GREEN AUDIT REPORT

CONSULTATION REPORT

RISE KRISHNA SAI GANDHI GROUP OF INSTITUTIONS ONGOLE, VALLURU
Andhra Pradesh- 523272

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

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ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the

management of **Green Audit Report Rise Krishna Sai Gandhi Group of Institutions, Ongole** for

giving us an opportunity to conduct energy audit for the college .

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who

rendered their valuable assistance and co-operation the course of study.

Rajesh Kumar Singadiya

(Director)

M.Tech (Energy Management), B.E (Chemical Engineering)
PhD (Research Scholar) in Chemical Engineering
(Faculty of Energy and Environment Engineering)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
Lead Auditor ISO50001:2011 [EnMS] from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Charted Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]

Certificate of Accreditation

BUREAU OF ENERGY EFFICIENCY

ENERGY IS LIFE
B E E
CONSERVE IT

Examination Registration No.: .... **EA- 7271**
Accreditation Registration No.: **AEA-284**

Certificate of Accreditation

This is to certify that Mr./Ms.......... **Shri. Rajesh Kumar Singadiya** ....having its trade/registered office at .... has been given accreditation as accredited energy auditor. The certificate shall be effective from ..**9**th.. day of ..**May, 2018**..........

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No...**284**...... in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this **5**th day of **October, 2018**

Secretary,
Bureau of Energy Efficiency
New Delhi

Green Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited, Indore**

- **Mr. Rakesh Pathak**, [Director & Electrical Expert]
- **Mr. Rajesh Kumar Singadiya** [Director & Accredited Energy Auditor AEA-0284]
- **Mr. Hemendra Khedekar** [Sr. Project Manager]
- **Mr. Ajay Nahra** [Asst. Project Engineer]
- **Mr. Charchit Pathak** [Project Engineer]
- **Mr. Praveen Puniyasa**[Electrical Engineer]

EXECUTIVE SUMMARY

Green Audit is the most efficient way to identify the strength and weakness of environmentally sustainable practices and to find a way to solve problem. The executive summary of the Green Audit report furnished in this section briefly gives the identified green initiative taken by Institute and further recommendation for green campus, solid waste management and their impact on carbon foot print in the campus.

GREEN INITIATIVE TAKEN BY THE INSTITUTE.

- **CAMPAIGN OF PLANTATION AND GREEN CAMPUS:**
  - ❖ Institute has around 1642 no of plant & trees in the campus. Its good initiative taken by management for green campus under the campaign of plantation.-**It's Appreciable**

    (Annexture-01)

- **DUST BIN SYSTEM**
  - ❖ Institute has around 16 no's of dustbin system for all type of waste collected from Institute premises. **It's Appreciable**

- **FAUNAL DIVERSITY IN CAMPUS**
  - ❖ Institute has developed fauna diversity in institute premises. **It's Appreciable**

- **POLICY ON WASTE MANAGENET**
  - ❖ Institute has formed Swachhta Action Plan Committee for clean & healthy environment in institute campus- I**t's Appreciable**

- **E-WASTE COLLECTION MOU**
  - ❖ Institute has collected E- waste in a storeroom for E-waste treatment and also signed MOU with M/s. Dharsana Enterprises, Viiaya wada Private Limited for E-waste. **It's Appreciable**

Green Audit Recommendation

- **QR CODE SYSTEM ON TREE**

    While the world seems to be going digital, people lack the time to read books and process the information they contain.

Hence, Institute can be provided QR codes on the trees for its information and to exploit the rapidly growing platform for a unique purpose.

➕ AIR MONITORING SYSTEM: -

Installation of **"Cloud based (IoT based) Air Quality monitoring system in the Campus"** to monitor air quality index for institute campus.

➕ ECO-RESTORATION PROGRAMMES: -

Frame a holistic campus development plan with long-term eco-restoration programmes for replacing exotic acacia plantations with indigenous trees.

➕ VEHICLE POOLING: -

Vehicle pooling should be promoted both among students and faculty and use of bicycles should be promoted as a policy of institute.

CHAPTER-1
INTRODUCTION

1.1 About Institute

RISE Krishna Sai Gandhi Group of Institutions is one of the best institutions in the region of JNTUK, under the flagship of AICTE. It offers under graduate courses in Engineering. The Institution was established on 5th October 2009 by RISE which stands for Rural Institute of Social and Economic Empowerment. The captivating ambiance amidst panoramic scenic beauty all around would add glory to the face value of the campus. Since its inception, the institution has been flourishing in all aspects. RISE institution is bound together by a deep-rooted sense of excellence in education. Our commitment to quality in education, learning and research is uncompromising, and lived out in practice every day in our lecture halls, laboratories and libraries.
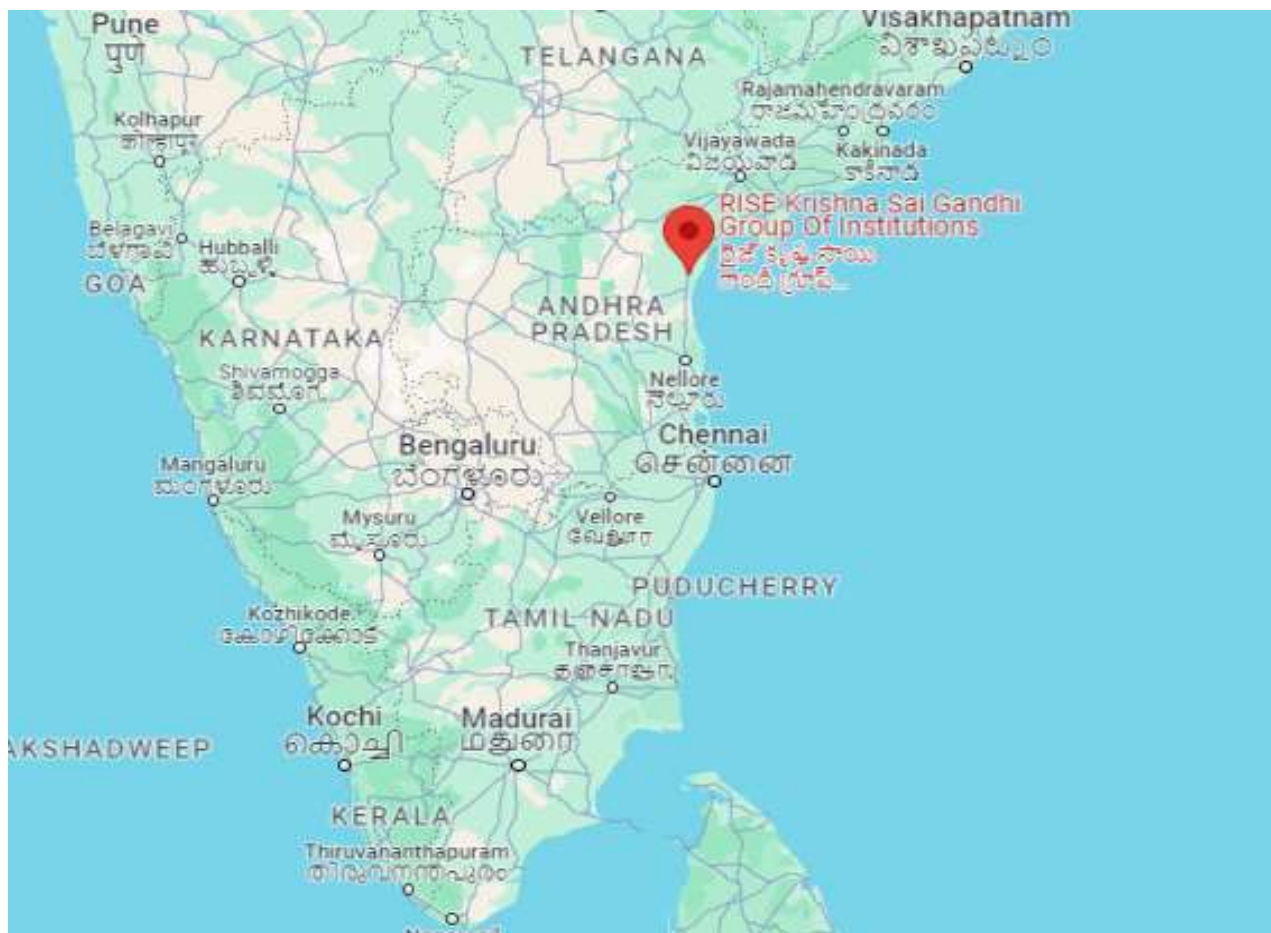
Fig.: 1.1 RISE Krishna Sai Gandhi Group of Institutions from Google map

