rajkot always believes in maintaining its own standard in matter of environment and quality consciousness. It has taken number of initiatives to protect its own environment with a pollution free campus.

To create a green cover, Eco-friendly atmosphere, pure oxygen at the university campus, a plantation program is organized every year with active participation from the university community and visitors. Green Audit Team owns responsibility to preserve the work carried out on the campus related to the environment.

This also helps in ensuring that the Environmental Policy is enacted, enforced, and reviewed using various environmental awareness programs.

ENVIRONMENTAL POLICY

Both the teaching and Non-teaching staff of Marwadi University Rajkot are committed for carrying out its activity for sustainable development. This we will achieve through the following :-

- i. To educate students and staff on how to appropriately utilize water effectively.
- ii. To put the campus' "Rain Water Harvesting" to use.
- iii. To make the most of the solar energy generated by the solar panels on the roofs of educational buildings.
- iv. To use ICT as much as possible while using paper as little as possible. It will contribute to the "Paperless Office" initiative.
- v. Using vermin-compost on the campus to turn solid waste into fertilizer.
- vi. To lessen the campus' noise pollution.
- vii. To protect and nurture the Flora and Fauna on the campus
- viii. To maintain green campus.
- ix. To use treated waste water for flushing and gardening purpose.
- x. To use recycle the waste material and make them usable.

5. CONSTITUTION FOR GREEN AUDIT

The Green Audit is carried out as per the environmental policy of the Green audit checklist. The aim of the audit is to check the existing practices and provide advice for the development of environmental policy and practice in the areas of:

- ✓ Waste management
- ✓ Management water conservation and management
- ✓ Tree plantations
- ✓ Bio-diversity and threatened/ endangered species
- ✓ Preservations Energy use and conservations
- ✓ Eco-friendly campus
- ✓ Green environment and clean campus
- ✓ Spread environmental awareness
- ✓ Educate the people about sustainability

MEMBERS OF GREEN AUDIT TEAMS

Sr. No.	Name of Auditor	Designation
1	Dr. Tarak Vora	Team Leader
2	Dr. Abhishek Gupta	Member
3	Dr. Archana Sharma	Member
4	Dr. Nitinkumar Singh	Member
5	Dr. Hirendrasinh Padhiyar	Member
6	Mrs. Bhavna Thummar	Member
7	Mr. Raj Chapala	Member
8	Mr. Jyupil Joshi	Member
9	Mr. Devesh Poorey	Member
10	Mr. Ravi Modi	Member
11	Mr. Kalpesh Chandarana	Member

6. OBJECTIVES OF THE STUDY

The green audit's primary goal is to support environmental management and conservation on college campuses. According to the relevant laws, rules, and standards, the audit's goal is to identify, measure, explain, and prioritise the framework for environmental sustainability. The following are the primary goals of doing a green audit:

- ✓ To secure the environment and cut down the threats posed to human health by analysing 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 status report on environmental compliance

7. METHODOLOGY

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

➤ **Water management**

- ✓ Raw Water
- ✓ Drinking Water
- ✓ Waste Water
- ✓ Sewage Water
- ✓ Rain Storm Drain Water

➤ **Energy Conservation**

- ✓ Petrol
- ✓ Diesel
- ✓ LPG
- ✓ Electricity

➤ **Waste management**

- ✓ Domestic Waste
- ✓ Grass Waste

8. FOCUS AREA OF AUDIT

To match with the objective of the green audit, following areas are kept under the scope of the audit.

1. Water management
2. Air Pollution Management
3. Noise Pollution Management
4. Waste Management
5. Green belt area & Bio-diversity

8.1 WATER MANAGEMENT

Water is a valuable natural resource for all living organisms. It is freely available depending on the climate and topographic features of a region. Water is a precious natural national resource available with a fixed quantum. The availability of water is decreasing due to the increasing population of the nation; as per capita availability of utilized water is going down.

Even though it is naturally present, drinking water that is portable is not easily available for human consumption. Just 3% of the water on our planet, which covers 70% of its surface, is fresh water. The world's 1.1 billion inhabitants are experiencing a water crisis. Water issue is greatly impacted by water pollution and waste. An alarming amount of water is being contaminated. Water contamination can cause a variety of illnesses or even death. Because of this, it's crucial to make sure that drinking water is sterile, clean, and free of germs and illnesses. Also, it's crucial to manage, protect, and conserve water resources so that they may be used sustainably. The use and quality of water on the university campus are being studied by our institution. Water auditing is done to assess raw water intake facilities and identify facilities for water treatment and reuse. The concerned auditor looks at the appropriate approach that may be used to balance the supply and demand for water.

USES AND MANAGEMENT

SOURCE OF WATER

Sr. No.	Resource	Quantity
1	GW (Narmada WATER)	-----
2	No of Open Well	02
3	No of Bore-well	03
4	Water reserve - Underground Tank	4 Lack Liters

WATER USERS IN CAMPUS

Sr. No.	Person in different section	Strength (No. of person - Approx)
1	Staff	430
2	Hostel Boarders	1380
3	Residential Family Members	40
4	Visitors	2000
5	Construction Labour	145

The visitors of the college vary with respect to different activities conducted in the college campus. During admission and different competitive exam conducted in the college campus. The total number of visitors of the college increases up to 2000 on such day.

WATER CONSUMPTION IN DIFFERENT ACTIVITY IN COLLEGE CAMPUS

Activity	Water used per activity (in Litter)	No. of times Activity performed in a day	Average water used Person/Day	No. of people using water	Total water consumption per Day
Hand and face wash	4-6 L	4	16-24L	1500	3000
Drinking Water	0.2-0.4L	6	1.2-2.4L	1500	2700
Toilet Flush	8-10L	4	32-40L	1500	54000
Bath	30-40 L	1	30-40 L	1500	52500
Cooking & Washing In resident	150-250L	2	300-500L	54	21600
Cooking & Washing Hostel	10-15L	4	40-60L	1500	75000
Total					235800

WATER QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : DRINKING WATER								
Test Report No / Ref.No. :- TA-191						Date: 10-6-2019		
Name of Customer		Marwadi University, Rajkot						
Address of Customer		Rajkot - Morbi Highway, Gauridad.						
Environmental		Ambient						
Date of Sample		5/6/2019						
Nature of Sample		Colour: Colour less						
Sample Quntity		100 ml						
Packing Type		Plastic bottle						
Type of Sampling		Grab						
Sample Collected By		Mr. Kalpesh Parmar						
Date of analysis		6/6/2019						
Analysis conclude on		10/6/2019						
Sr. No.	Parameter	Units	Test Method	Permissible Limit	Main Building	Main Building	PG Building	Law Building
1	pH	-	APHA 23rd Ed.,2017,4 500-H+B	6.5 - 8.5	7.38	7.26	7.48	7.22
2	TDS	mg/L	APHA 23rd Ed. Method 2540-C	500	155	122	181	128
3	Turbidity	FNU	APHA 23rd Edition 2130-B(Page No.2-13)	1	0.44	0.56	0.83	0.78
4	Conductivity	µs/cm	APHA 23 rd Ed. Titration Method 2510-B	200-800	347	352	341	387
5	Chloride	mg/L	APHA 23rd Ed 4500-Cl-B (Page No.4-75)	250	59	85	48	85
6	Total Hardness	mg/L	APHA 23rd Ed. Method 2510-B	200	108	101	157	188
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied, BDL= Below Detection Limit, MDL = Minimum Detection Limit</p> <p>2. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>3. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>4. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>5. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, -- : Not Applicable</p>								

End of Report

STP TREATED WATER QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : STP WATER SAMPLES							
Test Report No / Ref.No. :- TA-201						Date: 06-12-2019	
Name of Customer		Marwadi University					
Address of Customer		Rajkot - Morbi Highway, Gauridad.					
Date of Sample Collection		01-12-2019					
Sample Collected By		Mr. Deepak bhai					
Sample Tested By		Mr. Raj Chapala, Mr. Avon Dobariya & Mr. Jitesh Joshi					
Date of analysis starts		02-12-2019					
Analysis conclude on		06-12-2019					
Sr. No.	Parameters	Units	Test Method	Acceptable Limit	Inlet	Treated Water (Before Filtration)	Treated Water (After Filtration)
1	pH	-	APHA 23rd Ed.,2017,4500-H+B	6.5-8.5	7.11	7.78	7.51
2	BOD	mg/L	APHA 23rd Ed. Method 2540-C	30	148	89	29
3	COD	mg/L	APHA 23rd Edition 2130B	100	201	110	57
4	TSS	mg/L	APHA 23RD Edition 2540 D	100	118.2	87.4	46.6
5	Turbidity	FNU	APHA 23rd Edition 2130-B	5	16.8	7.9	1.4
6	Oil and Grease	mg/L	APHA 23RD Edition 5520 G	10	18.3	11.1	8.1
7	Ammonical Nitrogen	mg/L	APHA 23RD Edition 4500-NH3 C	5	10.2	2.99	2.05
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. BDL= Below Detection Limit, MDL</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, -- : Not Applicable</p>							

Testing Incharge

Team Leader

OBSERVATIONS IN REGARD OF WATER USAGES AND CONSERVATION PLAN

1. Treated water is used for flushing through dual plumbing system installed in all the buildings.
2. The garden is watered using sprinklers and drip irrigation system installed throughout the campus.
3. Drinking water quality is being tested regularly as per plan.
4. Low flow water fixtures are installed in bathroom and toilets.
5. Water level sensors are installed in the water tank for overflow cutoff.
6. Rainwater harvesting is done in the lake created in the campus.

8.2 AIR POLLUTION MANAGEMENT

PERIODIC AWARENESS PROGRAMME FOR STAFF, STUDENTS AND SOCIETY

The university has consistently run programmes to raise staff, student, and societal awareness of the need to preserve and conserve the environment. Moreover, programmes and rallies on different environmental and health-related topics are organised in order to raise awareness. Students and professors at the university participate in NSS/NCC-related events.

A) MASS TRANSPORTATION FACILITY

As such campus is not generating any air pollution by its own activity except it has its own transportation department. Faculties and students of the university are motivated to use mass transportation system. Faculties are given some advantages for use of the bus facility provided by the university.

All the office bearer are motivated to use the university vehicles on sharing basis. It has been mandated unless and until its an emergency do not use university vehicles for single persons.

AIR QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : AMBIENT AIR					
Name of Customer		Marwadi University			
Address of Customer		Rajkot - Morbi Highway, Gauridad.			
Environmental Condition		Satisfactory			
Date of Sample Collection		29-09-2019			
Nature of Sample		Colour : Colour Less			
Sample Collected By		Jyupil Joshi			
Sample Tested By		Raj Chapala			
Date of analysis starts		30-09-2019			
Analysis conclude on		30-09-2019			
Sr. No.	Parameters	Units	Test Method	Permissible Limit	MAIN BUILDING
1	PM ₁₀	(µg/m ³)	IS 5182 (Part 23) (1999, Reaffirmed 2010)	100	36.48
2	PM _{2.5}	(µg/m ³)	NAAQMS/36/2012-13	60	19.57
3	SO ₂	(µg/m ³)	IS 5182 (Part 2)	80	1.21
4	NO _x	(µg/m ³)	IS 5182 (Part 6)	80	3.58
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. BDL= Below Detection Limit, MDL = Minimum</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, - : Not Applicable</p>					

Testing Incharge

Team Leader

STACK ASSESSMENT REPORT

ANALYSIS REPORT : STACK : DG SET					
Test Report No / Ref.No. :- TA-222				Date:- 15-01-2020	
Name of Customer		Marwadi University, Rajkot			
Address of Customer		Rajkot - Morbi Highway, Gauridad.			
Temperature		31°C			
Weather Condition		Satisfactory			
Date of Sample Collection		14-01-2020			
Nature of Sample		Colour : Colour Less			
Sample Collected By		Dr. Tarak Vora, Mr. Jitesh Joshi & Mr. Jyupil Joshi			
Date of analysis starts		14-01-2020			
Analysis conclude on		15-01-2020			
Sr. No.	Parameters	Units	Test Method	Permissible Limit	DG Set
Stack Height In Meter					10
1	PM	mg/Nm ³	IS 11255 (Part 1)	150	44.79
2	SO₂	ppm	IS 11255 (Part 2)	100	21.22
3	NO_x	ppm	IS 11255 (Part 7)	50	36.21
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit</p>					

End of Report

Dr. Nitin Kumar Singh
Testing Incharge

Dr. Tarak Vora
Quality Manager

8.3 NOISE POLLUTION MANAGEMENT

A) SILENCE ZONES IN THE UNIVERSITY

For awareness of the need to preserve silence at the institution, several display boards have been put up in the library and other locations.

B) NOISE CONTROL IN THE UNIVERSITY

The institution has enacted a no honking policy that forbids the use of any noise on campus, including honking.

On college campuses, noise pollution is maintained to a minimum and designated quiet zones are established in places like the library and classrooms.

C) DG SET FOR POWER BACK-UP

Every time there is a power outage because of load shedding or maintenance on the college campus, the college uses its DG backup system. Noise monitoring of the stack of DG set is being done on regular basis.

NOISE LEVEL ASSESSMENT REPORT

ANALYSIS REPORT : NOISE			
Name of Customer		Marwadi University	
Address of Customer		Rajkot - Morbi Highway, Gauridad.	
Environmental Condition		Satisfactory	
Date of Sample Collection		12-12-2019	
Sr. No.	Location	Permissible limit	Day (dB-A)
1	Main Gate	65	64
2	PG Building		52
3	Hostel Aera		54
4	Main Canteen		53
5	New Canteen		51
<p>*NOTE</p> <ol style="list-style-type: none"> 1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified. 3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing. 4. This office is not responsible for the authenticity for the samples not collected by our officials. 5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only. 6. Permissible Limits: as per Schedule VI of EPA Rules-1986 <p>*ND : Not Detected, BDL : Below Detection Limit</p>			

Testing Incharge

Team Leader

8.4 WASTE MANAGEMENT

Waste management is the managing of waste by disposal and recycling of it. Moreover, waste management needs proper techniques keeping in mind the environmental situations. For instance, there are various methods and techniques by which the waste is disposed of. Some of them are Landfills, Recycling, Composting, etc. Furthermore, these methods are much useful in disposing of the waste without causing any harm to the environment. Waste management is a very crucial aspect of any of the organization. Marwadi university campus is spreaded over 42 acres of land where it is dealing with different types of waste as listed below.

- ✓ Domestic waste
- ✓ Food waste
- ✓ Green waste

OBSERVATIONS

SEGREGATION OF DOMESTIC WASTE

Colour coded dustbins are installed. Three separate dustbins, near each block for disposal of different types of wastes. All the segregated wastes are dumped in the particular dustbins of green, blue, yellow colour.

- ✓ The wet and biodegradable wastes are dumped in green dustbin. For e.g.: kitchen wastes including vegetables and fruits skins.
- ✓ Disposal of plastic wrappers and non-biodegradable wastes are meant for blue coloured dustbin.
- ✓ Papers and glass bottles are disposed in yellow dustbins
- ✓ Cleaning or emptying of the dustbins is being done on a regular basis at an allocated time.

RECYCLING OF WASTE

Vermicomposting is a method of making compost, with the use of earthworms, which generally live-in soil, eat biomass and excrete it in digested form. This compost is generally called vermicompost or Wormicompost. Marwadi University has prepared the composting beds for converting grass waste into the compost. Compost produced through the beds are distributed to the students and faculties of the campus.

INSTALLATION OF BIOGAS PLANT

University has installed 45 CUM capacity biogas plant within the campus. Where the combination of cow dung, food waste and grass waste is used as raw material. Biogas produced from the plant is utilized for cooking in the hostel canteen.

8.5 GREEN BELT AREA & BIO-DIVERSITY

The Green Belt Area is intended to preserve the environment and enhance the visual value of the college grounds. To guarantee that the structures adhere to green standards, the college's green area consists of the campus's vegetation, greenery, and sustainability. Also, by implementing various environmental awareness programmes, this aids in ensuring that the Environmental Policy is adopted, implemented, and evaluated.

OBSERVATIONS

The campus is close to over 50 different types (species) of flora and animals. Via the NSS unit, several tree planting initiatives are held during the months of July and August on college campuses and in the nearby communities. This initiative aids in promoting an eco-friendly atmosphere that gives the institute pure oxygen and raises awareness among the communities. The planting initiative comprises a variety of native decorative and therapeutic plants. The occurrence of similar species planted, such as "NEEM," is noted rather than sustaining biodiversity. Neem, Indian Blackberry Tree, Flame Tree, Mango Tree, Jack Fruit Tree, Teak, and Spanish Cherry Plant are the predominant species in the green belt.

9. EXECUTIVE SUMMERY & RECOMMENDATIONS

The university has created a green environmental policy and is working to promote sustainable growth on the campus. The university has created a team of academics and students that works to preserve biodiversity on the campus and contributes to efforts to reduce pollution in society. The university intends to add environmental management and protection to its curriculum. The university has given faculty and students workshops and trainings on environmental awareness. Low flow water fixtures are installed in the campus. Campus have planned for waste management and taken initiatives towards recycling of waste.


It is also verified that the initiatives on almost all the recommendations of the previous year have been taken by the university which are found satisfactory.


RECOMMENDATIONS

1. Cover energy auditing under the umbrella of green audit.
2. Plan to install solar panels to have green energy utilization
3. Special Tree Plantation shall be celebrated every year on environment day and also competitions for bird species identification and knowing the tree values in terms of medicinal and environment conservation
4. Additional energy meters to be placed to track water and energy usage by building and department.
5. Increase awareness about use of bicycle in campus and conduct cycling events.


ANNEXURE I : LIST OF TREES & PLANTS SPOTTED IN & AROUND MU


A survey was carried out to find plant diversity in the campus of Marwadi University. The survey was focused on the diversity of plants and trees on the basis of their classification and economic importance.