VISION

"To create a community of engineers who blend ground breaking technologies with ethical responsibility, driving global innovations while championing sustainable solutions and community empowerment."

MISSION

M1: Foster an inclusive academic setting that combines cutting-edge technology with ethical grounding.

M2: Inspire sustainable innovation by embedding environmental and social responsibility into our curriculum.

M3: Strengthen ties with industry and communities to ensure our engineers make a real world impact.

CORE VALUES

Integrity: Upholding honesty and ethical standards in all endeavors.

Innovation: Encouraging creative thinking and cutting-edge solutions.

Collaboration: Promoting teamwork and interdisciplinary partnerships.

Excellence: Striving for the highest quality in education and research.

Responsibility: Committing to sustainable practices and community betterment.

1.2 Institute Build-Up Area

The Institute campus is spread over 41,197 sq. m. with greenery & open space and sports

area. The details of various department and building are given below:

S. No.	Area	Area in sq. m.
	Total Campus Area	41,197 sq. m.
	Buildup area in campus	9910 sq. m.

1.3 Institute Population

S. NO.	Category	Total Numbers
1	Total No. of Student	**1027**
2	Total No. of Teaching Faculty	**71**
3	Total No. of Non-Teaching Staff	**57**

1.4 Institute Layout
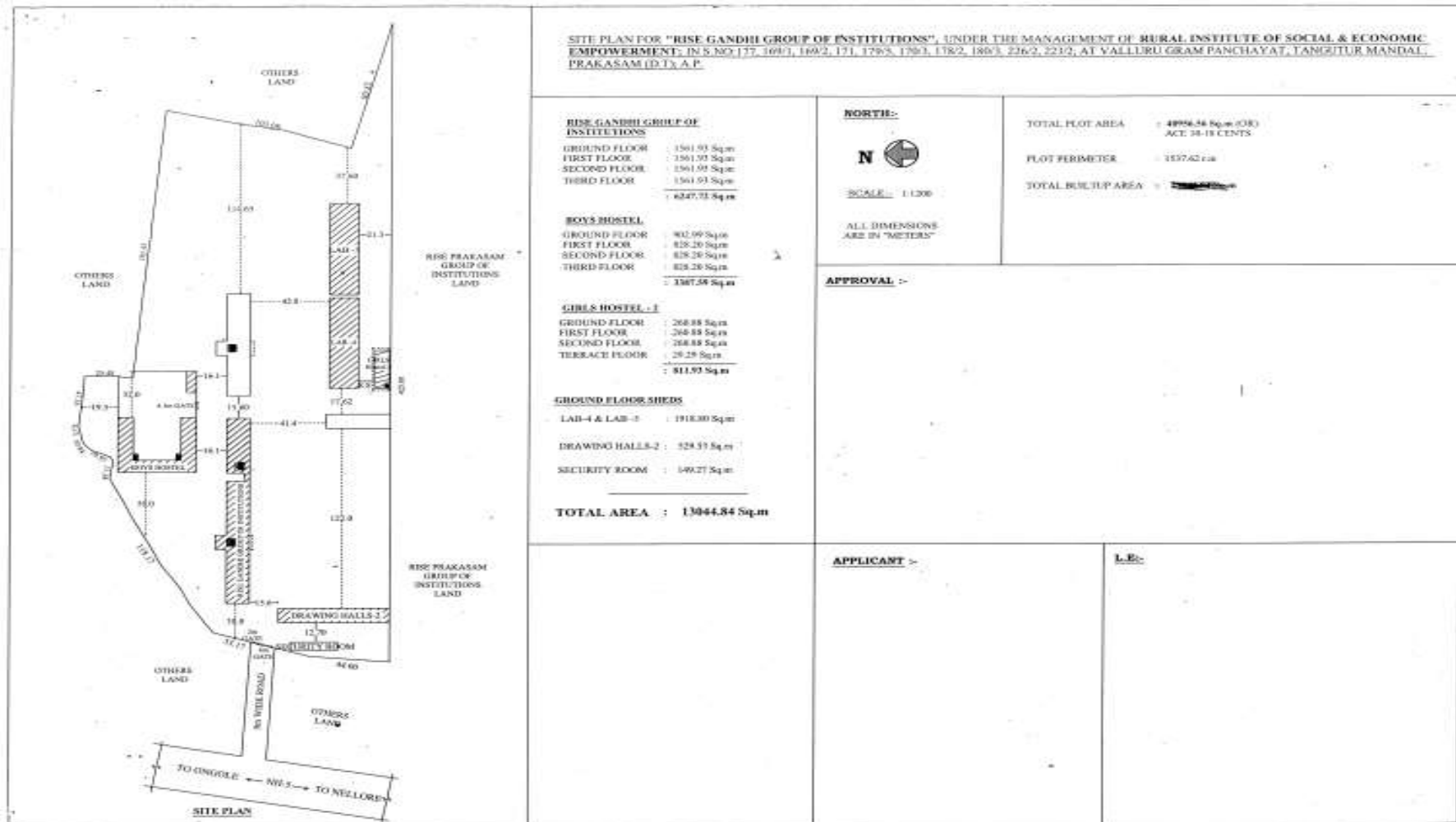
1.5 Green Committee

RISE KRISHNA SAI GANDHI GROUP OF INSTITUTIONS

(Approved by AICTE, New Delhi and affiliated to JNTUK, Kakinada)
NH-16, Valluru - 523 272, ONGOLE, Prakasam Dt., A.P.