Species Type	Tree	
Botanical Name	<i>Bauhinia purpurea</i>	
Common Name	Butterfly Tree, geranium Tree	
Family	Fabaceae Caesalpinioideae	
Local Names	• Gujarati: Hadayparni	
	• Sanskrit : Kanchanar (red)	


Species Type	Tree	
Botanical Name	<i>Azadirachta indica</i>	
Synonyms	<i>Antelaea indica</i> (L.) Adelb., <i>Melia azadirachta</i> L., <i>Melia indica</i> (A. Juss.) Brandis	
Common Name	Neem	
Family	Meliaceae	
Local Names	• Hindi :	Neem
	• Gujarati :	Limbado , Kadavo Limbado
	• Sanskrit :	Nimba


Species Type	Tree	
Botanical Name	Khaya senegalensis	
Common Name	Senegal Mahogany, African Mahogany, Senegal Khaya	
Family	Meliaceae	
Local Name	• Gujarati: Khaya	


Species Type	Tree	
Botanical Name	Spathodea campanulata	
Common Name	<i>African tulip tree</i>	
Family	Bignoniaceae	
Local Names	• Gujarati: Tulip tree	


Species Type	Tree	
Botanical Name	Samanea saman	
Common Name	Saman, Pukul Lima, Cow Tamarind, Hujan-Hujan, East Indian Walnut, Monkey, rain tree	
Family	Fabaceae (alt. Mimosaceae), legume family	
Local Names	<ul style="list-style-type: none"> • Gujarati: <i>Shirish</i>, • Sanskrit :<i>Shriisha</i> 	


Species Type	Tree	
Botanical Name	<i>Terminalia mantaly</i>	
Common Name	Madagascar Almond, Umbrella Tree	
Family	Combretaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: African tree 	


Species Type	Tree	
Botanical Name	Alstonia scholaris	
Common Name	Scholar Tree, Dita bark, Devil tree, Blackboard Tree	
Family	Apocynaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: <i>Saptaparni</i> • Sanskrit :Saptaparna 	
Uses	<p>Medicinal uses: ⚠️ Its bark, known as Dita Bark, is used in traditional medicine to treat dysentery and fever. In Ayurveda it is used as a bitter and as an astringent herb for treating skin disorders, malarial fever, urticaria, chronic dysentery, diarrhea, in snake bite and for upper purification process of Panchakarma . The Milky juice of the tree is applied to ulcers.</p>	


Species Type	Tree	
Botanical Name	Lagerstroemia speciosa	
Common Name	Giant crepe-myrtle, Queen's crepe-myrtle, banabá plant, or pride of India	
Family	Bignoniaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Jarul, Moto Bhondar • Sanskrit : Syandana 	


Species Type	Tree	
Botanical Name	Senna siamea	
Common Name	kassod tree, cassod tree and cassia tree	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: kashid tree 	


Species Type	Tree	
Botanical Name	Delonix regia	
Common Name	<i>Flame Tree, Royal Poinciana</i>	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Gulmohar • Sanskrit : Raj abharan tree, Krishna chud tree 	


Species Type	Shrub	
Botanical Name	<i>Ocimum gratissimum</i>	
Synonyms	<i>Ocimum gratissimum</i> L.	
Common Name	Shrubby basil, Rama tulsi	
Family	Lamiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Jangli tulasi 	


Species Type	Shrub	
Botanical Name	<i>Hibiscus rosa-sinensis</i>	
Common Name	Jasud, Shoe flower and china rose	
Family	Malvaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati Name-: Jasud 	


Species Type	Shrub	
Botanical Name	<i>Lawsonia inermis</i>	
Synonyms	<i>Lawsonia alba</i> lam., <i>Lawsonia spinosa</i> L.	
Common Name	Mehandi	
Family	Lythraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Mehendi • Gujarati : Mehndi 	


Species Type	Shrub	
Botanical Name	<i>Datura metel</i>	
Synonyms	<i>Datura fastuosa</i> L., <i>Datura fastuosa</i> var. <i>alba</i> (Nees) C.B. Clarke	
Common Name	Dhattura	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Dhotra - Black • Gujarati : Dhaturu 	


Species Type	Shrub	
Botanical Name	<i>Rauvolfia tetraphylla</i>	
Synonyms	<i>Rauvolfia canescens</i> L., <i>Rouvolfia tomentosa</i> Jacq., <i>Rauvolfia tetraphylla</i> L.	
Common Name	Bara Chand	
Family	Apocynaceae	
Local Names	• Gujarati : Sarpagandha	


Species Type	Shrub	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	Touch me not	
Common Name	Ail	
Family	Fabaceae - Mimosoideae	
Local Names	Gujarati : Iajawni	


Species Type	Tree	
Botanical Name	<i>Bauhinia variegata</i>	
Synonyms	<i>Bauhinia candida</i> Roxb.	
Common Name	Mountain ebony, Kachnar	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Kachnar	
	• Sanskrit Kancharan (white)	


Species Type	Tree	
BotanicalName	<i>Bixa orellana</i>	
Synonyms	<i>Bixa orellana</i> L.	
CommonName	Sindhuri	
Family	Bixaceae	
Local Names	• Marathi : Shenduri	


Species Type	Tree	
Botanical Name	Butea monosperma	
Synonyms	<i>Butea frondosa</i> Koenig ex Roxb., <i>Erythrina monosperma</i> Lam., <i>Butea monosperma</i> L.	
Common Name	Palas	
Family	Fabaceae-Papilionioideae	
Local Names	• Marathi : Palas, khakra	
	• Gujarati : Khaakhro	
	• Hindi : Palash	


Species Type	Tree	
Botanical Name	<i>Eucalyptus globulus</i>	
Synonyms	<i>Eucalyptus gigantea</i> Dehn., <i>Eucalyptus glauca</i> DC., <i>Eucalyptus perfoliata</i> Desf., <i>Eucalyptus pulverulenta</i> Link	
Common Name	Australian gum Tree, Eucalyptus	
Family	Myrtaceae	
Local Names	• Marathi : Nilgiri	
	• Gujarati : Nilgiri	


Species Type	Tree	
Botanical Name	<i>Nyctanthes arbo-tristis</i>	
Synonyms	<i>Bruschia macrocarpa</i> Bertol., <i>Nyctanthes arbor-tristis</i> var. <i>dentata</i> Hort.ex Moldenke, <i>Nyctanthes dentata</i> Blume, <i>Nyctanthes tristis</i> Salisb., <i>Parilium arbor-tristis</i> Gaertn., <i>Scabrita triflora</i> L.	
Common Name	Night jasmine, Harshingar	
Family	Nyctanthaceae	
Local Names	<ul style="list-style-type: none"> • Sanskrit : Parijata • Gujarati : Paarijaat 	


Species Type	Tree	
Botanical Name	<i>Peltophorum pterocarpum</i>	
Synonyms	<i>Caesalpinia gleniei</i> Thwaites, <i>Caesalpinia inermis</i> Roxb., <i>Inga pterocarpa</i> DC., <i>Peltophorum ferrugineum</i> (Decne) Benth., <i>Peltophorum inerme</i> (Roxb.) Llanos, <i>Peltophorum roxburghii</i> (G.Don) Degener, <i>Poiciana roxburghii</i> G.Don	
Common Name	Yellow gold mohur	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Taamraparni 	


Species Type	Tree	
Botanical Name	<i>Cocos nucifera</i>	
Common Name	Coconut palm	
Family	Arecaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Naral • Gujarati :Nariyeli 	

Species Type	Tree	
Botanical Name	<i>Ficus religiosa</i>	
Synonyms	Urostigma religiosum (L.) Gasparrini	
Common Name	Bot-Tree, Pipal	
Family	Moraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pimpal 	


Species Type	Tree	
Botanical Name	<i>Mangifera indica</i> L.	
Synonyms	<i>Mangifera indica</i> L.	
Common Name	Aam	
Family	Anacardiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Amba 	


Species Type	Tree	
Botanical Name	<i>Murraya Koenigii</i>	
Synonyms	<i>Bergera koenigii</i> L., <i>Chalcas koenigii</i> (L.) Kurz, <i>Murraya foetidissima</i> Teijsm. & Binnend, <i>Murraya koenigii</i> (L.) Spreng	
Common Name	Indian curry leaf Tree, Mitha neem	
Family	Rutaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : kadhi patta • Gujarati: Mitho Limdo 	


Species Type	Tree	
Botanical Name	<i>Saraca indica</i>	
Common Name	Asoka	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : ashok	
	• Gujarati : Ashok	


Species Type	Tree	
Botanical Name	<i>Tamarindus indica</i>	
Synonyms	<i>Tamarindus occidentalis</i> Gaertn., <i>Tamarindus officinalis</i> Hook.	
Common Name	Tamarind Tree, Imli	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Chinch	
	• Gujarati : Khaati Amli	


Species Type	Herb	
Botanical Name	<i>Aloe barbadensis</i>	
Synonyms	<i>Aloe abyssinica</i> Lam., <i>Aloe chinensis</i> Baker, <i>Aloe indica</i> Royle, <i>Aloe littoralis</i> Koenig ex Baker, <i>Aloe vera</i> (L.) Burm.f., <i>Aloe vulgaris</i> Lam., <i>Alpinia allhugas</i> Roscoe, <i>Aloe barbadensis</i> Mill.	
Common Name	Aloe	
Family	Liliaceae	
Local Names	<ul style="list-style-type: none"> • Marathi :Korphad • Gujarati : Ghrutakumari 	


Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kaasundro 	


Species Type	Herb	
Botanical Name	<i>Catharanthus roseus</i>	
Synonyms	<i>Lochnera rosea</i> (L.) Reichb., <i>Vinca rosea</i> L., <i>Catharanthus roseus</i> (L.) G. Don	
Common Name	Sadabahar	
Family	Apocynaceae	
Local Names	• Marathi : Sadaphuli	


Species Type	Herb	
Botanical Name	<i>Cymbopogon citratus</i>	
Synonyms	<i>Andropogon citratus</i> DC., <i>Cymbopogon citratus</i> (DC.) Stapf	
Common Name	Lemon grass, Gandh-ghas	
Family	Poaceae	
Local Names	• Gujarati : Lili-cha	


Species Type	Herb	
Botanical Name	<i>Elettaria cardamomum</i>	
Common Name	Elaichi	
Family	Scitamineaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : elaichi 	


Species Type	Herb	
Botanical Name	<i>Mentha piperita</i>	
Common Name	Peppermint	
Family	Lamiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pudina • Gujarati : Pudino 	


Species Type	Herb	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	<i>Mimosa pudica</i> L.	
Common Name	Touch-me-not	
Family	Fabaceae-Mimosoideae	
Local Names	• Marathi : Lajwanti	
	• Gujarati : Lajaamni	


Species Type	Herb	
Botanical Name	<i>Ocimum basilicum</i>	
Common Name	Babui tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Sabja, tulas	
	• Gujarati : Damro	


Species Type	Herb	
Botanical Name	<i>Ocimum sanctum</i>	
Synonyms	<i>Ocimum inodurum</i> Burm.	
Common Name	Tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Krishna Tulas	
	• Gujarati : Vishnu Tulsi	


Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : isabgula	


Species Type	Herb	
Botanical Name	<i>Rauvolfia serpentina</i>	
Synonyms	<i>Ophioxylon album</i> Gaertn., <i>Ophioxylon serpentium</i> L., <i>Ophioxylon trifoliatum</i> Gaertn., <i>Rauvolfia trifoliata</i> (Gaertn.) Baill., <i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	
Common Name	Sarpagandha, chota chand	
Family	Apocynaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Sarpagandha • Sanskrit: Sarpagandha 	


Species Type	Herb	
BotanicalName	<i>Solanum surattense</i>	
Synonyms	<i>Solanum mccanni</i> Sant., <i>Solanum xanthocarpum</i> Schrad. & Wendl.	
CommonName	Kantakari, Kateli	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kantkari 	


Species Type	Herb	
Botanical Name	<i>Swertia chirata</i>	
Common Name	Kiryata	
Family	Gentianaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : chirata 	


Species Type	Herbs	
Botanical Name	<i>Zingiber officinale</i>	
Common Name	Adrak	
Family	Zingiberaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Adrak • Gujarati : adu 	


Species Type	<i>Shrub</i>	
Botanical Name	<i>Withania somnifera</i>	
Synonyms	<i>Physalis flexuosa</i> L., <i>Physalis somnifera</i> L., <i>Withania somnifera</i> (L.) Dunal.	
Common Name	Ashwagandha	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Ashwagandha • Gujarati : Ashwagandha 	


Species Type	<i>Herb</i>	
Botanical Name	<i>Kalanchoe pinnata</i>	
Synonyms	<ul style="list-style-type: none"> • Bryophyllum pinnatum (Lam.) Oken. • Bryophyllum calycinum Salisb. • Cotyledon pinnata Lam. 	
Family	Crassulaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : patthar-chatti • Sanskrit : 	

Species Type	Climber	
Botanical Name	<i>Asparagus racemosus</i>	
Synonyms	<i>Asparagus racemosus</i> Willd	
Common Name	Satavari	
Family	Liliaceae	
Local Names	• Marathi : Shatavari	
	• Gujarati : Shatavari	


Species Type	Shrub	
Botanical Name	<i>Adhatoda vasica</i>	
Synonyms	<i>Adhatoda vasica</i> Nees	
Common Name	Malabar nut	
Family	Acanthaceae	
Local Names	• Marathi :	
	• Gujarati :	


Species Type	Tree	
Botanical Name	<i>Pongamia pinnata</i>	
Common Name	Indian beach	
Family	Fabaceae-Papilionioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Karanj • Gujarati : Karanj 	


Species Type	Climber	
Botanical Name	<i>Tylophora indica</i>	
Synonyms	<i>Asclepias asthmatica</i> L. f., <i>Cynanchum bracteatum</i> Thunb., <i>C. indicum</i> Burm. f., <i>Hoya hirsuta</i> Moon. <i>Tylophora asthmatica</i> (L.f.) Wight & Arn.	
Common Name	Indian ipecacuanha	
Family	Asclepiadaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Damvel • Gujarati : Damvel 	


Species Type	Climber	
Botanical Name	<i>Piper longum</i>	
Synonyms	<i>Chavica roxburghii</i> Miq., <i>Piper longum</i> L.	
Common Name	Indian long pepper, Pipal	
Family	Piperaceae	
Local Names	• Marathi : Lendi pimpli	
	• Gujarati :	


Species Type	Herb	
Botanical Name	<i>Bacopa monnieri</i>	
Synonyms	<i>Bacopa monniera</i> (L.) Wettst., <i>Gratiola monniera</i> L., <i>Herpestis monniera</i> Benth., <i>Herpestis monniera</i> (L.) HBK., <i>Lysimachia monnieri</i> L., <i>Moniera cuneifolia</i> Michx.	
Common Name	Thyme-leaved Gratiola , Jal Brahmi	
Family	Scrophulariaceae	
Local Names	• sanskrit : Brahmi	
	• Gujarati :	


Species Type	Herb	
Botanical Name	<i>Eclipta alba</i>	
Common Name	Bhangra	
Family	Asteraceae	
Local Names	• sanskruit : Bhrungaraj	
	• Gujarati : Bhaangro	
	• Hindi : Bhringraj	
	• Marathi : Maka (White)	

Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : Isabgol	

Species Type	Climber	
Botanical Name	<i>Mucuna pruriens</i>	
Synonyms	<i>Carpopogon niveum</i> Roxb., <i>Carpopogon pruriens</i> Roxb., <i>Dolichos pruriens</i> L., <i>Mucuna nivea</i> (Roxb.) DC., <i>Mucuna prurita</i> Hook., <i>Stizolobium pruriens</i> (L.) Medikus	
Common Name	Kawach	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Khaj-kujli - Black • Gujarati : Kaucha 	

Species Type	Herb	
Botanical Name	<i>Trachyspermum ammi</i>	
Common Name	Carum Ajwain	
Family	Apiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Owaa • Gujarati : Kaucha 	

Species Type	Tree	
BotanicalName	<i>Punica granatum</i>	
Synonyms	<i>Punica granatum</i> L.	
CommonName	Anar	
Family	Lythraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Dalimb • Gujarati : Daadam 	

Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Kaasundro • Gujarati : Kaasundro 	

ANNEXURE-II : LIST OF BIRDS SPOTTED IN & AROUND MU

A survey was carried out to find the animal diversity in the campus of Marwadi University Rajkot. The survey focused on the diversity of birds, butterfly, Amphibia.