Cell : 95028 35678
70933 83852

E-mail: rise_gandhi@yahoo.com
www.risegroup.edu.in

Dr. K.V. Subrahmanyam
M.Tech, Ph.D, MISTE, FIE, FIETE.
Principal

Dt.   05.06.23

Constitution of Committee for Energy/Environment/Green

In view of Environment impact assessment & procedure for situation urgent action regarding regular assessment of pollution soil degradation & waste management following committee are required to be constituted for saving the environment w.e.f. date of issue, for the period of three years.

Name of the Committee	Proposed name of the members
1. Energy Audit	1. Smt M.Sireesha
	2. Smt B Lavanya
	3. Mr Naga Suresh
2. Environmental Audit	1. Mr N Madhu Babu
	2. Mr V Anjaneyulu
	3. Mr P Rajasekhar
2. Green Audit	1. Mr.S V Ravi Kumar
	2. Mrs.Silaja
	3. Sk Meeravali

IQAC Coordinator
IQAC Co-ordinator

Principal

(Dr K V Subrahmanyam)
PRINCIPAL
RISE KRISHNA SAI GANDHI
GROUP OF INSTITUTION,
VALLURU:: ONGOLE.

Promoted by
Rural Institute of Social & Economic Empowerment (RISE)

1.6 About Green Auditing

Eco campus is concepts implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge in to the environment.

Green audit means to identify opportunities to sustainable development practices, enhance environmental quality, improve health, hygiene and safety, reduce liabilities achieve values of virtue. Green audit also provides a basis for calculating the economic benefits of resource conservation projects by establishing the current rates of resource use and their associated costs.

Green auditing of Institute enables to assess the life style, action and its impact on the environment. This green audit was mainly focused on greening indicators like utilization of green energy (solar energy) and optimum use of secondary energy sources (petrol and diesel) in the Institute campus, vegetation, and carbon foot print of the campus etc. The aim of green auditing is to help the institution to apply sustainable development practices and to set examples before the community and young learners.

1.7 Objectives of Green Audit

The general objective of green audit is to prepare a baseline report on Plant &Trees, Alternative energy sources (solar energy), measures to mitigate resource wastage and improve sustainable practices.

The specific objectives are:

+ To inculcate values of sustainable development practices through green audit mechanism.
+ Providing a database for corrective actions and future plans.
+ To identify the gap areas and suggest recommendations to improve the green campus status of the Institute.

1.8 Target Areas of Green Audit

Green audit forms part of a resource management process. Although they are individual events, the real value of green audit is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Target areas included in this green auditing is plant trees, green energy and carbon foot print.

CHAPTER-2
GREEN CAMPUS & GREEN ENERGY

2.1 Green Campus

In the survey, focus has been given on assessment of present status of diversity in form of plants, in Institute campus and efforts made by the Institute authorities for nature conservation. Campus is located in the vicinity of approximately more than 1642 trees/ medicinal herbs/ ornamental plants. The detail is given below:

Figure- 2.1 Green Campus of Institute

Figure- 2.2 Green Campus of Institute

Figure- 2.3 Plantation in RISE Krishna Sai Gandhi Group of Institution

2.2 Tree Diversity

Our campus area is immensely diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods of time through various plantation programs organized by the authority and have become an integral part of the college. The trees of the college have increased the quality of life, not only the college fraternity but also the people around of the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, and supporting wildlife, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer.

Many spices of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favorite of birds and many insects. Leaf – covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species display a seemingly endless variety of shapes, forms, texture and vibrant colors. Even individual trees vary their appearance throughout the course of the year as the seasons change. The strength, long lifespan and regal stature of trees give them a monument – like quality. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. Thus, the college has been playing a significant role in maintaining the environment and its surrounding areas. The following are the tree species with whom we are being attached-

2.3 Tree and plant with quantity in Institute Campus

Table -2.1 Details of Name of Tree/Plant in Institute campus.

S. No	Common Name	Scientific Name	Family	Total
1	Fox Tail	SetariaItalica	Arecaceae	242
2	Ixora coccina	Plumeria	Rubiaceae	266
3	Water Apple	SyzygiumSamarangense	Myrtaceae	4
4	BauhinlaAccuminata	Hibiscus	Fabaleac	5
5	Lime Tree	Tilia	Malvaceae	2
6	Apricot Tree	Prunus	Rosaceae	5
7	Coconut Tree	Cocusnucitera	Palm Tree	59

S. No	Common Name	Scientific Name	Family	Total
8	Guava	Psidium Guajava	Myrtle	5
9	Sapota Tree	Manilkara Zapota	Royen	7
10	Wild Turmone	Curcuma Aromatica	Zingibrale	451
11	Weeping Tree	Ficus Benjamina	Moraceae	168
12	Swampweds	Hygrophila	Acnthuceae	6
13	Arecaceae	Palm Tree	peremial	28
14	Swietenin	mahogany	sapindall	29
15	Saracaasoca	Ashokwee	fabaleae	32
16	Indian beech	ponjamiapinnatu	fabaleac	148
17	Neem tree	azadirachta indica	mahogany	16
18	Mango	mamitera indica	cashew	9
20	Kurry Tree	Murrayakoeninni	rutaceae	3
21	Sybus	dvospyrous	Ebenaceae	2
22	Alovera	Liliaceaae	Asphodeloideae	3
23	Eucalyptus	Eucalyptus dlobulus	myrtel	2
24	Water apple	syzugium	myrtaceae	8
25	Bonadatree	mimusopselenni	sapotaceae	6
26	Pertia tree	Thespesia populnea	malvaleae	4
27	Swimming tree	phonetysynestns	arecaceae	23
28	Punica granatum	pomegranate	lythracae	3
29	Soapnut	Sapandus	sopindaceae	1
30	Oleander	Nerium oleander	Apocynaceae	53
31	Red sanders	Pterocarpus santalinus	Fabaceae	52
TOTAL TREES IN CAMPUS				**1642**

Fig. : 2.4 Greenery in college campus

2.4 Faunal Diversity in Campus

Rise Krishna Sai Group of Institutions is located in District of Prakasam, Andhra Pradesh.

The highest temperature is recorded 42^0 C just prior to the onset of monsoon (around May-early June). Summer rain is normal, and is principally caused from late June to August by the moisture-laden South-West Monsoon, on striking the Himalayan foothills of the north. The climatic condition of the Rise Krishna Sai Group of Institutions district as a whole and Rise Krishna Sai Group of Institutions in particular is very suitable for a wide variedly of flora and fauna to support its rich biodiversity. The faunal Diversity Rise Krishna Sai Group of Institutions campus has been studied and documented as below:

Table: 2.2 Common and Scientific names of birds and animals

S.No	Common Name	Scientific Name
1	Butter Fly	DanausGenutia
2	House Crow	CorvusSplendens
3	Bank Myna	AcridotheresGinginianus
4	Common Myna	AcridotheresTristis
5	Parrot	Psittaciformes
6	Slender Skimmer	Orthetrum Sabina
7	Indian Cow	Bos Indicus
8	Spider	Araneae
9	House Sparrow	Passer Domesticus
10	Caterpillar	Lepidoptera
11	Turtle Dove	Columbidae
12	Cuckoo	Cuculidae
13	Little Owl	Athene Brama
14	Garden Tiger Moth	ArctiaCaja
15	Red-Vented Bulbul	PycnonotusCafer
16	Skylark	AludaGulgula
17	Pied Myna	Gracupica Contra

Butter Fly (Danaus Genutia)

House Crow (Corvus Splendens)

Parrot (Psittaciformes)

Slender Skimmer (Orthetrum Sabina)

House Sparrow (PasserDomesticus)

Caterpillar(Lepidoptera)

Little Owl (Athene Brama)

Garden Tiger Moth (ArctiaCaja)

Fig. : 2.5 Greenery in college campus

2.5 CO_2 Sequestration calculation:

Based on list of tree & plant in the campus CO_2 Sequestration is calculated in table 2.2.

Table: 2.2 - CO_2 Sequestered by the trees

Sr. no.	Common Name	Botanical and Family Name	Average Dai meter CM (10 to 100)	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	Total	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount (Ton/year)
1	Fox Tail	SetariaItalica	35	583.8	87.6	671.3	335.7	1230.6	242	297799	4.06
2	Ixora coccina	Plumeria	12	35.4	5.3	40.7	20.4	74.7	266	19865	0.27
3	Water Apple	SyzygiumSamarangense	21	164.5	24.7	189.1	94.6	346.7	4	1387	0.02
4	Bauhinla Accuminata	Hibiscus	14	54.6	8.2	62.8	31.4	115.1	5	575	0.01
5	Lime Tree	Tilia	36	623.9	93.6	717.5	358.7	1315.2	2	2630	0.04
6	Apricot Tree	Prunus	15	66.2	9.9	76.2	38.1	139.6	5	698	0.01
7	Coconut Tree	Cocusnucitera	36	623.9	93.6	717.5	358.7	1315.2	59	77595	1.06
8	Guava	Psidium Guajava	19	126.3	18.9	145.2	72.6	266.2	5	1331	0.02
9	Sapota Tree	Manilkara Zapota	40	798.0	119.7	917.7	458.9	1682.2	7	11775	0.16
10	Wild Turmone	Curcuma Aromatica	12	35.4	5.3	40.7	20.4	74.7	451	33681	0.46

Sr. no.	Common Name	Botanical and Family Name	Average Daimeter CM (10 to 100)	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	Total	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount (Ton/year)
11	Weeping Tree	Ficus Benjamina	26	283.7	42.5	326.2	163.1	598.0	168	100456	1.37
12	Swampweds	Hygrophila	16	79.2	11.9	91.1	45.5	166.9	6	1002	0.01
13	Arecaceae	Palm Tree	24	231.9	34.8	266.7	133.3	488.9	28	13688	0.19
14	Swietenin	mahogany	22	185.6	27.8	213.4	106.7	391.2	29	11345	0.15
15	Saracaasoca	Ashokwee	12	35.4	5.3	40.7	20.4	74.7	32	2390	0.03
16	Indian beech	ponjamiapinnatu	26	283.7	42.5	326.2	163.1	598.0	148	88497	1.21
17	Neem tree	azadirachta indica	12	35.4	5.3	40.7	20.4	74.7	16	1195	0.02
18	Mango	mamitera indica	10	21.7	3.3	24.9	12.5	45.7	9	411	0.01
19	Kurry Tree	Murrayakoeninni	12	35.4	5.3	40.7	20.4	74.7	3	224	0.00
20	Sybus	dvospyrous	35	583.8	87.6	671.3	335.6	1205.4	2	2411	0.06
21	Alovera	Liliaceaae	12	35.4	5.3	40.7	20.4	74.7	3	224	0.00
22	Eucalyptus	Eucalyptus dlobulus	10	21.7	3.3	24.9	12.5	45.7	2	91	0.00
23	Water apple	syzugium	8	13.4	2.0	15.4	7.7	28.2	8	226	0.00
24	Bonadatree	mimusopselenni	12	35.4	5.3	40.7	20.4	74.7	6	448	0.01
25	Pertia tree	Thespesia populnea	11	27.9	4.2	32.1	16.0	58.8	4	235	0.001

26	Swimming tree	phonetysynestns	10	21.7	3.25	24.94	12.4718	45.7214	23	1051.59	9.17
27	Punica granatum	pomegranate	12	35.4	5.3	40.7	20.4	74.7	3	224	14.27
28	Soapnut	Sapandus	14	54.6	8.2	62.8	31.4	115.1	1	115	28.28
29	Oleander	Nerium oleander	20	144.7	21.7	166.4	83.2	305.0	53	16165	56.53
30	Red sanders	Pterocarpus santalinus	14	54.6	8.2	62.8	31.4	115.1	52	5984	113.06
								TOTAL TREES		**1642**	**382.25**

Institute has planted total **1642 trees** in the college campus. This is good initiative taken by management for green campus under the campaign of plantation. Total neutralized by tree is **382.28 Ton /Year CO$_2$** - **It's APPRECIABLE.**

Chapter- 03

Carbon Foot print

3.1 About Carbon Foot Print

The Climate change is one of the greatest challenges facing nations, governments, institutions, business and mankind today. The total amount of greenhouse gases produced to directly and indirectly support human activities, usually expressed in equivalent tons of carbon dioxide (CO_2).

Carbon footprint is a measure of the impact your activities have on the amount of carbon dioxide (CO_2) produced through the burning of fossil fuels and is expressed as a weight of CO_2 emissions produced in tones.

We focus on consumption in each of our five major categories: housing, travel, food, products and services. In addition to these we also estimate the share of national emissions over which we have little control, government purchases and capital investment.

For simplicity and clarity all our calculations follow one basic method. We multiply a use input by an emissions factor to calculate each footprint. All use inputs are per individual and include things like fuel use, distance, calorie consumption and expenditure. Working out your inputs is a matter of estimating them from your home, travel, diet and spending behavior.