Common name: Spotted owl
Scientific name : *Strix occidentalis*



Common name: Brahminy kite
Scientific name : *Haliastur indus*



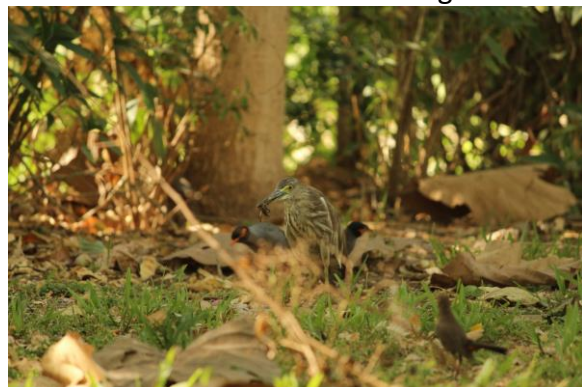
Common name:
Scientific name :



Common name: Common starling
Scientific name : *Sturnus vulgaris*



Common name: Kabae
Scientific name : common Myna



Common name: Pond heron
Scientific name : *Ardeola*



Common name: Woodpecker
Scientific name : Picidae



Common name: common kingfisher
Scientific name : Alcedo atthis



Common name: Purple sunbird
Scientific name : Cinnyris asiaticus



Common name: Common tailorbird
Scientific name : Orthotomus sutorius



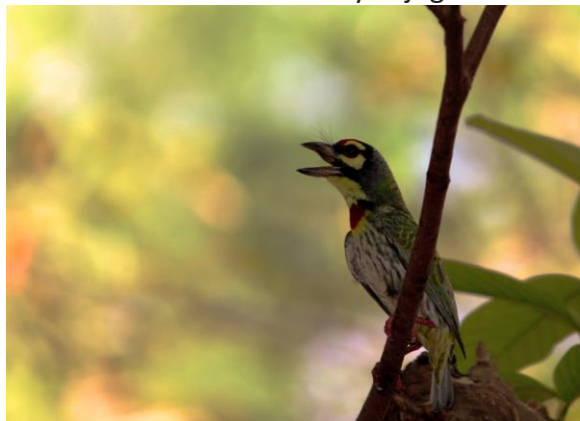
Common name: Asian green bee-eater
Scientific name : Merops orientalis



Common name: olive-backed sunbird
Scientific name : Cinnyris jugularis



Common name: house sparrow
Scientific name : Passer domesticus



Common name: coppersmith barbet
Scientific name : Psilopogon haemacephalus



Common name: Bulbul
Scientific name : Pycnonotidae



Common name: laughing dove
Scientific name : Streptopelia senegalensis



Common name: Little egret
Scientific name : Egretta garzetta



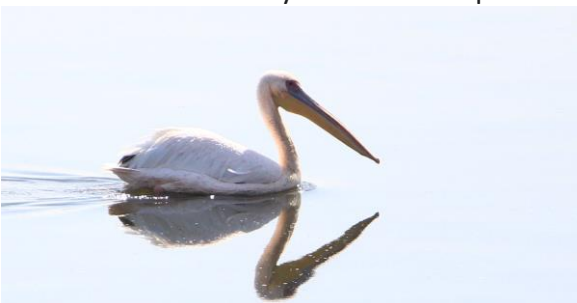
Common name: Oriental darter
Scientific name : Anhinga melanogaster



Common name: Painted stork
Scientific name : Mycteria leucocephala



Common name:
Scientific name :



Common name: billed pelican
Scientific name : Pelecanus philippensis



Common name: Parrots
Scientific name : Psittaciformes



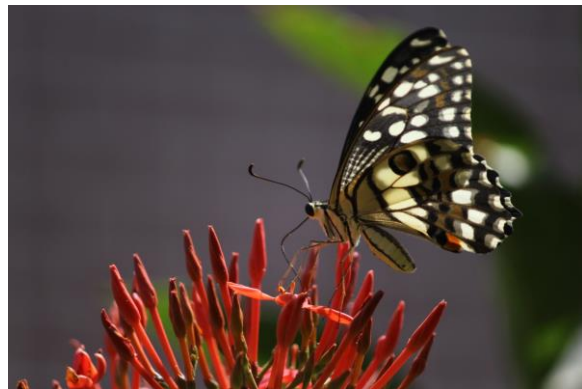
Common name: Robber flies
Scientific name : Asilidae



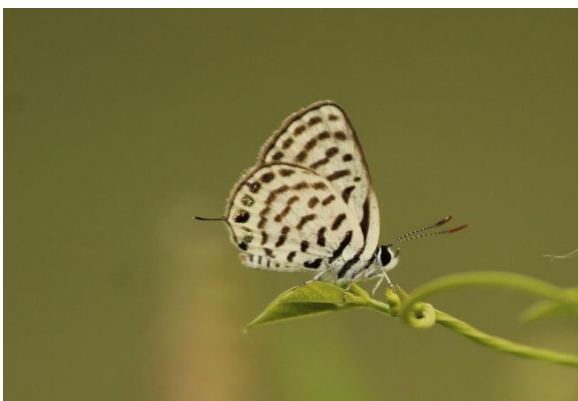
Common name: Dragonfly
Scientific name : Anisoptera



Common name:
Scientific name :



Common name:California sister
Scientific name :Adelpha bredowii



Common name:
Scientific name :



Common name: common tiger
Scientific name : Danaus genutia



Common name: Spotted Joker
Scientific name : *Byblia ilithyia*



Common name: Blue tiger
Scientific name : *Tirumala limniace*



Common name: Signature Spider
Scientific name : *Argiope anasuja*



Common name: button spider
Scientific name : *Latrodectus umbukwane*

ANNEXURE-III : LIST OF RAPTILES SPOTTED IN & AROUND MU



Scientific name: *Rattus rattus*
Common Name : House Rat



Scientific name: *Calotes versicolor* Common
Name : Indian Garden Lizard



Scientific name: *Hoplobatrachus tigerinus*
Common Name : Indian Bull Frog



Scientific name: *Naja naja*
Common Name : Indian Cobra



Marwadi
University
Marwadi Chandarana Group

GREEN AUDIT REPORT

2020-2021



Marwadi University

Rajkot-Morbi Road, Rajkot – 360003
Gujarat, India

Submitted By

Green Audit Team

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ACKNOWLEDGEMENT



Green Audit Assessment Team thanks to the Dean, Marwadi University, Rajkot for assigning the task of Green Audit of the university campus to us. We appreciate the cooperation that we got from all the faculties and students during the entire process. Our special thanks to Prof. (Dr.) Sandeep Sancheti, Provost and Shri Naresh Jadeja, Registrar of the university for their warm support and encouragement from the very beginning till the end of the process.

We are also thankful to the testing and consultancy cell for provided various test report done by them to match requirement of this audit & helping us in collecting different data and analyzing them.

We are also thankful to all the students, faculties and staff for provide help at different level to collect the various details as per the requirement of this green audit.

The entire team is very grateful to the management of Marwadi University for their continuous support and motivation to take various innovative and challenging assignments.

Dr. Tarak Vora
Team Leader
Green Audit Team
Marwadi University. Rajkot

DISCLAIMER

Green Audit Team Has prepare this report on the basis of primary data collected from the different areas of the university. All reasonable care has been taken in its preparation: details contained in this report have been compiled in good faith based on information gathered.

Date: 25/03/2021

Prepared by:
Green Audit Team

1. BRIEF ABOUT MARWADI UNIVERSITY

In 2007-08 the availability of world class academic facilities in the Saurashtra region were sparse; which encouraged Marwadi Group, Rajkot to launch Marwadi Education Foundation's Group of Institutes, offering Technical and Professional UG & PG courses and programs such as B.E, MBA and MCA. Marwadi Education Foundation's Group of Institutions (MEFGI) was incepted as a major organ of Marwadi Education Foundation's Group of Institutions in 2008, under the Bombay Public Trust Act 1950. Marwadi Education Foundation's Group of Institutions is a body promoted by Marwadi Shares & Finance Limited; a major stock broking company in India & Chandarana Intermediaries Brokers Pvt. Ltd. Since its inception Marwadi Education Foundation's Group of Institutions were affiliated with Gujarat Technological University.

Commitment to provide best and industry relevant education received an overwhelming trust from the society and in order to blend Engineering with Science and support them through Management and Law disciplines and have multi disciplinary course offerings in Science, Commerce, Arts, Health and Management, Marwadi Education Foundation proposed to establish "Marwadi University" in the Year 2016. Marwadi University bill was introduced and passed in Gujarat Assembly and Marwadi University was established under Gujarat Private Universities act no. 9 of 2016 on 9th May, 2016.

2. VISION & MISSION OF MARWADI UNIVERSITY

2.1 VISION OF THE UNIVERSITY

Our vision is to address challenges facing our society and planet through sterile education that builds capacity of our students and empower them through their innovative thinking practice and character building that will ultimately manifest to boost creativity and responsibility utilizing the limited natural resources to meet with the challenges of the 21st century

2.2 MISSION OF THE UNIVERSITY

- ✓ To produce creative, responsible and informed professionals.
- ✓ To produce individuals who are digital-age literates, inventive thinkers, effective communicators and highly productive.
- ✓ To deliver cost-effective quality education.
- ✓ To offer world-class, cross-disciplinary education in strategic sectors of economy through well devised and synchronized delivery structure and system, designed to tickle the creative intelligence and enhance the productivity of individuals.
- ✓ To provide a conducive environment that enables and promotes individuals to creatively interact, coordinate, disseminate and examine change, opinion as well as concept that will enable students to experience higher level of learning acquired through ceaseless effort that lead to the development of character, confidence, values and technical skills.

3. GREEN AUDIT

Modernization and industrialization are the two important outputs of the twentieth century that have made human life more luxurious and comfortable. They are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources, and finally making our mother Earth ugly and inhospitable. The time has come to wake up, unite and combat together for a sustainable environment.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, universities, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly university.

3.1 GOALS OF GREEN AUDIT

- The objective of carrying out Green Audit is securing the environment and cut down the threats posed to human health.
- To conduct a survey to know the ground reality about green practices.
- To make sure that rules and regulations are taken care of to save environment.
- To avoid the interruptions in environment that are more difficult to handle and whose correction requires higher cost.
- The long-term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issues.
- To Identify strengths and weaknesses in green practices.

3.2 BENEFITS OF GREEN AUDIT

- It would help to protect the environment in and around the campus.
- Recognize the cost saving methods through waste minimization and management.
- Empower the organization to frame a better environmental performance.
- Point out the prevailing and fourth coming impacts on environment.
- Recognize the cost-saving methods through waste minimizing and managing.
- Ensures conformity with the applicable laws.
- Empower the organizations to frame a better environmental performance.
- Developing an environmental ethic and value systems in youngsters.
- It portrays a good image of an institution which helps building better relationships with the group of interested parties.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the University.
- It will help to build a positive impression through green initiatives for the upcoming NAAC visit.

4. ENVIRONMENTAL POLICY OF THE UNIVERSITY

Marwadi University, Rajkot always believes in maintaining its own standard in matter of environment and quality consciousness. It has taken number of initiatives to protect its own environment with a pollution free campus.

To create a green cover, Eco-friendly atmosphere, pure oxygen at the university campus, a plantation program is organized every year with active participation from the university community and visitors. Green Audit Team owns responsibility to preserve the work carried out on the campus related to the environment.

This also helps in ensuring that the Environmental Policy is enacted, enforced, and reviewed using various environmental awareness programs.

ENVIRONMENTAL POLICY

Both the teaching and Non-teaching staff of Marwadi University Rajkot are committed for carrying out its activity for sustainable development. This we will achieve through the following :-

- i. To educate students and staff on how to appropriately utilize water effectively.
- ii. To put the campus' "Rain Water Harvesting" to use.
- iii. To make the most of the solar energy generated by the solar panels on the roofs of educational buildings.
- iv. To use ICT as much as possible while using paper as little as possible. It will contribute to the "Paperless Office" initiative.
- v. Using vermin-compost on the campus to turn solid waste into fertilizer.
- vi. To lessen the campus' noise pollution.
- vii. To protect and nurture the Flora and Fauna on the campus
- viii. To maintain green campus.
- ix. To use treated waste water for flushing and gardening purpose.
- x. To use recycle the waste material and make them usable.

5. CONSTITUTION FOR GREEN AUDIT

The Green Audit is carried out as per the environmental policy of the Green audit checklist. The aim of the audit is to check the existing practices and provide advice for the development of environmental policy and practice in the areas of:

- ✓ Waste management
- ✓ Management water conservation and management
- ✓ Tree plantations
- ✓ Bio-diversity and threatened/ endangered species
- ✓ Preservations Energy use and conservations
- ✓ Eco-friendly campus
- ✓ Green environment and clean campus
- ✓ Spread environmental awareness
- ✓ Educate the people about sustainability

MEMBERS OF GREEN AUDIT TEAMS

Sr. No.	Name of Auditor	Designation
1	Dr. Tarak Vora	Team Leader
2	Dr. Abhishek Gupta	Member
3	Dr. Archana Sharma	Member
4	Dr. Nitinkumar Singh	Member
5	Dr. Hirendrasinh Padhiyar	Member
6	Mrs. Bhavna Thummar	Member
7	Mr. Raj Chapala	Member
8	Mr. Jyupil Joshi	Member
9	Mr. Devesh Poorey	Member
10	Mr. Ravi Modi	Member
11	Mr. Sachin Parmar	Member
12	Mr. Kalpesh Chandarana	Member

6. OBJECTIVES OF THE STUDY

The green audit's primary goal is to support environmental management and conservation on college campuses. According to the relevant laws, rules, and standards, the audit's goal is to identify, measure, explain, and prioritise the framework for environmental sustainability. The following are the primary goals of doing a green audit:

- ✓ To secure the environment and cut down the threats posed to human health by analysing 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 status report on environmental compliance

7. METHODOLOGY

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

➤ **Water management**

- ✓ Raw Water
- ✓ Drinking Water
- ✓ Waste Water
- ✓ Sewage Water
- ✓ Rain Storm Drain Water

➤ **Energy Conservation**

- ✓ Petrol
- ✓ Diesel
- ✓ LPG
- ✓ Electricity

➤ **Waste management**

- ✓ Domestic Waste Management
- ✓ Grass Waste Management
- ✓ Food Waste Management
- ✓ Fiscal Waste Management

8. FOCUS AREA OF AUDIT

To match with the objective of the green audit, following areas are kept under the scope of the audit.

1. Water management
2. Air Pollution Management
3. Noise Pollution Management
4. Energy use & conservation
5. Waste Management
6. Green belt area & Bio-diversity
7. Environmental Awareness initiative

8.1 WATER MANAGEMENT

Water is a valuable natural resource for all living organisms. It is freely available depending on the climate and topographic features of a region. Water is a precious natural national resource available with a fixed quantum. The availability of water is decreasing due to the increasing population of the nation; as per capita availability of utilized water is going down.

Even though it is naturally present, drinking water that is portable is not easily available for human consumption. Just 3% of the water on our planet, which covers 70% of its surface, is fresh water. The world's 1.1 billion inhabitants are experiencing a water crisis. Water issue is greatly impacted by water pollution and waste. An alarming amount of water is being contaminated. Water contamination can cause a variety of illnesses or even death. Because of this, it's crucial to make sure that drinking water is sterile, clean, and free of germs and illnesses. Also, it's crucial to manage, protect, and conserve water resources so that they may be used sustainably. The use and quality of water on the university campus are being studied by our institution. Water auditing is done to assess raw water intake facilities and identify facilities for water treatment and reuse. The concerned auditor looks at the appropriate approach that may be used to balance the supply and demand for water.

USES AND MANAGEMENT

SOURCE OF WATER

Sr. No.	Resource	Quantity
1	GWI (Narmada WATER)	-----
2	No of Open Well	02
3	No of Bore-well	03
4	Water reserve - Underground Tank	4 Lakh liters

WATER USERS IN CAMPUS

Sr. No.	Person in different section	Strength (No. of person - Approx)
1	Staff	450
2	Hostel Boarders	1400
3	Residential Family Members	40
4	Visitors	2000
5	Construction Labour	125

The visitors of the college vary with respect to different activities conducted in the college campus. During admission and different competitive exam conducted in the college campus. The total number of visitors of the college increases up to 2000 on such day.

WATER CONSUMPTION IN DIFFERENT ACTIVITYIN COLLEGE CAMPUS

Activity	Water used per activity (in Litter)	No. of times Activity performed in a day	Average water used Person/Day	No. of people using water	Total water consumption per Day
Hand and face wash	4-6 L	4	16-24L	1550	31000
Drinking Water	0.2-0.4L	6	1.2-2.4L	1550	2790
Toilet Flush	8-10L	4	32-40L	1550	55800
Bath	30-40 L	1	30-40 L	1550	54250
Cooking & Washing In resident	150-250L	2	300-500L	40	16000
Cooking & Washing Hostel	10-15L	4	40-60L	1550	77500
Total					237340

WATER QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : DRINKING WATER									
Test Report No / Ref.No. :- TA-421								Date: 10-1-2021	
Name of Customer		Marwadi University, Rajkot							
Address of Customer		Rajkot - Morbi Highway, Gauridad.							
Environmental Condition		Ambient							
Date of Sample Collection		5/1/2021							
Nature of Sample		Colour: Colour less							
Sample Quantity		100 ml							
Packing Type		Plastic bottle							
Type of Sampling		Grab							
Sample Collected By		Mr. Kalpesh Parmar							
Date of analysis starts		6/1/2021							
Analysis conclude on		10/1/2021							
Sr. No.	Parameters	Units	Test Method	Permissible Limit	Hostel-A	Hostel-B	Hostel-C	Hostel-D	International Canteen
1	pH	-	APHA 23rd Ed.,2017,4500-H+B	6.5 - 8.5	7.06	7.28	7.22	7.41	7.36
2	TDS	mg/L	APHA 23rd Ed. Method 2540-C	500	74	85.3	97.6	142	102
3	Turbidity	FNU	APHA 23rd Edition 2130-B (Page No.2-13)	1	0.52	0.48	0.51	0.48	0.44
4	Conductivity	µs/cm	APHA 23 rd Ed. Titration Method 2510-B	200-800	202.4	199.8	206.4	322	204
5	Chloride	mg/L	APHA 23rd Ed 4500-Cl- B (Page No.4-75)	250	41	40	40	54	43
6	Total Hardness	mg/L	APHA 23rd Ed. Method 2510-B	200	64	52	76	148	122
<small> *NOTE 1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied, BDL- Below Detection Limit, MDL - Minimum Detection Limit 2. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing. 3. This office is not responsible for the authenticity for the samples not collected by our officials. 4. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat jurisdiction only. 5. Permissible Limits: as per Schedule VI of EPA Rules-1986 *ND : Not Detected, BDL : Below Detection Limit, - : Not Applicable </small>									

End of Report

 Dr. Nitin Kumar Singh
 Testing Incharge

 Dr. Tarak Vora
 Quality Manager

STP TREATED WATER QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : STP WATER SAMPLES							
Test Report No / Ref.No. :- TA-401						Date: 06-12-2020	
Name of Customer		Marwadi University					
Address of Customer		Rajkot - Morbi Highway, Gauridad.					
Date of Sample Collection		01-12-2020					
Sample Collected By		Mr. Deepak bhai					
Sample Tested By		Mr. Raj Chapala, Mr. Avon Dobariya & Mr. Jitesh Joshi					
Date of analysis starts		02-12-2020					
Analysis conclude on		06-12-2020					
Sr. No.	Parameters	Units	Test Method	Acceptable Limit	Inlet	Treated Water (Before Filtration)	Treated Water (After Filtration)
1	pH	-	APHA 23rd Ed.,2017,4500-H+B	6.5-8.5	7.21	7.48	7.25
2	BOD	mg/L	APHA 23rd Ed. Method 2540-C	30	123	87	54
3	COD	mg/L	APHA 23rd Edition 2130B	100	188	112	54
4	TSS	mg/L	APHA 23RD Edition 2540 D	100	118.7	88.8	45.7
5	Turbidity	FNU	APHA 23rd Edition 2130-B	5	18.8	8.1	2.3
6	Oil and Grease	mg/L	APHA 23RD Edition 5520 G	10	15.8	12.3	3.6
7	Ammonical Nitrogen	mg/L	APHA 23RD Edition 4500-NH3 C	5	11.2	3.05	2.2
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.,BDL= Below Detection Limit, MDL</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, -- : Not Applicable</p>							

Testing Incharge

Team Leader

OBSERVATIONS IN REGARD OF WATER USAGES AND CONSERVATION PLAN

1. Treated water is used for flushing through dual plumbing system installed in all the buildings.
2. The garden is watered using sprinklers and drip irrigation system installed throughout the campus.
3. Drinking water quality is being tested regularly as per plan.
4. Low flow water fixtures are installed in bathroom and toilets.
5. Water level sensors are installed in the water tank for overflow cutoff.
6. Rainwater harvesting is done in the lake created in the campus.
7. Rainwater is being recharged in the bore.
8. Displays about the saving water are placed at various locations in the campus.