Although working out you inputs can take some investigation on your part the much more challenging aspect of carbon calculations is estimating the appropriate emissions factor to use in your calculation. Where possible you want this emissions factor to account for as much of the relevant life cycle as possible.

We all have a carbon footprint…

Fig.-3.1 About carbon foot print

3.2 Methodology and Scope

The carbon footprint gives a general overview of the Institute greenhouse gas emissions, converted into CO_2 -equivalents and it is based on reported data from internal and external systems.

The purposes of the carbon indicators are to measure the carbon intensity per unit of product, in addition to showing environmental transparency towards external stakeholders.

The carbon footprint reporting approach undertaken in this study follows the guidelines and principles set out in the "Greenhouse Gas Protocol Corporate Accounting and Reporting Standard" (hereafter referred to as the GHG Protocol) developed by the Greenhouse Gas Protocol Initiative and international standard for the quantification and reporting of greenhouse gas emissions -ISO 14064.

This is the most widely used and accepted methodology for conducting corporate carbon footprints. The study has assessed carbon emissions from the Institute Campus. This involves accounting for, and reporting on, the GHG emissions from all those activities for which the company is directly responsible.

The items quantified in this study are as classified under the ISO 14064 standards:

The report calculates the greenhouse gas emissions from Institute

. This includes electricity, as well as emission associated with diesel consumption in the institute vehicle. The emission associated with air travel, waste generation, administration, and marketing related activities has been excluded from the current study. Emissions from business activities are generally classified as scope 1, 2 or 3 areas classified under the ISO 14064 standards.

3.3 Carbon emission from electricity

Direct emissions factors are widely published and show the number of emissions produced by power stations in order to produce an average kilowatt-hour within that grid region

Unlike with other energy sources the carbon intensity of electricity varies greatly depending on how it is produced and transmitted. For most of us, the electricity we use comes from the grid and is produced from a wide variety of sources. Although working out the carbon intensity of this mix is difficult, most of the work is generally done for us.

Electricity used in the site is the significant contributors towards GHGs emission from the unit. Electricity used onsite is the most direct, and typically the most significant, a contributor to a unit's carbon footprint. Thus, using an average fuel mix of generating electricity, carbon dioxide intensity of electricity for national grid is assumed to be 0.9613 Kg CO_2 /Kwh (Reference: Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/database_11.zip) Electricity Purchased from the grid

Table:- 3.1 Electricity purchased from the grid and emissions from the electricity Import

Sr.	Year	Energy Consumption	Unit	Emission Factor kg CO_2 e/kWh	Emission ton CO_2 e/year
1	2022-23	3,97,452	kWh	0.91	382.07

3.4 Carbon emission from vehicles

In India, it is the third most CO_2 emitting sector, and within the transport sector, road transport contributed more than 90% of total CO_2 emissions (IEA, 2020; Ministry of Environment Forest and Climate Change, 2018)
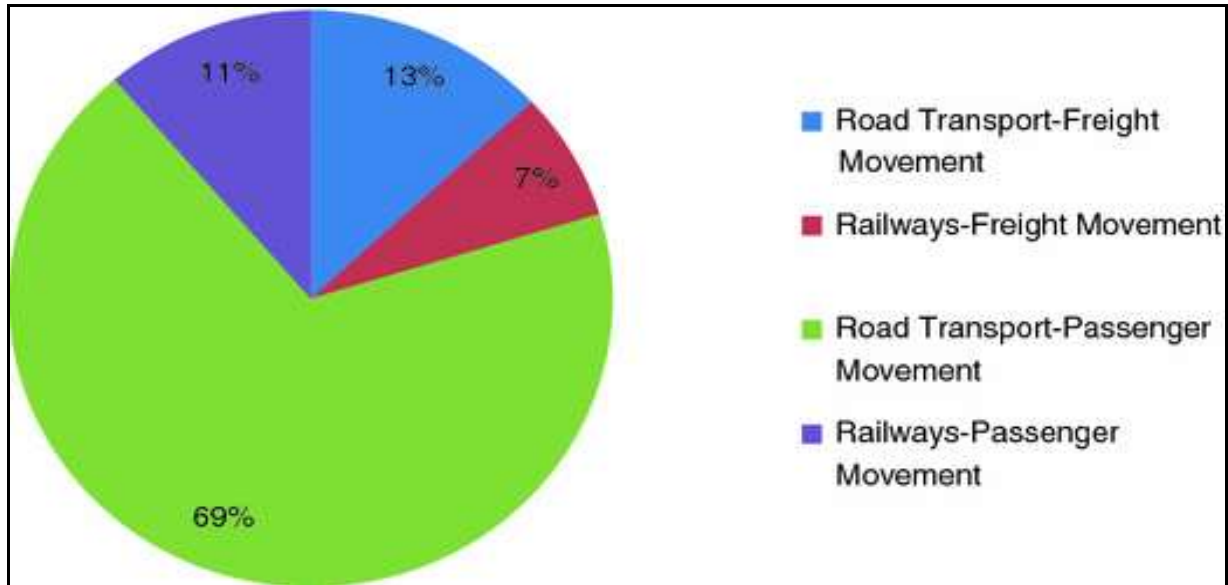
Transportation (29 percent of 2019 greenhouse gas emissions) – The transportation sector generates the largest share of greenhouse gas emissions. Greenhouse gas emissions from transportation primarily come from burning fossil fuel for our cars, trucks, ships, trains, and planes.

We have also considered the total GHGs emission done by transportation facilities available in campus like Cars, Buses. We consider the different type of vehicles which are operated on petrol and diesel fuels. Energy team was analyzed following vehicles are movement for Campus.

3.5 Calculation of Carbon foot print in campus for vehicles

The college buses & personal vehicles travel 20 KM & 15 KM per day.

Following details are given in table 3.2.

Table -3.2 Lists of vehicles in Institute campus

Sr. No	Vehicle Type	Fuel type	Average Mileage (Per Litter)	Distance Travel KM	Quantity
1	Personal Vehicle	Petrol	20	15	3
2	Bus	Diesel	9	20	9
Sr. No	**Vehicle Type**	**Fuel type**	**Average Capacity of Cylinder (Litter)**		**Quantity**
3	Gas Cylinder in Lab	LPG Gas	14		15

- ❖ CO_2 Emissions from a gallon of gasoline: 8,887 grams CO_2 / gallon
- ❖ CO_2 Emissions from a gallon of diesel: 10,180 grams CO_2 / gallon

(1 US Gallon = 3.7854 litters)

- ❖ CO_2 Emissions from a Littre of gasoline: 2347.95 grams CO_2 / Litter.
- ❖ CO_2 Emissions from a Littre of diesel: 2689.56 grams CO_2 / litter.

CO_2 Emissions from Personal vehicles

$$\textbf{Total } CO_2 \textbf{ Emissions} = \frac{CO_2 \textbf{ Per litter}}{\textbf{Average Mileage (Km/Littre)}} \times \textbf{Distance (in km)}$$

$$\textbf{Total } CO_2 \textbf{ Emissions} \ \frac{2689.59}{20} \times 15 = \textbf{2017.19 gram or 2.01 Kg/day}$$

When personal vehicles traveling in 300 Days in Year =

2.01×300 = 603 Kg/year or **0.60 Ton/year**

CO_2 Emissions from Bus

$$\text{Total } CO_2 \text{ Emissions} = \frac{CO_2 \text{ Per litter}}{\text{Average Mileage (Km/Littre)}} \times \text{Distance (in km)}$$

$$\text{Total } CO_2 \text{ Emissions} \frac{2689.59}{9} \times 20 = \textbf{5,976.86 gram or 5.97 Kg/day}$$

When bus traveling in 300 Days in Year =

$5.97 \times 300 = 1{,}791$ Kg/year or **1.79 Ton/year**

CO_2 Emissions from LPG gas cylinder

$$\text{Total } CO_2 \text{ Emissions} = \frac{CO_2 \text{ Per litter}}{\text{Average Mileage}} \times \text{no. of cylinder}$$

$$\text{Total } CO_2 \text{ Emissions} \frac{2397.95}{14} \times 15 = \textbf{2569.23 gram or 2.56 Kg/day}$$

When Gas cylinder used in 300 Days in Year =

$2.56 \times 300 = 768$ Kg/year or **0.768 Ton/year**

Total CO_2 Emissions by vehicles & cylinders = 0.60 + 1.79+0.768 = 3.15 Ton/year

3.6 Carbon emission from DG Set

Institute has 1 no DG sets installed during the grid power failure. Total diesel consumption in a month is 514 litters.

Every litter of diesel fuel contains 10180 grams of pure carbon in an average

Hydrocarbon burning engine. It can be assumed that about 99 % of the fuel be Oxidize (It is assumed that somewhat less than 01 % will fail to fully oxidize and will be emitted as a particulate of unburned hydrocarbons instead of CO_2

Calculation of Total CO_2 =

CO_2 Emissions from a Littre of diesel: 2689.56 grams CO_2 / litter.

Diesel consumption July-2022 to Jun-2023 = 514 x 12=6,168 Litters

6168 x 2689 = 16,585 Kg. or 16.58 Ton/year

Total Carbon Footprint generated By the campus	**=**	**Carbon footprint by electricity** **+** **Carbon foot print by vehicle** **+** **Carbon foot print by DG Sets.** **-** Carbon neutralized by tree

Total Carbon Foot print by campus: -(382.7 + 0.6 +1.79+0.768+16.58) – (382.25) = 20.18 tons/year

Recommendation for reduce CO_2 Emission.

Required more plantation and installation of more solar panels to further reduce carbon emission share by the Institute.

3.7 Other Emissions Excluded

This study did not evaluate the carbon sequestration potential of existing plantation activities and emission from the staff commuting, food supply, official flights, paper products, water supply, and waste disposal and recycling due to limited data availability. The current study identifies areas where data monitoring, recording and archiving need to be developed for enlarging the scope of mapping of GHGs emission in the future years. Accordingly, a set of tools and record keeping procedure will be developed for improving the quality of data collection for the next year carbon footprint studies.

CHAPTER -4

WASTE MANAGEMENT

4.1 About Waste

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health Waste management is important for an eco-friendly campus. In Institute different types of wastes are generated, its collection and management are very challenging.

Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. A bio-degradable waste includes food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the Institute Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid waste is essential to a sustainable Institute The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

Table 4.1 Different types of waste generated in the Institute Campus.

Sr. No.	Types of Waste	Particulars
1	Solid wastes	Damaged furniture, paper waste, paper plates, food wastes etc
2	Plastic waste	Pen, refill, plastic water bottles and other plastic containers, wrappers etc
3	E-Waste	Computers, electrical and electronic parts etc
4	Glass waste	Broken glass wares from the labs etc
5	Chemical wastes	Laboratory waste etc
6	Bio-medical Waste	Sanitary napkin etc

4.2 Waste management practices adopted by the Institute

Institute is implemented **"Two dust Bin"** waste collection system. All kind of waste generated from various activity is collected.

Figure 4.1: - Waste collection bin in Institute campus

Recommendation:

It is recommended adopted 5 Bin Waste Collection System for collect different type of waste generated in campus premises.

Fig. 4.2:   Recommended 5 dust bin waste collection System

4.3 Waste Collection Points

Institute has total 16 No's of out waste collection point in various building.

 Table: 4.2 Detailed of Waste collection dust bin system in Institute campus

Sr. No	Location	Dry Dust Bin	Wet Dust Bin
1	Administrative Block	08	08
	Total Dust bin	**8**	**8**

4.4 Policy on waste management

The institute has formed a committee for waste management for intended to reduce the adverse effects of waste on human health, the environment, planetary resources, and aesthetics. The aim of waste management is to reduce the dangerous effects of such waste like solid waste, liquid waste, E-waste on the environment and human health- **It's Appreciable (Annexture-02)**

4.5 E-waste Management

Institute has collect all type E-waste from all campus and handover to the M/s. Dharsana Enterprises, Vijayawada Private Limited for safe treatments. Institute has MOU sign with M/s. Dharsana Enterprises Private Limited for all kind of E-waste.- **It's Appreciable (Annexture-03)**

4.6 Swachhta Action Plan Committee Certificate

The Institute takes good initiative to keep the institute clean & healthy formed the Swachhta action plan committee.

CHAPTER-5

RECOMMENDATIONS AND SUGGESTIONS

5.1 QR Code Systems

While the world seems to be going digital, people lack the time to read books and process the information they contain. Hence, campus can be provided QR codes on the trees for its information and to exploit the rapidly growing platform for a unique purpose.

Fig: 5.1 QR code systems for plants

These codes can give students all the information they need to know about the tree from its scientific name to its medicinal value. They only need to put their smart-phones to use. QR codes to them, making it easier for everybody to learn about a plant or a tree at the tip of their fingers," If any app generating a QR code, which is available for free on the online stores, can be used to avail the information of the trees.

+ **Eco-restoration programmes**
  - Frame long-term eco-restoration programmes for replacing exotic Acacia plantations with indigenous trees and need of the hour is to frame a holistic campus development plan.

5.2 Other Suggestions

Some of the very important suggestions are: -

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

- Increase recycling education on campus.

- Increase Awareness of Environmentally Sustainable Development in Institute campus.

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

- Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development.

- Collaborate for Interdisciplinary Approaches- To develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.

- Increase reduces, reuse, and recycle education on campus.

- Name all the trees and plants (Plant DNA barcodes) with its common name and scientific name.

- Arrange training programmes on environmental management system and nature conservation.