8.2 AIR POLLUTION MANAGEMENT

PERIODIC AWARENESS PROGRAMME FOR STAFF, STUDENTS AND SOCIETY

The university has consistently run programmes to raise staff, student, and societal awareness of the need to preserve and conserve the environment. Moreover, programmes and rallies on different environmental and health-related topics are organised in order to raise awareness. Students and professors at the university participate in NSS/NCC-related events.

A) MASS TRANSPORTATION FACILITY

As such campus is not generating any air pollution by its own activity except it has its own transportation department. Faculties and students of the university are motivated to use mass transportation system. Faculties are given some advantages for use of the bus facility provided by the university. Regular maintenance of all the buses are planned and executed so that their mileage as well as emission would remain efficient.

All the office bearer are motivated to use the university vehicles on sharing basis. It has been mandated unless and until its an emergency do not use university vehicles for single persons.

AIR QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : AMBIENT AIR					
Name of Customer	Marwadi University				
Address of Customer	Rajkot - Morbi Highway, Gauridad.				
Environmental Condition	Satisfactory				
Date of Sample Collection	07-10-2020				
Nature of Sample	Colour : Colour Less				
Sample Collected By	Jyupil Joshi				
Sample Tested By	Raj Chapala				
Date of analysis starts	08-10-2020				
Analysis conclude on	09-10-2020				
Sr. No.	Parameters	Units	Test Method	Permissible Limit	MAIN BUILDING
1	PM₁₀	(µg/m ³)	IS 5182 (Part 23) (1999, Reaffirmed 2010)	100	41.35
2	PM_{2.5}	(µg/m ³)	NAAQMS/36/2012-13	60	12.59
3	SO₂	(µg/m ³)	IS 5182 (Part 2)	80	1.38
4	NO_x	(µg/m ³)	IS 5182 (Part 6)	80	2.58
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. BDL= Below Detection Limit, MDL = Minimum</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, - : Not Applicable</p>					

Testing Incharge

Team Leader

STACK ASSESSMENT REPORT

ANALYSIS REPORT : STACK : DG SET					
Test Report No / Ref.No. :- TA-422			Date:- 19-01-2021		
Name of Customer	Marwadi University, Rajkot				
Address of Customer	Rajkot - Morbi Highway, Gauridad.				
Temperature	31°C				
Weather Condition	Satisfactory				
Date of Sample Collection	18-01-2021				
Nature of Sample	Colour : Colour Less				
Sample Collected By	Dr. Tarak Vora, Mr. Jitesh Joshi & Mr. Jyupil Joshi				
Date of analysis starts	18-01-2021				
Analysis conclude on	19-01-2021				
Sr. No.	Parameters	Units	Test Method	Permissible Limit	DG Set
Stack Height In Meter					10
1	PM	mg/Nm ³	IS 11255 (Part 1)	150	45.8
2	SO ₂	ppm	IS 11255 (Part 2)	100	29.3
3	NO _x	ppm	IS 11255 (Part 7)	50	22.8
*NOTE 1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified. 3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing. 4. This office is not responsible for the authenticity for the samples not collected by our officials. 5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only. 6. Permissible Limits: as per Schedule VI of EPA Rules-1986 *ND : Not Detected, BDL : Below Detection Limit					

End of Report

Dr. Nitin Kumar Singh
Testing Incharge

Dr. Tarak Vora
Quality Manager

8.3 NOISE POLLUTION MANAGEMENT

A) SILENCE ZONES IN THE UNIVERSITY

For awareness of the need to preserve silence at the institution, several display boards have been put up in the library and other locations.

B) NOISE CONTROL IN THE UNIVERSITY

The institution has enacted a no honking policy that forbids the use of any noise on campus, including honking.

On college campuses, noise pollution is maintained to a minimum and designated quiet zones are established in places like the library and classrooms.

C) DG SET FOR POWER BACK-UP

Every time there is a power outage because of load shedding or maintenance on the college campus, the college uses its DG backup system. Noise monitoring of the stack of DG set is being done on regular basis.

NOISE LEVEL ASSESSMENT REPORT

ANALYSIS REPORT : NOISE			
Name of Customer		Marwadi University	
Address of Customer		Rajkot - Morbi Highway, Gauridad.	
Environmental Condition		Satisfactory	
Date of Sample Collection		01-12-2020	
Sr. No.	Location	Permissible limit	Day (dB-A)
1	Main Gate	65	61
2	PG Building		54
3	Hostel Aera		51
4	Main Canteen		55
5	New Canteen		52
<p>*NOTE</p> <ol style="list-style-type: none"> 1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified. 3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing. 4. This office is not responsible for the authenticity for the samples not collected by our officials. 5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only. 6. Permissible Limits: as per Schedule VI of EPA Rules-1986 <p>*ND : Not Detected, BDL : Below Detection Limit</p>			

Testing Incharge

Team Leader

8.4 ENERGY USE AND CONSERVATION

Energy use, energy sources, energy monitoring, lights, appliances, natural gas, and cars are all included by this indication. Energy usage is obviously a crucial component of campus sustainability, therefore its inclusion in the assessment needs no justification.

Following Energy Sources are used in the college

- ✓ Electrical
- ✓ Diesel
- ✓ Petrol
- ✓ LPG

OBSERVATIONS

- University has installed electrical meters at various locations to understand the power usage pattern.
- University is doing energy audit on yearly basis as per the planned schedule.
- University is in the installation stage for 650 kVA rooftop solar panel within the campus. This meets almost 50% of its total demand.
- Sensor based lights are installed in the main building.
- University is converting all the lights to the LED lights phase wise as per the plan.

8.5 WASTE MANAGEMENT

Waste management is the managing of waste by disposal and recycling of it. Moreover, waste management needs proper techniques keeping in mind the environmental situations. For instance, there are various methods and techniques by which the waste is disposed of. Some of them are Landfills, Recycling, Composting, etc. Furthermore, these methods are much useful in disposing of the waste without causing any harm to the environment. Waste management is a very crucial aspect of any of the organization. Marwadi university campus is spreaded over 42 acres of land where it is dealing with different types of waste as listed below.

- ✓ Domestic waste
- ✓ Food waste
- ✓ Green waste

- ✓ Fiscal waste

OBSERVATIONS

SEGREGATION OF DOMESTIC WASTE

Colour coded dustbins are installed. Three separate dustbins, near each block for disposal of different types of wastes. All the segregated wastes are dumped in the particular dustbins of green, blue, yellow colour.

- ✓ The wet and biodegradable wastes are dumped in green dustbin. For e.g.: kitchen wastes including vegetables and fruits skins.
- ✓ Disposal of plastic wrappers and non-biodegradable wastes are meant for blue coloured dustbin.
- ✓ Papers and glass bottles are disposed in yellow dustbins
- ✓ Cleaning or emptying of the dustbins is being done on a regular basis at an allocated time.

200 KLD STP PLANT

Recycling of water is the crucial thing when water consumption is high in the organization. University has setup a 200 kLD Sewage Treatment Plant in the campus. Treated water is being used for gardening purpose. Excess treated water is used in the flushing as all the buildings are installed with dual plumbing system to utilized treated water in flushing.

RECYCLING OF WASTE

Vermicomposting is a method of making compost, with the use of earthworms, which generally live-in soil, eat biomass and excrete it in digested form. This compost is generally called vermicompost or Wormicompost. Marwadi University has prepared the composting beds for converting grass waste into the compost. Compost produced through the beds are distributed to the students and faculties of the campus.

INSTALLATION OF BIOGAS PLANT

University has installed 45 CUM capacity biogas plant within the campus. Where the combination of cow dung, food waste and grass waste is used as raw material. Biogas produced from the plant is utilized for cooking in the hostel canteen.

8.6 GREEN BELT AREA & BIO-DIVERSITY

The Green Belt Area is intended to preserve the environment and enhance the visual value of the college grounds. To guarantee that the structures adhere to green standards, the college's green area consists of the campus's vegetation, greenery, and sustainability. Also, by implementing various environmental awareness programmes, this aids in ensuring that the Environmental Policy is adopted, implemented, and evaluated.

OBSERVATIONS

The campus is close to over 60 different types (species) of flora and animals. Via the NSS unit, several tree planting initiatives are held during the months of July and August on college campuses and in the nearby communities. This initiative aids in promoting an eco-friendly atmosphere that gives the institute pure oxygen and raises awareness among the communities. The planting initiative comprises a variety of native decorative and therapeutic plants. The occurrence of similar species planted, such as "NEEM," is noted rather than sustaining biodiversity. Neem, Indian Blackberry Tree, Flame Tree, Mango Tree, Jack Fruit Tree, Teak, and Spanish Cherry Plant are the predominant species in the green belt.

8.7 ENVIRONMENTAL AWARENESS INITIATIVES

Marwadi University regularly educates employees and faculty on how to use bicycles, how to use paper responsibly, and how to establish a plantation aim. Some of the steps done include the display of environmental protection banners, signs encouraging people to save electricity and water in prominent locations, and garbage disposal containers for both wet and dry waste.

9. EXECUTIVE SUMMARY & RECOMMENDATIONS

The university has created a green environmental policy and is working to promote sustainable growth on the campus. The university has created a team of academics and students that works to preserve biodiversity on the campus and contributes to efforts to reduce pollution in society. The university intends to add environmental management and protection to its curriculum. The university has given faculty and students workshops and trainings on environmental awareness. Low flow water fixtures are installed in the campus. Campus have planned for waste management and taken initiatives towards recycling of waste. Green audit has also covered energy parameters also in the observation this time; however, detailed energy audit is being conducted by electrical department on yearly basis.

It is also verified that the initiatives on almost all the recommendations of the previous year have been taken by the university which are found satisfactory.

GOOD POINTS OBSERVED


- ✓ The university has formed a policy on green environmental and contributing to promote sustainable growth on the campus.
- ✓ A team is formed by the university including a team of academicians and students that works to preserve and improve biodiversity on the campus. Contributions have been made by the team to reduce pollution in society.
- ✓ It is planned to install solar panel to cover almost 50% of the power requirement of the campus.
- ✓ Environmental awareness and education programs are conducted by the university on regular basis.
- ✓ Five beds for vermicomposting has been set up at the university to spread awareness about waste conversion and utilization as well as for research.


RECOMMENDATIONS


1. Environmental awareness and education should be scaled up in a planned manner.
2. Plan for green belt development to be prepared
3. Awareness for energy and water conservation among students and staff by displaying boards.
4. Installation of solar panel should done be done on priority basis.
5. Watering schedule to be planned according the season


ANNEXURE I : LIST OF TREES & PLANTS SPOTTED IN & AROUND MU


A survey was carried out to find plant diversity in the campus of Marwadi University. The survey was focused on the diversity of plants and trees on the basis of their classification and economic importance.


Species Type	Tree	
Botanical Name	<i>Bauhinia purpurea</i>	
Common Name	Butterfly Tree, geranium Tree	
Family	Fabaceae Caesalpinioideae	
Local Names	• Gujarati: Hadayparni	
	• Sanskrit : Kanchanar (red)	


Species Type	Tree	
Botanical Name	<i>Azadirachta indica</i>	
Synonyms	<i>Antelaea indica</i> (L.) Adelb., <i>Melia azadirachta</i> L., <i>Melia indica</i> (A. Juss.) Brandis	
Common Name	Neem	
Family	Meliaceae	
Local Names	• Hindi :	Neem
	• Gujarati :	Limbado , Kadavo Limbado
	• Sanskrit :	Nimba


Species Type	Tree	
Botanical Name	Khaya senegalensis	
Common Name	Senegal Mahogany, African Mahogany, Senegal Khaya	
Family	Meliaceae	
Local Name	• Gujarati: Khaya	


Species Type	Tree	
Botanical Name	Spathodea campanulata	
Common Name	<i>African tulip tree</i>	
Family	Bignoniaceae	
Local Names	• Gujarati: Tulip tree	


Species Type	Tree	
Botanical Name	Samanea saman	
Common Name	Saman, Pukul Lima, Cow Tamarind, Hujan-Hujan, East Indian Walnut, Monkey, rain tree	
Family	Fabaceae (alt. Mimosaceae), legume family	
Local Names	<ul style="list-style-type: none"> • Gujarati: <i>Shirish</i>, • Sanskrit :<i>Shiriisha</i> 	


Species Type	Tree	
Botanical Name	<i>Terminalia mantaly</i>	
Common Name	Madagascar Almond, Umbrella Tree	
Family	Combretaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: African tree 	


Species Type	Tree	
Botanical Name	Alstonia scholaris	
Common Name	Scholar Tree, Dita bark, Devil tree, Blackboard Tree	
Family	Apocynaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: <i>Saptaparni</i> • Sanskrit :Saptaparna 	
Uses	<p>Medicinal uses: ⚠️ Its bark, known as Dita Bark, is used in traditional medicine to treat dysentery and fever. In Ayurveda it is used as a bitter and as an astringent herb for treating skin disorders, malarial fever, urticaria, chronic dysentery, diarrhea, in snake bite and for upper purification process of Panchakarma . The Milky juice of the tree is applied to ulcers.</p>	


Species Type	Tree	
Botanical Name	Lagerstroemia speciosa	
Common Name	Giant crepe-myrtle, Queen's crepe-myrtle, banabá plant, or pride of India	
Family	Bignoniaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Jarul, Moto Bhondar • Sanskrit : Syandana 	


Species Type	Tree	
Botanical Name	Senna siamea	
Common Name	kassod tree, cassod tree and cassia tree	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: kashid tree 	

Species Type	Tree	
Botanical Name	Delonix regia	
Common Name	<i>Flame Tree, Royal Poinciana</i>	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Gulmohar • Sanskrit : Raj abharan tree, Krishna chud tree 	


Species Type	Tree	
Botanical Name	Tabebuia rosea	
Common Name	Salvador Pink Trumpet Tree	
Family	Bignoniaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Vasant Rani 	


Species Type	Tree	
Botanical Name	<i>Cassia fistula</i>	
Common Name	Golden shower tree, Amaltas	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Garmalo • Sanskrit : Aragwadha 	
Uses	<p>specially used in joint pain, migraine, chest pain and blood dysentery. Amaltas root is also useful in fever, heart diseases, retained excretions and biliousness. It is also used in cardiac disorders biliousness, rheumatic condition, haemorrhages, wounds, ulcers and boils and various skin diseases.</p>	


Species Type	Small Tree	
Botanical Name	Melaleuca citrina	
Common Name	Bottlebrush, crimson bottlebrush, or lemon bottlebrush tree	
Family	Myrtaceae	
Local Names	• Gujarati: Cheel	


Species Type	Small Tree (flower)	
Botanical Name	Plumeria Alba	
Common Name	Champa, Gulchin	
Family	Apocynaceae	
Local Names	• Gujarati: Champa	


Species Type	Tree	
Botanical Name	Mimusops elengi	
Common Name	Borsalli, Bakul, Spanish Cherry	
Family	Sapotaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Borsali • Sanskrit :Bakul 	
Uses	The bark, flowers, fruits, and seeds of <i>Bakula</i> are used in Ayurvedic medicine in which it is purported to be <u>astrigent</u> , cooling, <u>anthelmintic</u> , tonic, and <u>febrifuge</u> . It is mainly used for dental ailments such as bleeding gums, <u>pyorrhea</u> , <u>dental caries</u> , and loose teeth	


Species Type	Tree (Fruit)	
Botanical Name	Achras sapota/Manilkara zapota	
Common Name	Chiku, Sapodilla, Sauh Menila, Naseberry, Nispero, Chicle, Chicle Gum, Ciku	
Family	Sapotaceae.	
Local Names	<ul style="list-style-type: none"> • Gujarati: Chiku • Sanskrit : Vikootam 	


Species Type	Shrub (flower)	
Botanical Name	(<i>Rosa rubiginosa</i> , <i>Rosa indica</i> , <i>Rosa grandiflora</i> ; <i>Rosa bonica</i> ; <i>Rosa floribunda</i> ; <i>Rosa gallicanae</i> ; <i>Rosa pimpinellifoliae</i>)	
Common Name	Rose, Gulab, rosa	
Family	Rosaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Gulab 	


Species Type	Palm	
Botanical Name	<i>Hyophorbe lagenicaulis</i>	
Common Name	Royal palm	
Family	Arecaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: <i>bottle palm</i> 	


Species Type	Shrub	
Botanical Name	<i>Lawsonia inermis</i>	
Synonyms	<i>Lawsonia alba</i> lam., <i>Lawsonia spinosa</i> L.	
Common Name	Mehandi	
Family	Lythraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Mehendi • Gujarati : Mehndi 	


Species Type	Shrub	
Botanical Name	<i>Datura metel</i>	
Synonyms	<i>Datura fastuosa</i> L., <i>Datura fastuosa</i> var. <i>alba</i> (Nees) C.B. Clarke	
Common Name	Dhattura	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Dhotra - Black • Gujarati : Dhaturu 	


Species Type	Shrub	
Botanical Name	<i>Rauvolfia tetraphylla</i>	
Synonyms	<i>Rauvolfia canescens</i> L., <i>Rouvolfia tomentosa</i> Jacq., <i>Rauvolfia tetraphylla</i> L.	
Common Name	Bara Chand	
Family	Apocynaceae	
Local Names	• Gujarati : Sarpagandha	