- Renovation of cooking system in the canteen to save gas by installation solar water heater system with heat pump.

- Establish a procurement policy that is energy saving and eco-friendly.

(Annexture-01)

PILLI VENKATARAMANA Proprietor
Cash/Credit Bill
SUSWAGATAM
RAVI GARDENS
STD : 0883
☎ 2453932 (R)
2454598 (O)

N.H. 5 Road, VEMAGIRI - 533 125, Kadiyam Mandalam, E.G.Dt.,
Suppliers of : All Varieties of Fruits and Flower Plants

No. 19
Date : 15/06/2003

Sri. RISE Krishna Sai Group of Institutions (ongole)

S. No.	PARTICULARS	Qty.	Rate	Amount Rs.	Ps.
1.	Tabubia Rosia	60	350	21,000	00
2.	Gulmohar Yellow	10	350	3,500	00
3.	Ganga Raavi	3	350	1,050	00
4.	Raavi	3	350	1,050	00
5.	Gulmohar Red	10	350	3,500	00
		86		30,100	00

This Quotation Includes loading and
Plants Cost only. Transportation and unloading
Charges belongs to You only we are not
Responsible for These Things

Thanking You Sir

In words " Thirty Thousand and one
hundred " Rupees only

TOTAL 30,100 00

For RAVI GARDENS
P. Mua

(Annexture-02)

RISE KRISHNA SAI GANDHI GROUP OF
INSTITUTIONS::ONGOLE

POLICY ON THE WASTE MANGEMENT

VERSION 1

BOG	29.9.2018

Prepared By

S.No	Name	Desg	Signature
1	Smt P. Sridevi	Accoc. Prof	
2	Mr V. Krishna	Office Staff	
3	Mr S.V. Ravi Kumar	Assoc. Prof	

Objective of the Policy

Waste management is intended to reduce the adverse effects of waste on human health, the environment, planetary resources, and aesthetics. The aim of waste management is to reduce the dangerous effects of such waste on the environment and human health.
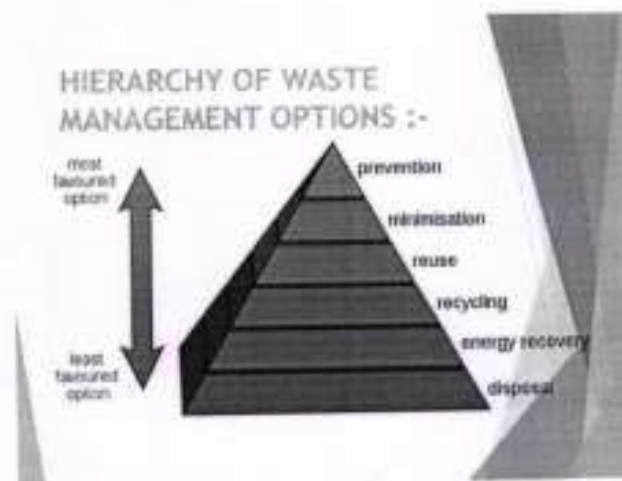
Action Plan

Waste Management

Campus cleaning involves collecting the solid waste regularly from all class rooms, laboratories, library, mess and hostel. The collected waste is properly disposed in appropriate place using dustcart which includes shipping cost. Trashcans are used in the institution to collect waste materials. Damaged or worn out trashcans are replaced periodically and expenditure includes purchase of trashcans, trolleys, Gloves, etc,

Maintenance of laboratories, Library and playground require special maintenance gadgets to clean and dispose the waste.

Kitchen wastes are disposed regularly. Expenditure is incurred for the waste disposal containers and carriers.

HIERARCHY OF WASTE MANAGEMENT OPTIONS :-

most favoured option — prevention — minimisation — reuse — recycling — energy recovery — disposal — least favoured option

Solid waste management:

Solid waste is collected from hostel rooms each morning by housekeeping staff in separate containers and assembled at the waste yard marked as compost pit at extreme end of the campus. Here the dry waste including paper/plastics etc. is segregated and sent in vans to recyclable joints and/or Municipal Corporation dump yard.

We encourage students and staff not to use plastic items. Also we encourage them to reuse the plastic items. Many of our students are encouraged for making best from waste items by using plastic bottles etc. In our college campus NO PLASTIC sign boards are available at various places to encourage students and staff not to use

plastic items. The waste generated in the campus includes wrappers, glass, metals, paper, plastics, etc.

Old newspapers, used papers, workshop scrap etc. are given for recycling to external agency with an objective to educate people on recycling of waste to protect environment, conserve natural resources, incubate the habit of source segregation among the citizens, recover the dry recyclable waste which is going in to landfill and make it available for recycling and incentivize the municipal workers. Leaf litter is allowed to decompose systematically over a period of time to be used as manure for the gardens in the institute.

College adopts almost paperless concept by digitization of office procedures through electronic means via WhatsApp group, email, thus reducing paper-based waste and reduce carbon dioxide emissions. Also to encourage paper waste in the aspect of teaching and learning - Slip tests, Quizzes etc, are conducted using various apps and by sharing link to the students. PowerPoint is also shared to student's whatsapp groups by the faculty members to reduce the wastage in paper printing as well as expenses. Use of paper printed on one side is encouraged in print drafts before final document, meeting minutes, memos and notes in office practices as environmentally preferred alternative to waste management. Biodegradable kitchen waste from mess and cafeteria is collected in separate bins. Horticultural waste such as dried leaves, twigs, and plant clippings

is collected from all around the campus and used for vermi composting. Dustbins have been installed throughout campus for waste segregation. Students are encouraged to use waste paper and newspaper in creative practices during various extracurricular activities.

Liquid Waste Management:

Liquid waste is generated from Science laboratories, Hostels, Residential quarters and canteen. Liquid wastes generated are of two types:

➤ Sewage Waste

➤ Laboratory, Residential washing and canteen effluent.

The liquid wastes are mainly drained to improve the ground level of water. Hazardous Chemicals are kept separately in the laboratory away from the reach of students. Lab In-charge and lab-assistant takes care of the chemicals and safety norms in the laboratory are strictly followed. Students are made aware of the hazardous chemicals and safety aspects when they are given instructions before utilizing the chemicals. The chemicals are wisely utilized for the batches of students in morning and afternoon under the guidance of faculty. Water for washing and rinsing of glassware for cleaning is done with regular water in low amounts. The Chemicals used in the experiments are diluted and after usage the chemical waste gets mixed with routine waste water. The rain water and the water which is over floated from water tanks are diverted towards lawn/garden through pipe lines.

E-waste management:

Electronic goods are put to optimum use; the minor repairs are set right by the laboratory assistants and the major repairs are handled by the support of technical assistants. The equipment which cannot be refurbished for re-use is dismantled and remanufactured into raw materials (i.e. metals, plastics, glass) to be marketed as recyclable. Input devices like keyboards which are of no use are utilized by students for their typing practice and teaching in a very basic level. UPS Batteries are recharged / repaired / exchanged by the suppliers. The waste compact discs and other disposable non-hazardous items are used by students for scrap art in extracurricular activities.