Species Type	Shrub	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	Touch me not	
Common Name	Ail	
Family	Fabaceae - Mimosoideae	
Local Names	Gujarati : Iajawni	


Species Type	Tree	
Botanical Name	<i>Bauhinia variegata</i>	
Synonyms	<i>Bauhinia candida</i> Roxb.	
Common Name	<i>Mountain ebony</i> , Kachnar	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Kachnar	
	• Sanskrit Kancharan (white)	


Species Type	Tree	
BotanicalName	<i>Bixa orellana</i>	
Synonyms	<i>Bixa orellana</i> L.	
CommonName	Sindhuri	
Family	Bixaceae	
Local Names	• Marathi : Shenduri	


Species Type	Tree	
Botanical Name	Butea monosperma	
Synonyms	<i>Butea frondosa</i> Koenig ex Roxb., <i>Erythrina monosperma</i> Lam., <i>Butea monosperma</i> L.	
Common Name	Palas	
Family	Fabaceae-Papilionioideae	
Local Names	• Marathi : Palas, khakra	
	• Gujarati : Khaakhro	
	• Hindi : Palash	


Species Type	Tree	
Botanical Name	<i>Eucalyptus globulus</i>	
Synonyms	<i>Eucalyptus gigantea</i> Dehn., <i>Eucalyptus glauca</i> DC., <i>Eucalyptus perfoliata</i> Desf., <i>Eucalyptus pulverulenta</i> Link	
Common Name	Australian gum Tree, Eucalyptus	
Family	Myrtaceae	
Local Names	• Marathi : Nilgiri	
	• Gujarati : Nilgiri	


Species Type	Tree	
Botanical Name	<i>Nyctanthes arbo-tristis</i>	
Synonyms	<i>Bruschia macrocarpa</i> Bertol., <i>Nyctanthes arbor-tristis</i> var. <i>dentata</i> Hort.ex Moldenke, <i>Nyctanthes dentata</i> Blume, <i>Nyctanthes tristis</i> Salisb., <i>Parilium arbor-tristis</i> Gaertn., <i>Scabrita triflora</i> L.	
Common Name	Night jasmine, Harshingar	
Family	Nyctanthaceae	
Local Names	<ul style="list-style-type: none"> • Sanskrit : Parijata • Gujarati : Paarijaat 	


Species Type	Tree	
Botanical Name	<i>Peltophorum pterocarpum</i>	
Synonyms	<i>Caesalpinia gleniei</i> Thwaites, <i>Caesalpinia inermis</i> Roxb., <i>Inga pterocarpa</i> DC., <i>Peltophorum ferrugineum</i> (Decne) Benth., <i>Peltophorum inerme</i> (Roxb.) Llanos, <i>Peltophorum roxburghii</i> (G.Don) Degener, <i>Poiciana roxburghii</i> G.Don	
Common Name	Yellow gold mohur	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Taamraparni 	


Species Type	Tree	
Botanical Name	<i>Cocos nucifera</i>	
Common Name	Coconut palm	
Family	Arecaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Naral • Gujarati :Nariyeli 	


Species Type	Tree	
Botanical Name	<i>Ficus religiosa</i>	
Synonyms	Urostigma religiosum (L.) Gasparrini	
Common Name	Bot-Tree, Pipal	
Family	Moraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pimpal 	


Species Type	Tree	
Botanical Name	<i>Mangifera indica</i> L.	
Synonyms	<i>Mangifera indica</i> L.	
Common Name	Aam	
Family	Anacardiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Amba 	


Species Type	Tree	
Botanical Name	<i>Murraya Koenigii</i>	
Synonyms	<i>Bergera koenigii</i> L., <i>Chalcas koenigii</i> (L.) Kurz, <i>Murraya foetidissima</i> Teijsm. & Binnend, <i>Murraya koenigii</i> (L.) Spreng	
Common Name	Indian curry leaf Tree, Mitha neem	
Family	Rutaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : kadhi patta • Gujarati: Mitho Limdo 	


Species Type	Tree	
Botanical Name	<i>Saraca indica</i>	
Common Name	Asoka	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : ashok	
	• Gujarati : Ashok	


Species Type	Tree	
Botanical Name	<i>Tamarindus indica</i>	
Synonyms	<i>Tamarindus occidentalis</i> Gaertn., <i>Tamarindus officinalis</i> Hook.	
Common Name	Tamarind Tree, Imli	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Chinch	
	• Gujarati : Khaati Amli	


Species Type	Herb	
Botanical Name	<i>Aloe barbadensis</i>	
Synonyms	<i>Aloe abyssinica</i> Lam., <i>Aloe chinensis</i> Baker, <i>Aloe indica</i> Royle, <i>Aloe littoralis</i> Koenig ex Baker, <i>Aloe vera</i> (L.) Burm.f., <i>Aloe vulgaris</i> Lam., <i>Alpinia allhugas</i> Roscoe, <i>Aloe barbadensis</i> Mill.	
Common Name	Aloe	
Family	Liliaceae	
Local Names	<ul style="list-style-type: none"> • Marathi :Korphad • Gujarati : Ghrutakumari 	


Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kaasundro 	


Species Type	Herb	
Botanical Name	<i>Catharanthus roseus</i>	
Synonyms	<i>Lochnera rosea</i> (L.) Reichb., <i>Vinca rosea</i> L., <i>Catharanthus roseus</i> (L.) G. Don	
Common Name	Sadabahar	
Family	Apocynaceae	
Local Names	• Marathi : Sadaphuli	


Species Type	Herb	
Botanical Name	<i>Cymbopogon citratus</i>	
Synonyms	<i>Andropogon citratus</i> DC., <i>Cymbopogon citratus</i> (DC.) Stapf	
Common Name	Lemon grass, Gandh-ghas	
Family	Poaceae	
Local Names	• Gujarati : Lili-cha	


Species Type	Herb	
Botanical Name	<i>Elettaria cardamomum</i>	
Common Name	Elaichi	
Family	Scitamineaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : elaichi 	


Species Type	Herb	
Botanical Name	<i>Mentha piperita</i>	
Common Name	Peppermint	
Family	Lamiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pudina • Gujarati : Pudino 	


Species Type	Herb	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	<i>Mimosa pudica</i> L.	
Common Name	Touch-me-not	
Family	Fabaceae-Mimosoideae	
Local Names	• Marathi : Lajwanti	
	• Gujarati : Lajaamni	


Species Type	Herb	
Botanical Name	<i>Ocimum basilicum</i>	
Common Name	Babui tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Sabja, tulas	
	• Gujarati : Damro	


Species Type	Herb	
Botanical Name	<i>Ocimum sanctum</i>	
Synonyms	<i>Ocimum inodurum</i> Burm.	
Common Name	Tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Krishna Tulas	
	• Gujarati : Vishnu Tulsi	


Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : isabgula	


Species Type	Herb	
Botanical Name	<i>Rauvolfia serpentina</i>	
Synonyms	<i>Ophioxylon album</i> Gaertn., <i>Ophioxylon serpentium</i> L., <i>Ophioxylon trifoliatum</i> Gaertn., <i>Rauvolfia trifoliata</i> (Gaertn.) Baill., <i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	
Common Name	Sarpagandha, chota chand	
Family	Apocynaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Sarpagandha • Sanskrit: Sarpagandha 	


Species Type	Herb	
BotanicalName	<i>Solanum surattense</i>	
Synonyms	<i>Solanum mccanni</i> Sant., <i>Solanum xanthocarpum</i> Schrad. & Wendl.	
CommonName	Kantakari, Kateli	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kantkari 	


Species Type	Herb	
Botanical Name	<i>Swertia chirata</i>	
Common Name	Kiryata	
Family	Gentianaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : chirata 	

Species Type	Herbs	
Botanical Name	<i>Zingiber officinale</i>	
Common Name	Adrak	
Family	Zingiberaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Adrak • Gujarati : adu 	


Species Type	<i>Shrub</i>	
Botanical Name	<i>Withania somnifera</i>	
Synonyms	<i>Physalis flexuosa</i> L., <i>Physalis somnifera</i> L., <i>Withania somnifera</i> (L.) Dunal.	
Common Name	Ashwagandha	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Ashwagandha • Gujarati : Ashwagandha 	


Species Type	<i>Herb</i>	
Botanical Name	<i>Kalanchoe pinnata</i>	
Synonyms	<ul style="list-style-type: none"> • Bryophyllum pinnatum (Lam.) Oken. • Bryophyllum calycinum Salisb. • Cotyledon pinnata Lam. 	
Family	Crassulaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : patthar-chatti • Sanskrit : 	

Species Type	Climber	
Botanical Name	<i>Asparagus racemosus</i>	
Synonyms	<i>Asparagus racemosus</i> Willd	
Common Name	Satavari	
Family	Liliaceae	
Local Names	• Marathi : Shatavari	
	• Gujarati : Shatavari	


Species Type	Shrub	
Botanical Name	<i>Adhatoda vasica</i>	
Synonyms	<i>Adhatoda vasica</i> Nees	
Common Name	Malabar nut	
Family	Acanthaceae	
Local Names	• Marathi :	
	• Gujarati :	


Species Type	Tree	
Botanical Name	<i>Pongamia pinnata</i>	
Common Name	Indian beach	
Family	Fabaceae-Papilionioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Karanj • Gujarati : Karanj 	


Species Type	Climber	
Botanical Name	<i>Tylophora indica</i>	
Synonyms	<i>Asclepias asthmatica</i> L. f., <i>Cynanchum bracteatum</i> Thunb., <i>C. indicum</i> Burm. f., <i>Hoya hirsuta</i> Moon. <i>Tylophora asthmatica</i> (L.f.) Wight & Arn.	
Common Name	Indian ipecacuanha	
Family	Asclepiadaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Damvel • Gujarati : Damvel 	


Species Type	Climber	
Botanical Name	<i>Piper longum</i>	
Synonyms	<i>Chavica roxburghii</i> Miq., <i>Piper longum</i> L.	
Common Name	Indian long pepper, Pipal	
Family	Piperaceae	
Local Names	• Marathi : Lendi pimpli	
	• Gujarati :	


Species Type	Herb	
Botanical Name	<i>Bacopa monnieri</i>	
Synonyms	<i>Bacopa monniera</i> (L.) Wettst., <i>Gratiola monniera</i> L., <i>Herpestis monniera</i> Benth., <i>Herpestis monniera</i> (L.) HBK., <i>Lysimachia monnieri</i> L., <i>Moniera cuneifolia</i> Michx.	
Common Name	Thyme-leaved Gratiola , Jal Brahmi	
Family	Scrophulariaceae	
Local Names	• sanskruit : Brahmi	
	• Gujarati :	


Species Type	Herb	
Botanical Name	<i>Eclipta alba</i>	
Common Name	Bhangra	
Family	Asteraceae	
Local Names	• sanskrit : Bhrungaraj	
	• Gujarati : Bhaangro	
	• Hindi : Bhringraj	
	• Marathi : Maka (White)	

Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : Isabgol	

Species Type	Climber	
Botanical Name	<i>Mucuna pruriens</i>	
Synonyms	<i>Carpopogon niveum</i> Roxb., <i>Carpopogon pruriens</i> Roxb., <i>Dolichos pruriens</i> L., <i>Mucuna nivea</i> (Roxb.) DC., <i>Mucuna prurita</i> Hook., <i>Stizolobium pruriens</i> (L.) Medikus	
Common Name	Kawach	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Khaj-kujli - Black • Gujarati : Kaucha 	

Species Type	Herb	
Botanical Name	<i>Trachyspermum ammi</i>	
Common Name	Carum Ajwain	
Family	Apiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Owaa • Gujarati : Kaucha 	

Species Type	Tree	
BotanicalName	<i>Punica granatum</i>	
Synonyms	<i>Punica granatum</i> L.	
CommonName	Anar	
Family	Lythraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Dalimb • Gujarati : Daadam 	

Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Kaasundro • Gujarati : Kaasundro 	

ANNEXURE-II : LIST OF BIRDS SPOTTED IN & AROUND MU

A survey was carried out to find the animal diversity in the campus of Marwadi University Rajkot. The survey focused on the diversity of birds, butterfly, Amphibia.



Common name: Spotted owl
Scientific name : *Strix occidentalis*



Common name: Brahminy kite
Scientific name : *Haliastur indus*



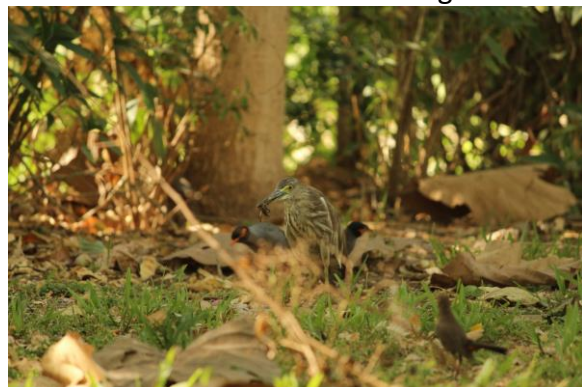
Common name:
Scientific name :



Common name: Common starling
Scientific name : *Sturnus vulgaris*



Common name: Kabae
Scientific name : common Myna



Common name: Pond heron
Scientific name : *Ardeola*



Common name: Woodpecker
Scientific name : Picidae



Common name: common kingfisher
Scientific name : Alcedo atthis



Common name: Purple sunbird
Scientific name : Cinnnyris asiaticus



Common name: Common tailorbird
Scientific name : Orthotomus sutorius



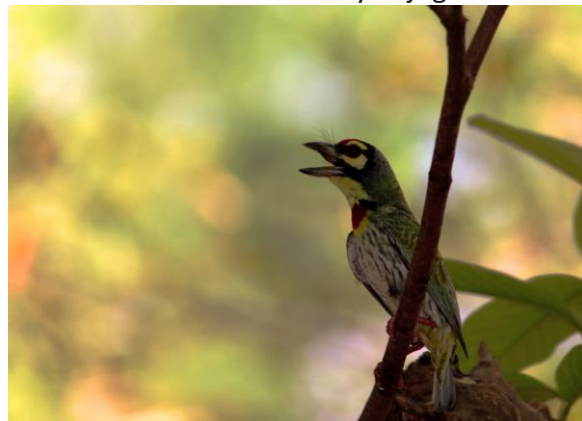
Common name: Asian green bee-eater
Scientific name : Merops orientalis



Common name: olive-backed sunbird
Scientific name : Cinnnyris jugularis



Common name: house sparrow
Scientific name : Passer domesticus



Common name: coppersmith barbet
Scientific name : Psilopogon haemacephalus



Common name: Bulbul
Scientific name : Pycnonotidae



Common name: laughing dove
Scientific name : Streptopelia senegalensis



Common name: Little egret
Scientific name : Egretta garzetta



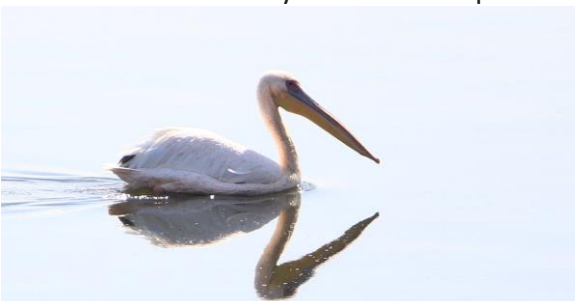
Common name: Oriental darter
Scientific name : Anhinga melanogaster



Common name: Painted stork
Scientific name : Mycteria leucocephala



Common name:
Scientific name :



Common name: billed pelican
Scientific name : Pelecanus philippensis



Common name: Parrots
Scientific name : Psittaciformes



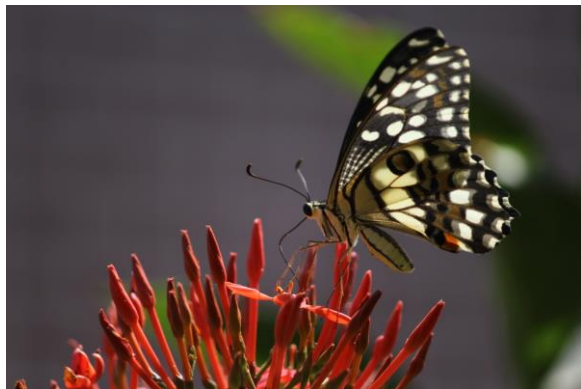
Common name: Robber flies
Scientific name : Asilidae



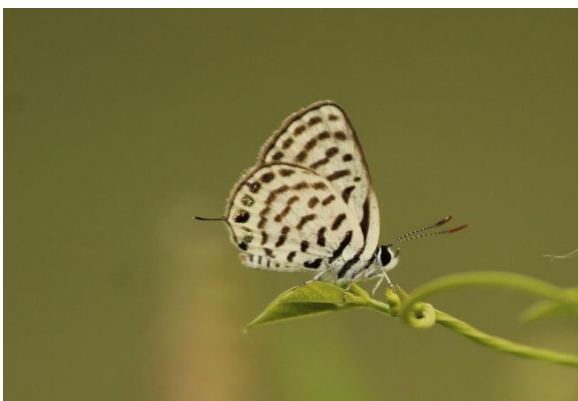
Common name: Dragonfly
Scientific name : Anisoptera



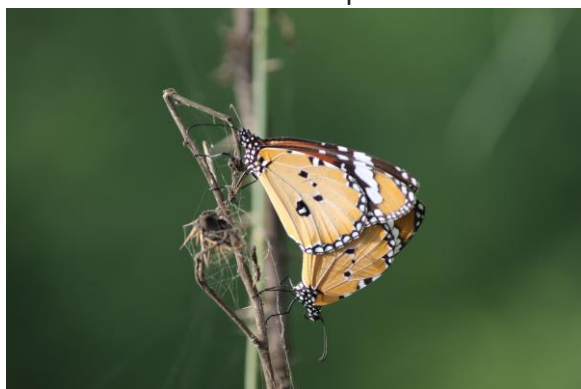
Common name:
Scientific name :



Common name:California sister
Scientific name :Adelpha bredowii



Common name:
Scientific name :



Common name: common tiger
Scientific name : Danaus genutia



Common name: Spotted Joker
Scientific name : *Byblia ilithyia*



Common name: Blue tiger
Scientific name : *Tirumala limniace*



Common name: Signature Spider
Scientific name : *Argiope anasuja*



Common name: button spider
Scientific name : *Latrodectus umbukwane*

ANNEXURE-III : LIST OF RAPTILES SPOTTED IN & AROUND MU



Scientific name: *Rattus rattus*
Common Name : House Rat



Scientific name: *Calotes versicolor* Common
Name : Indian Garden Lizard



Scientific name: *Hoplobatrachus tigerinus*
Common Name : Indian Bull Frog



Scientific name: *Naja naja*
Common Name : Indian Cobra



GREEN AUDIT REPORT

2021-2022



Marwadi University

Rajkot-Morbi Road, Rajkot – 360003
Gujarat, India

Submitted By

Green Audit Team

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ACKNOWLEDGEMENT



Green Audit Assessment Team thanks to the Dean, Marwadi University, Rajkot for assigning the task of Green Audit of the university campus to us. We appreciate the cooperation that we got from all the faculties and students during the entire process. Our special thanks to Prof. (Dr.) Sandeep Sancheti, Provost and Shri Naresh Jadeja, Registrar of the university for their warm support and encouragement from the very beginning till the end of the process.

We are also thankful to the testing and consultancy cell for provided various test report done by them to match requirement of this audit & helping us in collecting different data and analyzing them.

We are also thankful to all the students, faculties and staff for provide help at different level to collect the various details as per the requirement of this green audit.

The entire team is very grateful to the management of Marwadi University for their continuous support and motivation to take various innovative and challenging assignments.

Dr. Tarak Vora
Team Leader
Green Audit Team
Marwadi University. Rajkot

DISCLAIMER

Green Audit Team Has prepare this report on the basis of primary data collected from the different areas of the university. All reasonable care has been takesn in its preparation: details contained in this reprot have been compiled in good faith based on information gathered.

Date: 25/03/2022

Prepared by:
Green Audit Team

1. BRIEF ABOUT MARWADI UNIVERSITY

In 2007-08 the availability of world class academic facilities in the Saurashtra region were sparse; which encouraged Marwadi Group, Rajkot to launch Marwadi Education Foundation's Group of Institutes, offering Technical and Professional UG & PG courses and programs such as B.E, MBA and MCA. Marwadi Education Foundation's Group of Institutions (MEFGI) was incepted as a major organ of Marwadi Education Foundation's Group of Institutions in 2008, under the Bombay Public Trust Act 1950. Marwadi Education Foundation's Group of Institutions is a body promoted by Marwadi Shares & Finance Limited; a major stock broking company in India & Chandarana Intermediaries Brokers Pvt. Ltd. Since its inception Marwadi Education Foundation's Group of Institutions were affiliated with Gujarat Technological University.

Commitment to provide best and industry relevant education received an overwhelming trust from the society and in order to blend Engineering with Science and support them through Management and Law disciplines and have multi disciplinary course offerings in Science, Commerce, Arts, Health and Management, Marwadi Education Foundation proposed to establish "Marwadi University" in the Year 2016. Marwadi University bill was introduced and passed in Gujarat Assembly and Marwadi University was established under Gujarat Private Universities act no. 9 of 2016 on 9th May, 2016.

2. VISION & MISSION OF MARWADI UNIVERSITY

2.1 VISION OF THE UNIVERSITY

To foster an environment that empowers people, organizations and societies through education, ideas, research and training.

2.2 MISSION OF THE UNIVERSITY

- To provide quality education and thereby bringing social transformation.
- To create leaders through innovation and entrepreneurship.
- To cultivate the culture of research advancements.
- To imbibe universal consciousness.
- To stimulate growth through industrial and international partner

3. GREEN AUDIT

Modernization and industrialization are the two important outputs of the twentieth century that have made human life more luxurious and comfortable. They are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources, and finally making our mother Earth ugly and inhospitable. The time has come to wake up, unite and combat together for a sustainable environment.

The intention of organizing Green Audit is to upgrade the environment condition in and around the institutes, universities, companies and other organizations. It is carried out with the aid of performing tasks like waste management, energy saving and others to turn into a better environmental friendly university.

3.1 GOALS OF GREEN AUDIT

- The objective of carrying out Green Audit is securing the environment and cut down the threats posed to human health.
- To conduct a survey to know the ground reality about green practices.
- To make sure that rules and regulations are taken care of to save environment.
- To avoid the interruptions in environment that are more difficult to handle and whose correction requires higher cost.
- The long-term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issues.
- To Identify strengths and weaknesses in green practices.

3.2 BENEFITS OF GREEN AUDIT

- It would help to protect the environment in and around the campus.
- Recognize the cost saving methods through waste minimization and management.
- Empower the organization to frame a better environmental performance.
- Point out the prevailing and fourth coming impacts on environment.
- Recognize the cost-saving methods through waste minimizing and managing.
- Ensures conformity with the applicable laws.
- Empower the organizations to frame a better environmental performance.
- Developing an environmental ethic and value systems in youngsters.
- It portrays a good image of an institution which helps building better relationships with the group of interested parties.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the University.
- It will help to build a positive impression through green initiatives for the upcoming NAAC visit.

4. ENVIRONMENTAL POLICY OF THE UNIVERSITY

Marwadi University, Rajkot always believes in maintaining its own standard in matter of environment and quality consciousness. It has taken number of initiatives to protect its own environment with a pollution free campus.

To create a green cover, Eco-friendly atmosphere, pure oxygen at the university campus, a plantation program is organized every year with active participation from the university community and visitors. Green Audit Team owns responsibility to preserve the work carried out on the campus related to the environment.

This also helps in ensuring that the Environmental Policy is enacted, enforced, and reviewed using various environmental awareness programs.

ENVIRONMENTAL POLICY

Both the teaching and Non-teaching staff of Marwadi University Rajkot are committed for carrying out its activity for sustainable development. This we will achieve through the following :-

- i. To educate students and staff on how to appropriately utilize water effectively.
- ii. To put the campus' "Rain Water Harvesting" to use.
- iii. To make the most of the solar energy generated by the solar panels on the roofs of educational buildings.
- iv. To use ICT as much as possible while using paper as little as possible. It will contribute to the "Paperless Office" initiative.
- v. Using vermin-compost on the campus to turn solid waste into fertiliser.
- vi. To lessen the campus' noise pollution.
- vii. To protect and nurture the Flora and Fauna on the campus
- viii. To maintain green campus.
- ix. To use treated waste water for flushing and gardening purpose.
- x. To use recycle the waste material and make them usable.

5. CONSTITUTION FOR GREEN AUDIT

The Green Audit is carried out as per the environmental policy of the Green audit checklist. The aim of the audit is to check the existing practices and provide advice for the development of environmental policy and practice in the areas of:

- ✓ Waste management
- ✓ Management water conservation and management
- ✓ Tree plantations
- ✓ Bio-diversity and threatened/ endangered species
- ✓ Preservations Energy use and conservations
- ✓ Eco-friendly campus
- ✓ Green environment and clean campus
- ✓ Spread environmental awareness
- ✓ Educate the people about sustainability

MEMBERS OF GREEN AUDIT TEAMS

Sr. No.	Name of Auditor	Designation
1	Dr. Tarak Vora	Team Leader
2	Dr. Abhishek Gupta	Member
3	Dr. Archana Sharma	Member
4	Dr. Nitinkumar Singh	Member
5	Dr. Hirendrasinh Padhiyar	Member
6	Mrs. Bhavna Thummar	Member
7	Mr. Raj Chapala	Member
8	Mr. Jyupil Joshi	Member
9	Mr. Devesh Poorey	Member
10	Mr. Ravi Modi	Member
11	Mr. Sachin Parmar	Member
12	Mr. Kalpesh Chandarana	Member

6. OBJECTIVES OF THE STUDY

The green audit's primary goal is to support environmental management and conservation on college campuses. According to the relevant laws, rules, and standards, the audit's goal is to identify, measure, explain, and prioritise the framework for environmental sustainability. The following are the primary goals of doing a green audit:

- ✓ To secure the environment and cut down the threats posed to human health by analysing 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 status report on environmental compliance

7. METHODOLOGY

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

➤ **Water management**

- ✓ Raw Water
- ✓ Drinking Water
- ✓ Waste Water
- ✓ Sewage Water
- ✓ Rain Storm Drain Water

➤ **Energy Conservation**

- ✓ Petrol
- ✓ Diesel
- ✓ LPG
- ✓ Electricity

➤ **Waste management**

- ✓ Domestic Waste Management
- ✓ Grass Waste Management
- ✓ Food Waste Management
- ✓ Fiscal Waste Management

8. FOCUS AREA OF AUDIT

To match with the objective of the green audit, following areas are kept under the scope of the audit.

1. Water management
2. Air Pollution Management
3. Noise Pollution Management
4. Energy use & conservation
5. Waste Management
6. Green belt area & Bio-diversity
7. Environmental Awareness initiatives

8.1 WATER MANAGEMENT

Water is a valuable natural resource for all living organisms. It is freely available depending on the climate and topographic features of a region. Water is a precious natural national resource available with a fixed quantum. The availability of water is decreasing due to the increasing population of the nation; as per capita availability of utilized water is going down.

Even though it is naturally present, drinking water that is portable is not easily available for human consumption. Just 3% of the water on our planet, which covers 70% of its surface, is fresh water. The world's 1.1 billion inhabitants are experiencing a water crisis. Water issue is greatly impacted by water pollution and waste. An alarming amount of water is being contaminated. Water contamination can cause a variety of illnesses or even death. Because of this, it's crucial to make sure that drinking water is sterile, clean, and free of germs and illnesses. Also, it's crucial to manage, protect, and conserve water resources so that they may be used sustainably. The use and quality of water on the university campus are being studied by our institution. Water auditing is done to assess raw water intake facilities and identify facilities for water treatment and reuse. The concerned auditor looks at the appropriate approach that may be used to balance the supply and demand for water.

USES AND MANAGEMENT

SOURCE OF WATER

Sr. No.	Resource	Quantity
1	GWI (Narmada WATER)	-----
2	No of Open Well	02
3	No of Bore-well	03
4	Water reserve - Underground Tank	4 Lakh Liters

WATER USERS IN CAMPUS

Sr. No.	Person in different section	Strength (No. of person)
1	Staff	450
2	Hostel Boarders	1400
3	Residential Family Members	40
4	Visitors	2000
5	Construction Labour	125

The visitors of the college vary with respect to different activities conducted in the college campus. During admission and different competitive exam conducted in the college campus. The total number of visitors of the college increases up to 2000 on such day.

WATER CONSUMPTION IN DIFFERENT ACTIVITYIN COLLEGE CAMPUS

Activity	Water used per activity (in Litter)	No. of times Activity performed in a day	Average water used Person/Day	No. of people using water	Total water consumption per Day
Hand and face wash	4-6 L	4	16-24L	1550	31000
Drinking Water	0.2-0.4L	6	1.2-2.4L	1550	2790
Toilet Flush	8-10L	4	32-40L	1550	55800
Bath	30-40 L	1	30-40 L	1550	54250
Cooking & Washing In resident	150-250L	2	300-500L	40	16000
Cooking & Washing Hostel	10-15L	4	40-60L	1550	77500
Total					237340

WATER QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : DRINKING WATER									
Test Report No / Ref.No. :- TA-537								Date: 10-3-2022	
Name of Customer		Marwadi University, Rajkot							
Address of Customer		Rajkot - Morbi Highway, Gauridad.							
Environmental Condition		Ambient							
Date of Sample Collection		5/3/2022							
Nature of Sample		Colour: Colour less							
Sample Quantity		100 ml							
Packing Type		Plastic bottle							
Type of Sampling		Grab							
Sample Collected By		Mr. Kalpesh Parmar							
Date of analysis starts		6/3/2022							
Analysis conclude on		10/3/2022							
Sr. No.	Parameters	Units	Test Method	Permissible Limit	Hostel-A	Hostel-B	Hostel-C	Hostel-D	Inter-national Canteen
1	pH	-	APHA 23rd Ed.,2017,4500-H+B	6.5 - 8.5	7.31	7.29	7.3	7.52	7.55
2	TDS	mg/L	APHA 23rd Ed. Method 2540-C	500	75.7	98.4	97.6	154	102
3	Turbidity	FNU	APHA 23rd Edition 2130-B(Page No.2-13)	1	0.67	0.47	0.51	0.67	0.37
4	Conductivity	µs/cm	APHA 23 rd Ed. Titration Method 2510-B	200-800	201.5	201.2	206.4	308	204
5	Chloride	mg/L	APHA 23rd Ed 4500-Cl- B (Page No.4-75)	250	46	41	40	51	43
6	Total Hardness	mg/L	APHA 23rd Ed. Method 2510-B	200	72	52	76	140	48
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied, BDL= Below Detection Limit, MDL = Minimum Detection Limit</p> <p>2. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>3. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>4. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>5. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND: Not Detected, BDL: Below Detection Limit, -: Not Applicable</p>									

End of Report

Dr. Nitin Kumar Singh
Testing Incharge

Dr. Tarak Vora
Quality Manager

STP TREATED WATER QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : STP WATER SAMPLES							
Test Report No / Ref.No. :- TA-537						Date: 06-03-2022	
Name of Customer		Marwadi University					
Address of Customer		Rajkot - Morbi Highway, Gauridad.					
Date of Sample Collection		01-03-2022					
Sample Collected By		Mr. Deepak bhai					
Sample Tested By		Mr. Raj Chapala, Mr. Avon Dobariya & Mr. Jitesh Joshi					
Date of analysis starts		02-03-2022					
Analysis conclude on		06-03-2022					
Sr. No.	Parameters	Units	Test Method	Acceptable Limit	Inlet	Treated Water (Before Filtration)	Treated Water (After Filtration)
1	pH	-	APHA 23rd Ed.,2017,4500-H+B	6.5-8.5	7.27	7.75	7.48
2	BOD	mg/L	APHA 23rd Ed. Method 2540-C	30	140	90	29
3	COD	mg/L	APHA 23rd Edition 2130B	100	198	101	57
4	TSS	mg/L	APHA 23RD Edition 2540 D	100	114.2	78.4	46.6
5	Turbidity	FNU	APHA 23rd Edition 2130-B	5	11.5	6.8	1.4
6	Oil and Grease	mg/L	APHA 23RD Edition 5520 G	10	14.2	12.6	6.2
7	Ammonical Nitrogen	mg/L	APHA 23RD Edition 4500-NH3 C	5	9.4	1.45	1.12
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.,BDL= Below Detection Limit, MDL</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, -- : Not Applicable</p>							

Testing Incharge

Team Leader

OBSERVATIONS IN REGARD OF WATER USAGES AND CONSERVATION PLAN

1. Treated water is used for flushing through dual plumbing system installed in all the buildings.
2. The garden is watered using sprinklers and drip irrigation system installed throughout the campus.
3. Drinking water quality is being tested regularly as per plan.
4. Low flow water fixtures are installed in bathroom and toilets.
5. Water level sensors are installed in the water tank for overflow cutoff.
6. Rainwater harvesting is done in the lake created in the campus.
7. Rainwater is being recharged in the bore.
8. Displays about the saving water are placed at various locations in the campus.

8.2 AIR POLLUTION MANAGEMENT

PERIODIC AWARENESS PROGRAMME FOR STAFF, STUDENTS AND SOCIETY

The university has consistently run programmes to raise staff, student, and societal awareness of the need to preserve and conserve the environment. Moreover, programmes and rallies on different environmental and health-related topics are organised in order to raise awareness. Students and professors at the university participate in NSS/NCC-related events.

A) MASS TRANSPORTATION FACILITY

As such campus is not generating any air pollution by its own activity except it has its own transportation department. Faculties and students of the university are motivated to use mass transportation system. Faculties are given some advantages for use of the bus facility provided by the university. Regular maintenance of all the buses are planned and executed so that their mileage as well as emission would remain efficient.

All the office bearer are motivated to use the university vehicles on sharing basis. It has been mandated unless and until its an emergency do not use university vehicles for single persons.

AIR QUALITY ASSESSMENT REPORT

ANALYSIS REPORT : AMBIENT AIR					
Name of Customer	Marwadi University				
Address of Customer	Rajkot - Morbi Highway, Gauridad.				
Environmental Condition	Satisfactory				
Date of Sample Collection	20-03-2022				
Nature of Sample	Colour : Colour Less				
Sample Collected By	Jyupil Joshi				
Sample Tested By	Raj Chapala				
Date of analysis starts	21-03-2022				
Analysis conclude on	27-03-2022				
Sr. No.	Parameters	Units	Test Method	Permissible Limit	MAIN BUILDING
1	PM₁₀	(µg/m ³)	IS 5182 (Part 23) (1999, Reaffirmed 2010)	100	48.25
2	PM_{2.5}	(µg/m ³)	NAAQMS/36/2012-13	60	22.54
3	SO₂	(µg/m ³)	IS 5182 (Part 2)	80	1.8
4	NO_x	(µg/m ³)	IS 5182 (Part 6)	80	2.57
<p>*NOTE</p> <p>1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied, BDL= Below Detection Limit, MDL = Minimum</p> <p>2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.</p> <p>3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.</p> <p>4. This office is not responsible for the authenticity for the samples not collected by our officials.</p> <p>5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.</p> <p>6. Permissible Limits: as per Schedule VI of EPA Rules-1986</p> <p>*ND : Not Detected, BDL : Below Detection Limit, - : Not Applicable</p>					

Testing Incharge

Team Leader

STACK ASSESSMENT REPORT

ANALYSIS REPORT : STACK : DG SET					
Test Report No / Ref.No. :- TA-537				Date:- 15-09-2021	
Name of Customer		Marwadi University, Rajkot			
Address of Customer		Rajkot - Morbi Highway, Gauridad.			
Temperature		31°C			
Weather Condition		Satisfactory			
Date of Sample Collection		14-09-2021			
Nature of Sample		Colour : Colour Less			
Sample Collected By		Dr. Tarak Vora, Mr. Jitesh Joshi & Mr. Jyupil Joshi			
Date of analysis starts		14-09-2021			
Analysis conclude on		15-09-2021			
Sr. No.	Parameters	Units	Test Method	Permissible Limit	DG Set
Stack Height In Meter					10
1	PM	mg/Nm ³	IS 11255 (Part 1)	150	37.84
2	SO₂	ppm	IS 11255 (Part 2)	100	17.21
3	NO_x	ppm	IS 11255 (Part 7)	50	26.76
*NOTE					
1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied.					
2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.					
3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing.					
4. This office is not responsible for the authenticity for the samples not collected by our officials.					
5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.					
6. Permissible Limits: as per Schedule VI of EPA Rules-1986					
*ND : Not Detected, BDL : Below Detection Limit					

End of Report

Dr. Nitin Kumar Singh
Testing Incharge

Dr. Tarak Vora
Quality Manager

8.3 NOISE POLLUTION MANAGEMENT

A) SILENCE ZONES IN THE UNIVERSITY

For awareness of the need to preserve silence at the institution, several display boards have been put up in the library and other locations.