Any other relevant information:

The institution conducts Science fairs periodically where the participants from schools and colleges are invited. As a part of this, the students of the institution makes exhibits by using solid waste like papers, water bottles, iron pieces, rubbers and other e – waste like tube lights, bulbs and CPU fans.

Recycling waste

The Process of Anaerobic Digestion converts organic Waste into cooking gas and clean liquid fertilizer for the garden.

Anaerobic digestion is a series of biological processes in which microorganisms break down biodegradable material in the absence of oxygen. One of the end products is biogas, which is combusted to generate electricity and heat, or can be processed into renewable natural gas and transportation fuels. A range of anaerobic digestion technologies are converting livestock manure, municipal waste water solids, food waste, municipal organic solid waste, high strength industrial waste water and residuals, fats, oils and grease (FOG), and various other organic waste streams like spent grains from distilleries or breweries into biogas.

Continuous Review

This policy will be reviewed as and when required to assess its effectiveness and make necessary improvements.

(Annexture-03)

GSTIN : 37LCQPK1846R1ZE   Mobile : 8639952976

DHARSANA ENTERPRISES

Ground Floor, 41-5-20, Old Police Station Road,
Krishna Lanka, VIJAYAWADA - 520013., A.P.

Ref :   Date 20 - 06 - 2018

MEORANDUM OF UNDERSTANDING (MOU)
Between
RISE Krishna Sai Gandhi Group of Institutions
Ongole
&
DHARSANA ENTERPRISES
Vijayawada

The memorandum of Understanding signed on this day of 20th June,2018 by and between Dharsana Enterprises, Vijayawada, represented by proprietor having its office at Ground Gloor,41-5-20, Old police station road, Vijayawada here in after called the FIRST PARTY.

And

RISE Krishna Sai Gandhi Group of Institutions, Ongole, Andhra Pradesh represented by Principal here in after called the SECOND PARTY.

Whereas RISE Krishna Sai Gandhi Group of Institutions, has agreed to give away the E-Waste, paper waste, plastic waste and metal waste generated in its campus. The collected dry recyclables from RISE Krishna Sai Gandhi Group of Institutions will be initiated from as per the schedule, where both the parties agreed mutually.

MOU witness as follows
This MOU is intended to create a synergic alliance between RISE Krishna Sai Gandhi Group of Institutions & DHARSANA Enterprises (Scrap Business, Vijayawada) for recycling the dry waste, which is a vital element in the protection of environment.

1. Definitions
a) E_waste: Unusable Computer peripherals like monitor, CPU, motherboards, LAN cables or any other such material
b) Waste Paper: Discarded paper including card board, newspaper, magazines, shaded papers, old office records etc.
c) Plastic: Water Bottles, Polythene sheets, carry bags, Pet bottles, CPVC material etc. c) Metal waste: Iron scrap, condemned iron and other metals.
d) Designated day: A day at the end of the semester agreed between the parties.

2. Pickup locations.

RISE Krishna Sai Gandhi Group of Institutions	
Contact Person	Dr. K.V Subrahmanyam
Designation	Principal
Mobile number	9502835678
Email id	rise_gandhi@yahoo.com
Preferable week day for pick up	Saturday Time 10:00A.M

3. Quality and quantity

a) Material should be free from food particles, without any contamination of garbage, municipal waste or any item which are detrimental.

b) Minimum required quantity is 200 Kgs.

4. Roles and responsibilities of RISE Krishna Sai Gandhi Group of Institutions

a) RISE shall identify the quantum of E-Waste, wastepaper and plastic generated at various locations in the campus.

b) RISE would store the waste paper and plastic and informs DHARSANA Enterprises to pick up on mutually agreed schedule.

c) RISE agrees to appoint Mr Sandeep as Institute representative to coordinate on various activities identified in MOU and notify DHARSANA Enterprises within one month of any change in responsibility.

d) RISE needs to allocate for itself sufficient covered storage space for keeping the material safe.

e) A sale invoice in the name of the DHARSANA Enterprises shall be issued with local applicable VAT to enable faster payment from Vijayawada scrap business invoice will be sent by post/ courier to the address given in this MOU within two days from the date of collection of material along with the copies of the weighment slip.

f) Payment will be processed within two weeks from the date of receipt of the invoice along with gate pass and weighment slip.

4. Role and responsibilities of DHARSANA Enterprises

a) In considerations for enabling DHARSANA Enterprises to pick up the materials from RISE Krishna Sai Gandhi Group of Institutions, DHARSANA Enterprises shall pay to RISE Krishna Sai Gandhi Group of Institutions, the consideration amount based on weight recorded @ 200 per Kg of E-Waste @Rs 7/- (Rupees Seven) per Kg cartoon Boxes, shredding Paper, Old News Paper, Old Magazine, Old office records Dustbin Paper@ Rs 8/- (Rupees Eight) per Kg For dry waste, plastic waste@ Rs 4/- (Rupees Four) per Kg, Metal. Waste @ Rs 15/- (Rupees Fifteen) per Kg etc. Pay outs will be done to RISE Krishna Sai Gandhi Group of Institutions after collection of the materials.

b) DHARSANA Enterprises will make necessary arrangements for collecting the waste paper, plastic& metal waste Transporting to its go down.

c) DHARSANA Enterprises shall not use or disseminate any confidential information printed on the waste paper if the waste paper is not properly shredded by RISE Krishna Sai Gandhi Group of Institutions and the information is legible.

5. Roles and responsibilities of general

a) A conformation by both the parties that no benefit, either in cash or kind has been provided by the either party to the other party or to any officer or employee, or any relative/ associate institutions/ companies in order to enter into this agreement.

b) An undertaking by both the parties not to provide any benefit, either in cash or kind to any officer/ employer/ relative/associate of any officer or employee of either party as reward or consideration either for the entering into this MOU or other matter relating to this agreement.

c) Entry into Force and Duration: This agreement comes into force from 20th, June 2018. Either party may terminate this agreement by giving thirty (30) days written notice to the other party. We wish to suggest for open ended document, and not a Periodical document since this recycling activity is a continuing activity.

The first party and second party having read this document and understanding in full on this day of 20th December 2018 have affixed their signatures to collaboratively work together.

Authorized Signatures

1. On Behalf of Dharsana Enterprises

   For DHARSANA ENTERPRISES

2. On Behalf of RISE Krishna Sai Prakasam Group of Institutions

   PROPRIETOR
   PRINCIPAL
   RISE KRISHNA SAI GANDHI
   GROUP OF INSTITUTIONS
   VALLUR ONGOLE

END OF THE REPORT

THANKS