B) NOISE CONTROL IN THE UNIVERSITY

The institution has enacted a no honking policy that forbids the use of any noise on campus, including honking.

On college campuses, noise pollution is maintained to a minimum and designated quiet zones are established in places like the library and classrooms.

C) DG SET FOR POWER BACK-UP

Every time there is a power outage because of load shedding or maintenance on the college campus, the college uses its DG backup system. Noise monitoring of the stack of DG set is being done on regular basis.

D) AWARENESS ABOUT NOISE POLLUTION

University is conducting awareness drives about the harms due to noise pollution for the students and faculties of the campus.

NOISE LEVEL ASSESSMENT REPORT

ANALYSIS REPORT : NOISE			
Name of Customer		Marwadi University	
Address of Customer		Rajkot - Morbi Highway, Gauridad.	
Environmental Condition		Satisfactory	
Date of Sample Collection		02-01-2022	
Sr. No.	Location	Permissible limit	Day (dB-A)
1	Main Gate	65	60
2	PG Building		53
3	Hostel Aera		52
4	Main Canteen		58
5	New Canteen		54
<p>*NOTE</p> <ol style="list-style-type: none"> 1. The results refer only to the tested samples and applicable parameters. Endorsement of products is neither inferred nor implied. 2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified. 3. This report is not to be reproduced wholly or in part or used in any advertising media without the permission of the Laboratory in writing. 4. This office is not responsible for the authenticity for the samples not collected by our officials. 5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only. 6. Permissible Limits: as per Schedule VI of EPA Rules-1986 <p>*ND : Not Detected, BDL : Below Detection Limit</p>			

Testing Incharge

Team Leader

8.4 ENERGY USE AND CONSERVATION

Energy use, energy sources, energy monitoring, lights, appliances, natural gas, and cars are all included by this indication. Energy usage is obviously a crucial component of campus sustainability, therefore its inclusion in the assessment needs no justification.

Following Energy Sources are used in the college

- ✓ Electrical
- ✓ Diesel
- ✓ Petrol
- ✓ LPG

OBSERVATIONS

- University has installed electrical meters at various locations to understand the power usage pattern.
- University is doing energy audit on yearly basis as per the planned schedule.
- University has installed 650 kVA rooftop solar panel within the campus. This meets almost 50% of its total demand.
- Sensor based lights are installed in the main building.
- University is converting all the lights to the LED lights phase wise as per the plan.

8.5 WASTE MANAGEMENT

Waste management is the managing of waste by disposal and recycling of it. Moreover, waste management needs proper techniques keeping in mind the environmental situations. For instance, there are various methods and techniques by which the waste is disposed of. Some of them are Landfills, Recycling, Composting, etc. Furthermore, these methods are much useful in disposing of the waste without causing any harm to the environment. Waste management is a very crucial aspect of any of the organization. Marwadi university campus is spreaded over 42 acres of land where it is dealing with different types of waste as listed below.

- ✓ Domestic waste
- ✓ Food waste
- ✓ Green waste

OBSERVATIONS

SEGREGATION OF DOMESTIC WASTE

Colour coded dustbins are installed. Three separate dustbins, near each block for disposal of different types of wastes. All the segregated wastes are dumped in the particular dustbins of green, blue, yellow colour.

- ✓ The wet and biodegradable wastes are dumped in green dustbin. For e.g.: kitchen wastes including vegetables and fruits skins.
- ✓ Disposal of plastic wrappers and non-biodegradable wastes are meant for blue coloured dustbin.
- ✓ Papers and glass bottles are disposed in yellow dustbins
- ✓ Cleaning or emptying of the dustbins is being done on a regular basis at an allocated time.

200 KLD STP PLANT

Recycling of water is the crucial thing when water consumption is high in the organization. University has setup a 200 kLD Sewage Treatment Plant in the campus. Treated water is being used for gardening purpose. Excess treated water is used in the flushing as all the buildings are installed with dual plumbing system to utilized treated water in flushing.

RECYCLING OF WASTE

Vermicomposting is a method of making compost, with the use of earthworms, which generally live-in soil, eat biomass and excrete it in digested form. This compost is generally called vermicompost or Wormicompost. Marwadi University has prepared the composting beds for converting grass waste into the compost. Compost produced through the beds are distributed to the students and faculties of the campus.

INSTALLATION OF BIOGAS PLANT

University has installed 45 CUM capacity biogas plant within the campus. Where the combination of cow dung, food waste and grass waste is used as raw material. Biogas produced from the plant is utilized for cooking in the hostel canteen.

8.6 GREEN BELT AREA & BIO-DIVERSITY

The Green Belt Area is intended to preserve the environment and enhance the visual value of the college grounds. To guarantee that the structures adhere to green standards, the college's green area consists of the campus's vegetation, greenery, and sustainability. Also, by implementing various environmental awareness programmes, this aids in ensuring that the Environmental Policy is adopted, implemented, and evaluated.

OBSERVATIONS

The campus is close to over 65 different types (species) of flora and animals. Via the NSS unit, several tree planting initiatives are held during the months of July and August on college campuses and in the nearby communities. This initiative aids in promoting an eco-friendly atmosphere that gives the institute pure oxygen and raises awareness among the communities. The planting initiative comprises a variety of native decorative and therapeutic plants. The occurrence of similar species planted, such as "NEEM," is noted rather than sustaining biodiversity. Neem, Indian Blackberry Tree, Flame Tree, Mango Tree, Jack Fruit Tree, Teak, and Spanish Cherry Plant are the predominant species in the green belt. University have done tree plantation drive within the campus. Students and faculties have participated in the tree plantation drive and taken the pledge to plant the trees and will motivate others to do so. It is also planned to plant the trees outside the campus also in a systematic planned manner.

8.7 ENVIRONMENTAL AWARENESS INITIATIVES

Marwadi University regularly educates employees and faculty on how to use bicycles, how to use paper responsibly, and how to establish a plantation aim. Some of the steps done include the display of environmental protection banners, signs encouraging people to save electricity and water in prominent locations, and garbage disposal containers for both wet and dry waste. All the days like Environment day, world water day, etc. all celebrated by conducting seminars, expert lectures and competitions to spread the awareness about environmental conservation by the university. University has set the target to get Green Building Certification for the university campus. Thus, Marwadi University would become first university in the state to get such Green Building Certificate. Recently, the campus has received the Best Green Campus Award for the Rajkot city.

9. EXECUTIVE SUMMARY & RECOMMENDATIONS

The university has created a green environmental policy and is working to promote sustainable growth on the campus. The university has created a team of academics and students that works to preserve biodiversity on the campus and contributes to efforts to reduce pollution in society. The university intends to add environmental management and protection to its curriculum. The university has given faculty and students workshops and trainings on environmental awareness. Low flow water fixtures are installed in the campus. Campus have planned for waste management and taken initiatives towards recycling of waste. Green audit has also covered energy parameters also in the observation this time; however, detailed energy audit is being conducted by electrical department on yearly basis.

It is also verified that the initiatives on almost all the recommendations of the previous year have been taken by the university which are found satisfactory.

GOOD POINTS OBSERVED


- ✓ Marwadi university has received District Green Champion Award for the year 2021-21 on 19/08/2021 from Department of Higher Education, Ministry of Education, Government of India.
- ✓ Marwadi University is working on its own ERP in which more than 80% of its work is transformed into the paperless working approach.
- ✓ Marwadi University promotes waste utilizing by consuming building materials building materials having concrete with fly ash, fly ash bricks, AAC Blocks containing fly ash, Portland Pozzolana Cement, etc.
- ✓ Marwadi University has the policy to use local materials as far as possible in various construction in the campus. Almost all the materials are sourced within 10-100 km radius only.
- ✓ Marwadi University have motivated and facilitated two of its faculties to become Green Building Certified Professionals.

RECOMMENDATIONS

1. University should get Green Building Certificate to get the recognition for the various initiatives taken by the university towards sustainability.
2. Plan and execute tree plantation drive outside the campus also.
3. Security should inspect PUC certificates for all vehicles accessing the site.
4. More water meters should be installed to have mapping of the water usage pattern.
5. More avenues shall be explored to have the paperless approach in the internal working mechanism of the university in addition to all existing in practice.


ANNEXURE I : LIST OF TREES & PLANTS SPOTTED IN & AROUND MU


A survey was carried out to find plant diversity in the campus of Marwadi University. The survey was focused on the diversity of plants and trees on the basis of their classification and economic importance.


Species Type	Tree	
Botanical Name	<i>Bauhinia purpurea</i>	
Common Name	Butterfly Tree, geranium Tree	
Family	Fabaceae Caesalpinioideae	
Local Names	• Gujarati: Hadayparni	
	• Sanskrit : Kanchanar (red)	


Species Type	Tree	
Botanical Name	<i>Azadirachta indica</i>	
Synonyms	<i>Antelaea indica</i> (L.) Adalb., <i>Melia azadirachta</i> L., <i>Melia indica</i> (A. Juss.) Brandis	
Common Name	Neem	
Family	Meliaceae	
Local Names	• Hindi :	Neem
	• Gujarati :	Limbado , Kadavo Limbado
	• Sanskrit :	Nimba


Species Type	Tree	
Botanical Name	Khaya senegalensis	
Common Name	Senegal Mahogany, African Mahogany, Senegal Khaya	
Family	Meliaceae	
Local Name	• Gujarati: Khaya	


Species Type	Tree	
Botanical Name	Spathodea campanulata	
Common Name	<i>African tulip tree</i>	
Family	Bignoniaceae	
Local Names	• Gujarati: Tulip tree	


Species Type	Tree	
Botanical Name	Samanea saman	
Common Name	Saman, Pukul Lima, Cow Tamarind, Hujan-Hujan, East Indian Walnut, Monkey, rain tree	
Family	Fabaceae (alt. Mimosaceae), legume family	
Local Names	<ul style="list-style-type: none"> • Gujarati: <i>Shirish</i>, • Sanskrit :<i>Shriisha</i> 	


Species Type	Tree	
Botanical Name	<i>Terminalia mantaly</i>	
Common Name	Madagascar Almond, Umbrella Tree	
Family	Combretaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: African tree 	


Species Type	Tree	
Botanical Name	Alstonia scholaris	
Common Name	Scholar Tree, Dita bark, Devil tree, Blackboard Tree	
Family	Apocynaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: <i>Saptaparni</i> • Sanskrit :Saptaparna 	
Uses	<p>Medicinal uses: ⚠️ Its bark, known as Dita Bark, is used in traditional medicine to treat dysentery and fever. In Ayurveda it is used as a bitter and as an astringent herb for treating skin disorders, malarial fever, urticaria, chronic dysentery, diarrhea, in snake bite and for upper purification process of Panchakarma . The Milky juice of the tree is applied to ulcers.</p>	


Species Type	Tree	
Botanical Name	Lagerstroemia speciosa	
Common Name	Giant crepe-myrtle, Queen's crepe-myrtle, banabá plant, or pride of India	
Family	Bignoniaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Jarul, Moto Bhondar • Sanskrit : Syandana 	


Species Type	Tree	
Botanical Name	Senna siamea	
Common Name	kassod tree, cassod tree and cassia tree	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: kashid tree 	


Species Type	Tree	
Botanical Name	Delonix regia	
Common Name	<i>Flame Tree, Royal Poinciana</i>	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Gulmohar • Sanskrit : Raj abharan tree, Krishna chud tree 	


Species Type	Tree	
Botanical Name	Tabebuia rosea	
Common Name	Salvador Pink Trumpet Tree	
Family	Bignoniaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Vasant Rani 	


Species Type	Tree	
Botanical Name	<i>Cassia fistula</i>	
Common Name	Golden shower tree, Amaltas	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Garmalo • Sanskrit : Aragwadha 	
Uses	<p>specially used in joint pain, migraine, chest pain and blood dysentery. Amaltas root is also useful in fever, heart diseases, retained excretions and biliousness. It is also used in cardiac disorders biliousness, rheumatic condition, haemorrhages, wounds, ulcers and boils and various skin diseases.</p>	


Species Type	Small Tree	
Botanical Name	Melaleuca citrina	
Common Name	Bottlebrush, crimson bottlebrush, or lemon bottlebrush tree	
Family	Myrtaceae	
Local Names	• Gujarati: Cheel	


Species Type	Small Tree (flower)	
Botanical Name	Plumeria Alba	
Common Name	Champa, Gulchin	
Family	Apocynaceae	
Local Names	• Gujarati: Champa	


Species Type	Tree	
Botanical Name	Mimusops elengi	
Common Name	Borsalli, Bakul, Spanish Cherry	
Family	Sapotaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Borsali • Sanskrit :Bakul 	
Uses	The bark, flowers, fruits, and seeds of <i>Bakula</i> are used in Ayurvedic medicine in which it is purported to be <u>astrigent</u> , cooling, <u>anthelmintic</u> , tonic, and <u>febrifuge</u> . It is mainly used for dental ailments such as bleeding gums, <u>pyorrhea</u> , <u>dental caries</u> , and loose teeth	


Species Type	Tree (Fruit)	
Botanical Name	Achras sapota/Manilkara zapota	
Common Name	Chiku, Sapodilla, Sauh Menila, Naseberry, Nispero, Chicle, Chicle Gum, Ciku	
Family	Sapotaceae.	
Local Names	<ul style="list-style-type: none"> • Gujarati: Chiku • Sanskrit : Vikootam 	


Species Type	Shrub (flower)	
Botanical Name	(<i>Rosa rubiginosa</i> , <i>Rosa indica</i> , <i>Rosa grandiflora</i> ; <i>Rosa bonica</i> ; <i>Rosa floribunda</i> ; <i>Rosa gallicanae</i> ; <i>Rosa pimpinellifoliae</i>)	
Common Name	Rose, Gulab, rosa	
Family	Rosaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: Gulab 	


Species Type	Palm	
Botanical Name	<i>Hyophorbe lagenicaulis</i>	
Common Name	Royal palm	
Family	Arecaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: <i>bottle palm</i> 	


Species Type	Palm	
Botanical Name	<i>Caryota mitis</i>	
Common Name	fishtail palm, kitul palm, toddy palm, wine palm, sago palm and jaggery palm.	
Family	Areaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati: fishtail palm 	


Species Type	Shrub(Medicinal)	
Botanical Name	<i>Adhatoda vasaka</i>	
Synonyms	<i>Adhatoda beddomei</i>	
Common Name	Vasaca small	
Family	Acanthaceae	
Local Names	<ul style="list-style-type: none"> • Gjarati :Ardusi 	


Species Type	Shrub	
Botanical Name	<i>Ocimum gratissimum</i>	
Synonyms	<i>Ocimum gratissimum</i> L.	
Common Name	Shrubby basil, Rama tulsi	
Family	Lamiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Jangli tulasi 	


Species Type	Shrub	
Botanical Name	<i>Hibiscus rosa-sinensis</i>	
Common Name	Jasud, Shoe flower and china rose	
Family	Malvaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati Name-: Jasud 	


Species Type	Shrub	
Botanical Name	<i>Lawsonia inermis</i>	
Synonyms	<i>Lawsonia alba</i> lam., <i>Lawsonia spinosa</i> L.	
Common Name	Mehandi	
Family	Lythraceae	
Local Names	• Marathi : Mehendi	
	• Gujarati : Mehndi	


Species Type	Shrub	
Botanical Name	<i>Datura metel</i>	
Synonyms	<i>Datura fastuosa</i> L., <i>Datura fastuosa</i> var. <i>alba</i> (Nees) C.B. Clarke	
Common Name	Dhattura	
Family	Solanaceae	
Local Names	• Marathi : Dhotra - Black	
	• Gujarati : Dhaturu	


Species Type	Shrub	
Botanical Name	<i>Rauvolfia tetraphylla</i>	
Synonyms	<i>Rauvolfia canescens</i> L., <i>Rouvolfia tomentosa</i> Jacq., <i>Rauvolfia tetraphylla</i> L.	
Common Name	Bara Chand	
Family	Apocynaceae	
Local Names	• Gujarati : Sarpagandha	


Species Type	Shrub	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	Touch me not	
Common Name	Ail	
Family	Fabaceae - Mimosoideae	
Local Names	Gujarati : Iajawni	


Species Type	Tree	
Botanical Name	<i>Bauhinia variegata</i>	
Synonyms	<i>Bauhinia candida</i> Roxb.	
Common Name	<i>Mountain ebony</i> , Kachnar	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Kachnar	
	• Sanskrit Kancharan (white)	


Species Type	Tree	
BotanicalName	<i>Bixa orellana</i>	
Synonyms	<i>Bixa orellana</i> L.	
CommonName	Sindhuri	
Family	Bixaceae	
Local Names	• Marathi : Shenduri	


Species Type	Tree	
Botanical Name	Butea monosperma	
Synonyms	<i>Butea frondosa</i> Koenig ex Roxb., <i>Erythrina monosperma</i> Lam., <i>Butea monosperma</i> L.	
Common Name	Palas	
Family	Fabaceae-Papilionioideae	
Local Names	• Marathi : Palas, khakra	
	• Gujarati : Khaakhro	
	• Hindi : Palash	


Species Type	Tree	
Botanical Name	<i>Eucalyptus globulus</i>	
Synonyms	<i>Eucalyptus gigantea</i> Dehn., <i>Eucalyptus glauca</i> DC., <i>Eucalyptus perfoliata</i> Desf., <i>Eucalyptus pulverulenta</i> Link	
Common Name	Australian gum Tree, Eucalyptus	
Family	Myrtaceae	
Local Names	• Marathi : Nilgiri	
	• Gujarati : Nilgiri	


Species Type	Tree	
Botanical Name	<i>Nyctanthes arbo-tristis</i>	
Synonyms	<i>Bruschia macrocarpa</i> Bertol., <i>Nyctanthes arbor-tristis</i> var. <i>dentata</i> Hort.ex Moldenke, <i>Nyctanthes dentata</i> Blume, <i>Nyctanthes tristis</i> Salisb., <i>Parilium arbor-tristis</i> Gaertn., <i>Scabrita triflora</i> L.	
Common Name	Night jasmine, Harshingar	
Family	Nyctanthaceae	
Local Names	<ul style="list-style-type: none"> • Sanskrit : Parijata • Gujarati : Paarijaat 	


Species Type	Tree	
Botanical Name	<i>Peltophorum pterocarpum</i>	
Synonyms	<i>Caesalpinia gleniei</i> Thwaites, <i>Caesalpinia inermis</i> Roxb., <i>Inga pterocarpa</i> DC., <i>Peltophorum ferrugineum</i> (Decne) Benth., <i>Peltophorum inerme</i> (Roxb.) Llanos, <i>Peltophorum roxburghii</i> (G.Don) Degener, <i>Poiciana roxburghii</i> G.Don	
Common Name	Yellow gold mohur	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Taamraparni 	


Species Type	Tree	
Botanical Name	<i>Cocos nucifera</i>	
Common Name	Coconut palm	
Family	Arecaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Naral • Gujarati :Nariyeli 	


Species Type	Tree	
Botanical Name	<i>Ficus religiosa</i>	
Synonyms	Urostigma religiosum (L.) Gasparrini	
Common Name	Bot-Tree, Pipal	
Family	Moraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pimpal 	


Species Type	Tree	
Botanical Name	<i>Mangifera indica</i> L.	
Synonyms	<i>Mangifera indica</i> L.	
Common Name	Aam	
Family	Anacardiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Amba 	


Species Type	Tree	
Botanical Name	<i>Murraya Koenigii</i>	
Synonyms	<i>Bergera koenigii</i> L., <i>Chalcas koenigii</i> (L.) Kurz, <i>Murraya foetidissima</i> Teijsm. & Binnend, <i>Murraya koenigii</i> (L.) Spreng	
Common Name	Indian curry leaf Tree, Mitha neem	
Family	Rutaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : kadhi patta • Gujarati: Mitho Limdo 	


Species Type	Tree	
Botanical Name	<i>Saraca indica</i>	
Common Name	Asoka	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : ashok	
	• Gujarati : Ashok	


Species Type	Tree	
Botanical Name	<i>Tamarindus indica</i>	
Synonyms	<i>Tamarindus occidentalis</i> Gaertn., <i>Tamarindus officinalis</i> Hook.	
Common Name	Tamarind Tree, Imli	
Family	Fabaceae-Caesalpinioideae	
Local Names	• Marathi : Chinch	
	• Gujarati : Khaati Amli	


Species Type	Herb	
Botanical Name	<i>Aloe barbadensis</i>	
Synonyms	<i>Aloe abyssinica</i> Lam., <i>Aloe chinensis</i> Baker, <i>Aloe indica</i> Royle, <i>Aloe littoralis</i> Koenig ex Baker, <i>Aloe vera</i> (L.) Burm.f., <i>Aloe vulgaris</i> Lam., <i>Alpinia allhugas</i> Roscoe, <i>Aloe barbadensis</i> Mill.	
Common Name	Aloe	
Family	Liliaceae	
Local Names	<ul style="list-style-type: none"> • Marathi :Korphad • Gujarati : Ghrutakumari 	


Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kaasundro 	


Species Type	Herb	
Botanical Name	<i>Catharanthus roseus</i>	
Synonyms	<i>Lochnera rosea</i> (L.) Reichb., <i>Vinca rosea</i> L., <i>Catharanthus roseus</i> (L.) G. Don	
Common Name	Sadabahar	
Family	Apocynaceae	
Local Names	• Marathi : Sadaphuli	


Species Type	Herb	
Botanical Name	<i>Cymbopogon citratus</i>	
Synonyms	<i>Andropogon citratus</i> DC., <i>Cymbopogon citratus</i> (DC.) Stapf	
Common Name	Lemon grass, Gandh-ghas	
Family	Poaceae	
Local Names	• Gujarati : Lili-cha	


Species Type	Herb	
Botanical Name	<i>Elettaria cardamomum</i>	
Common Name	Elaichi	
Family	Scitamineaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : elaichi 	


Species Type	Herb	
Botanical Name	<i>Mentha piperita</i>	
Common Name	Peppermint	
Family	Lamiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Pudina • Gujarati : Pudino 	


Species Type	Herb	
Botanical Name	<i>Mimosa pudica</i>	
Synonyms	<i>Mimosa pudica</i> L.	
Common Name	Touch-me-not	
Family	Fabaceae-Mimosoideae	
Local Names	• Marathi : Lajwanti	
	• Gujarati : Lajaamni	


Species Type	Herb	
Botanical Name	<i>Ocimum basilicum</i>	
Common Name	Babui tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Sabja, tulas	
	• Gujarati : Damro	


Species Type	Herb	
Botanical Name	<i>Ocimum sanctum</i>	
Synonyms	<i>Ocimum inodurum</i> Burm.	
Common Name	Tulsi	
Family	Lamiaceae	
Local Names	• Marathi : Krishna Tulas	
	• Gujarati : Vishnu Tulsi	


Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : isabgula	


Species Type	Herb	
Botanical Name	<i>Rauvolfia serpentina</i>	
Synonyms	<i>Ophioxylon album</i> Gaertn., <i>Ophioxylon serpentium</i> L., <i>Ophioxylon trifoliatum</i> Gaertn., <i>Rauvolfia trifoliata</i> (Gaertn.) Baill., <i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	
Common Name	Sarpagandha, chota chand	
Family	Apocynaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Sarpagandha • Sanskrit: Sarpagandha 	


Species Type	Herb	
BotanicalName	<i>Solanum surattense</i>	
Synonyms	<i>Solanum mccanni</i> Sant., <i>Solanum xanthocarpum</i> Schrad. & Wendl.	
CommonName	Kantakari, Kateli	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : Kantkari 	


Species Type	Herb	
Botanical Name	<i>Swertia chirata</i>	
Common Name	Kiryata	
Family	Gentianaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : chirata 	


Species Type	Herbs	
Botanical Name	<i>Zingiber officinale</i>	
Common Name	Adrak	
Family	Zingiberaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Adrak • Gujarati : adu 	


Species Type	<i>Shrub</i>	
Botanical Name	<i>Withania somnifera</i>	
Synonyms	<i>Physalis flexuosa</i> L., <i>Physalis somnifera</i> L., <i>Withania somnifera</i> (L.) Dunal.	
Common Name	Ashwagandha	
Family	Solanaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Ashwagandha • Gujarati : Ashwagandha 	


Species Type	<i>Herb</i>	
Botanical Name	<i>Kalanchoe pinnata</i>	
Synonyms	<ul style="list-style-type: none"> • Bryophyllum pinnatum (Lam.) Oken. • Bryophyllum calycinum Salisb. • Cotyledon pinnata Lam. 	
Family	Crassulaceae	
Local Names	<ul style="list-style-type: none"> • Gujarati : patthar-chatti • Sanskrit : 	

Species Type	Climber	
Botanical Name	<i>Asparagus racemosus</i>	
Synonyms	<i>Asparagus racemosus</i> Willd	
Common Name	Satavari	
Family	Liliaceae	
Local Names	• Marathi : Shatavari	
	• Gujarati : Shatavari	


Species Type	Shrub	
Botanical Name	<i>Adhatoda vasica</i>	
Synonyms	<i>Adhatoda vasica</i> Nees	
Common Name	Malabar nut	
Family	Acanthaceae	
Local Names	• Marathi :	
	• Gujarati :	


Species Type	Tree	
Botanical Name	<i>Pongamia pinnata</i>	
Common Name	Indian beach	
Family	Fabaceae-Papilionioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Karanj • Gujarati : Karanj 	


Species Type	Climber	
Botanical Name	<i>Tylophora indica</i>	
Synonyms	<i>Asclepias asthmatica</i> L. f., <i>Cynanchum bracteatum</i> Thunb., <i>C. indicum</i> Burm. f., <i>Hoya hirsuta</i> Moon. <i>Tylophora asthmatica</i> (L.f.) Wight & Arn.	
Common Name	Indian ipecacuanha	
Family	Asclepiadaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Damvel • Gujarati : Damvel 	


Species Type	Climber	
Botanical Name	<i>Piper longum</i>	
Synonyms	<i>Chavica roxburghii</i> Miq., <i>Piper longum</i> L.	
Common Name	Indian long pepper, Pipal	
Family	Piperaceae	
Local Names	• Marathi : Lendi pimpli	
	• Gujarati :	


Species Type	Herb	
Botanical Name	<i>Bacopa monnieri</i>	
Synonyms	<i>Bacopa monniera</i> (L.) Wettst., <i>Gratiola monniera</i> L., <i>Herpestis monniera</i> Benth., <i>Herpestis monniera</i> (L.) HBK., <i>Lysimachia monnieri</i> L., <i>Moniera cuneifolia</i> Michx.	
Common Name	Thyme-leaved Gratiola , Jal Brahmi	
Family	Scrophulariaceae	
Local Names	• sanskrit : Brahmi	
	• Gujarati :	


Species Type	Herb	
Botanical Name	<i>Eclipta alba</i>	
Common Name	Bhangra	
Family	Asteraceae	
Local Names	• sanskruit : Bhrungaraj	
	• Gujarati : Bhaangro	
	• Hindi : Bhringraj	
	• Marathi : Maka (White)	

Species Type	Herb	
Botanical Name	<i>Plantago ovata</i>	
Common Name	Isabgol	
Family	Plantaginaceae	
Local Names	• Marathi : Isabgol	
	• Gujarati : Isabgol	

Species Type	Climber	
Botanical Name	<i>Mucuna pruriens</i>	
Synonyms	<i>Carpopogon niveum</i> Roxb., <i>Carpopogon pruriens</i> Roxb., <i>Dolichos pruriens</i> L., <i>Mucuna nivea</i> (Roxb.) DC., <i>Mucuna prurita</i> Hook., <i>Stizolobium pruriens</i> (L.) Medikus	
Common Name	Kawach	
Family	Fabaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Khaj-kujli - Black • Gujarati : Kaucha 	

Species Type	Herb	
Botanical Name	<i>Trachyspermum ammi</i>	
Common Name	Carum Ajwain	
Family	Apiaceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Owaa • Gujarati : Kaucha 	

Species Type	Tree	
BotanicalName	<i>Punica granatum</i>	
Synonyms	<i>Punica granatum</i> L.	
CommonName	Anar	
Family	Lythraceae	
Local Names	<ul style="list-style-type: none"> • Marathi : Dalimb • Gujarati : Daadam 	

Species Type	Herb	
Botanical Name	<i>Cassia occidentalis</i>	
Synonyms	<i>Senna occidentalis</i> (L.) Link	
Common Name	The Negro coffe, Kasondi	
Family	Fabaceae-Caesalpinioideae	
Local Names	<ul style="list-style-type: none"> • Marathi : Kaasundro • Gujarati : Kaasundro 	

ANNEXURE-II : LIST OF BIRDS SPOTTED IN & AROUND MU

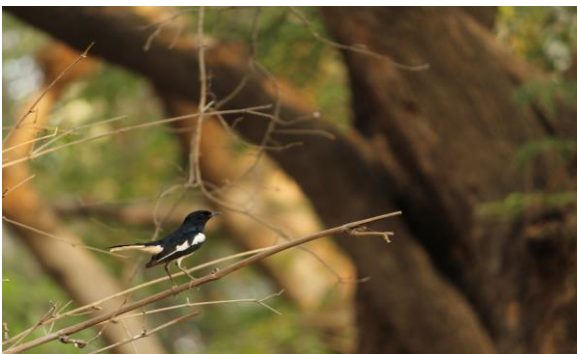
A survey was carried out to find the animal diversity in the campus of Marwadi University Rajkot. The survey focused on the diversity of birds, butterfly, Amphibia.



Common name: Spotted owl
Scientific name : *Strix occidentalis*



Common name: Brahminy kite
Scientific name : *Haliastur indus*



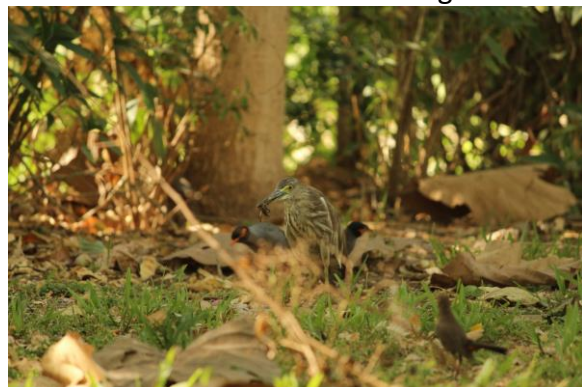
Common name:
Scientific name :



Common name: Common starling
Scientific name : *Sturnus vulgaris*



Common name: Kabae
Scientific name : common Myna



Common name: Pond heron
Scientific name : *Ardeola*



Common name: Woodpecker
Scientific name : Picidae



Common name: common kingfisher
Scientific name : Alcedo atthis



Common name: Purple sunbird
Scientific name : Cinnyris asiaticus



Common name: Common tailorbird
Scientific name : Orthotomus sutorius



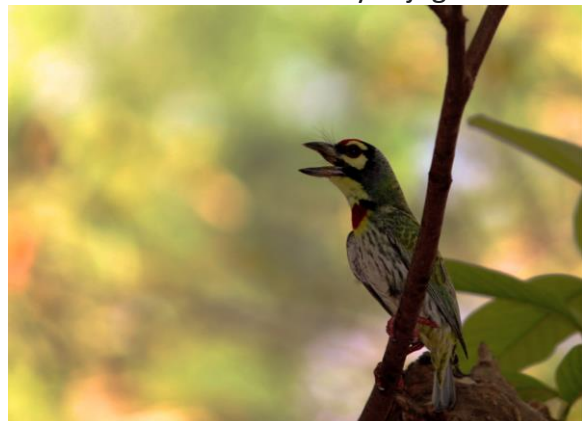
Common name: Asian green bee-eater
Scientific name : Merops orientalis



Common name: olive-backed sunbird
Scientific name : Cinnyris jugularis



Common name: house sparrow
Scientific name : Passer domesticus



Common name: coppersmith barbet
Scientific name : Psilopogon haemacephalus



Common name: Bulbul
Scientific name : Pycnonotidae



Common name: laughing dove
Scientific name : Streptopelia senegalensis



Common name: Little egret
Scientific name : Egretta garzetta



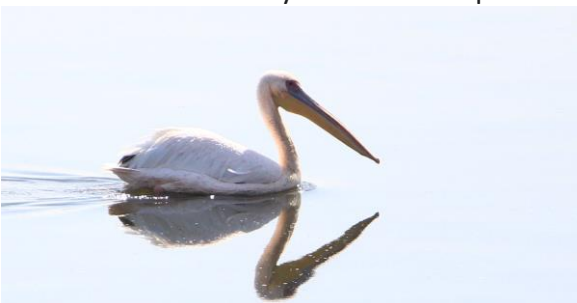
Common name: Oriental darter
Scientific name : Anhinga melanogaster



Common name: Painted stork
Scientific name : Mycteria leucocephala



Common name:
Scientific name :



Common name: billed pelican
Scientific name : Pelecanus philippensis



Common name: Parrots
Scientific name : Psittaciformes



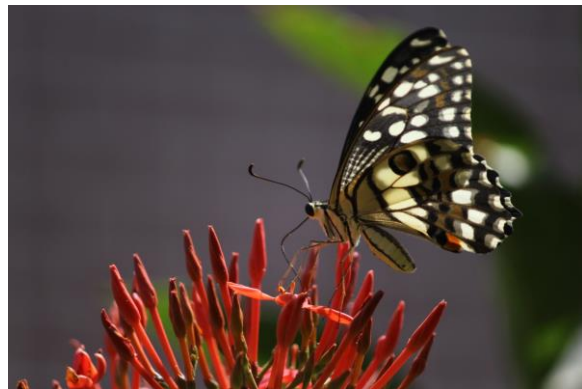
Common name: Robber flies
Scientific name : Asilidae



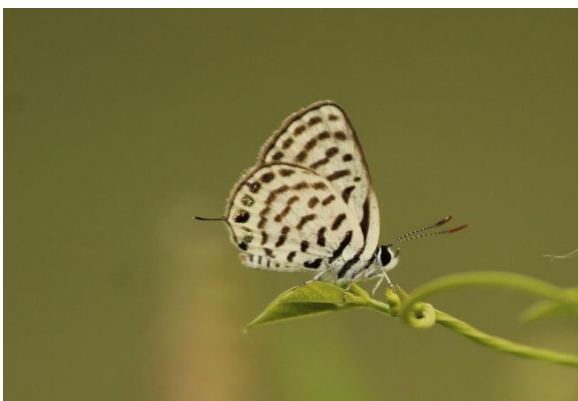
Common name: Dragonfly
Scientific name : Anisoptera



Common name:
Scientific name :



Common name:California sister
Scientific name :Adelpha bredowii



Common name:
Scientific name :



Common name: common tiger
Scientific name : Danaus genutia



Common name: Spotted Joker
Scientific name : *Byblia ilithyia*



Common name: Blue tiger
Scientific name : *Tirumala limniace*



Common name: Signature Spider
Scientific name : *Argiope anasuja*



Common name: button spider
Scientific name : *Latrodectus umbukwane*

ANNEXURE-III : LIST OF RAPTIRES SPOTTED IN & AROUND MU



Scientific name: *Rattus rattus*
Common Name : House Rat



Scientific name: *Calotes versicolor* Common
Name : Indian Garden Lizard



Scientific name: *Hoplobatrachus tigerinus*
Common Name : Indian Bull Frog



Scientific name: *Naja naja*
Common Name : Indian Cobra