

Office of Zoo Authority

Diary No. 006

Date 27/5/15



**MASTER PLAN
OF
ZOOLOGICAL PARK & RESCUE
CENTRE, GOREWADA
(NAGPUR)
2014-15 To 2024-25**

AUTHORITY

**FOREST DEVELOPMENT CORPORATION OF
MAHARASHTRA LIMITED, NAGPUR**



PROJECT CONSULTANT:

**ASHFAQUE AHMED CONSULTANCY
SERVICES PVT. LTD.**
289, New Colony, Nagpur-440001
Ph no. 2595752, 6957047, Mob: 9823054655,
Fax: 0712-2583349
email: craftteam9@yahoo.co.in
website: www.aadesigns@info.com




**ASHFAQUE
AHMED
CONSULTANCY
SERVICES
PRIVATE LIMITED**
ISO CERTIFIED: 9001 :2008

O/o Central Zoo Authority
Diary No. 006
Date 27/5/15

-1-

Certificate


This is to certify that the Master Plan (2014-15 to 2024-25) for Scientific and long term Management of Zoological Park and Rescue Center, Gorewada, Nagpur has been prepared by Forest Development Corporation of Maharashtra Ltd. through M/s Ashfaque Ahmed Consultancy Services Pvt. Ltd., 289, New Colony, Sadar, Nagpur in consultation with the expert group on Zoo Designing of Central Zoo Authority (CZA) and the Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden, Government of Maharashtra.


The Principal Chief Conservator of Forests (Wildlife) &
Chief Wildlife Warden,
Government of Maharashtra.




Managing Director
F.D.C.M. Ltd.
Nagpur

Master Plan is approved subject to the condition that the responsibility of Mobilizing the Financial resources for implementation of the Master plan will be sole responsibility of Zoological Park and Rescue Center, Gorewada, Nagpur.


27.5.15
Member Secretary
Central Zoo Authority
New Delhi
Member Secretary
Central Zoo Authority
(Ministry of Environment & Forests)
Govt. of India, New Delhi

Contents

PART – I

Acknowledgement	X
Preface	XI
Foreword	XIV
Abbreviations	XVI

CHAPTER – 1

INTRODUCTION

1.1	History	1
1.2	Vision	2
1.3	Mission	2
1.4	Strategy	3
1.5	Objectives	3
1.6	Physical Features	4
1.6.1	Topography	4
1.6.2	Geology	4
1.6.3	Rock & Soil	4
1.6.4	Flora & Fauna	4
1.6.5	Climate	4
1.6.6	Rainfall	4
1.6.7	Season	4
1.6.8	Approach	5
1.6.9	Demography	6
1.7	Legal Status of the Land	7

1.8	Sources of Pollution	7
------------	-----------------------------	----------

CHAPTER – 2

2.1	Appraisal of the present arrangement and constraints	8
------------	---	----------

PART – II

CHAPTER – 3

3.1	Future objectives	9
3.2	Vision	10
3.3	Mission	10
3.4	Theme	10
3.5	Strategy	12

CHAPTER – 4

Future Action Plan

4.1	Future planning	14
4.2	Animal collection plan	14
4.3	Description of layout plan	33
4.4	Visitor circulation	39
4.5	Services	40
4.5.1	Solid waste disposal	41
4.5.2	Water management system	41
4.5.3	Sewage system	45
4.5.4	Storm water network	45
4.5.5	Electricity supply system	46
4.6	Animal section	52
4.6.1	Duties & responsibilities	52

4.6.2	Equipment & vehicle requirement	52
4.6.3	Staff requirement	53
4.6.4	Brief of animal enclosures to be constructed	55
4.6.5	Features of butter fly and mouse town	78
4.6.6	Management of animal section	82
4.6.7	Calculation of strength of Zoo Keepers & Asst. Keepers	83
4.7	Veterinary section	85
4.7.1	Hospital facilities	85
4.7.2	Duties & responsibilities	85
4.7.3	Equipment & vehicle requirement	86
4.7.4	Staff requirement	87
4.7.5	Rescue center	87
4.7.6	Quarantine wards	88
4.7.7	Postmortem room	88
4.8	Sanitary section	88
4.8.1	Duties & responsibilities	89
4.8.2	Equipment & vehicle requirement	89
4.8.3	Staff requirement	90
4.9	Horticulture section	90
4.9.1	Duties & responsibilities	90
4.9.2	Equipment & vehicle requirement	91
4.9.3	Staff requirement	92
4.10	Security section	92
4.10.1	Duties & responsibilities	92
4.10.2	Equipment & vehicle requirement	93
4.10.3	Staff requirement	93

4.11	Store & Kitchen section	93
4.11.1	Duties & responsibilities	94
4.11.2	Equipment & vehicle requirement	94
4.11.3	Staff requirement	95
4.12	Construction & maintenance section	95
4.12.1	Duties & responsibilities	95
4.12.2	Equipment & vehicle requirement	96
4.12.3	Staff requirement	96
4.13	Education section	97
4.13.1	Duties & responsibilities	97
4.13.2	Equipment & vehicle requirement	98
4.13.3	Staff requirement	98
4.14	Research section	99
4.14.1	Duties & responsibilities	99
4.14.2	Equipment & vehicle requirement	99
4.14.3	Staff requirement	100
4.15	Administrative section	100
4.15.1	Duties & responsibilities of establishment section	101
4.15.2	Duties & responsibilities of accounts section	101
4.15.3	Equipment requirement for establishment & accounts section	102
4.15.4	Staff requirement for establishment section	102
4.15.5	Staff requirement for accounts section	102
4.15.6	Equipment & vehicle requirement for the office of Director & Deputy Director	102
4.15.7	Staff requirement for the office of Deputy Director	103
4.15.8	Staff requirement for the office of Director	103
4.15.9	Justification for staff & hierarchy	103

4.15.10 Staffing pattern of Zoo and Rescue center, Gorewada, Nagpur	107
4.15.11 Promotion opportunities	108
4.16 Visitor amenities	108
4.16.1 Parking	108
4.16.2 Entry gate	108
4.16.3 Entry fee & other charges	109
4.16.4 Zoo timings	110
4.16.5 Night safari timings	110
4.16.6 Toilets & drinking water points	110
4.16.7 Cafeteria, kiosk & souvenir shop	110
4.16.8 Battery operated vehicle ride	110
4.16.9 Day safari ride	111
4.16.10 Wheel chair	111
4.16.11 Sitting benches & shelters	111
4.16.12 First Aid facility	111
4.16.13 Dustbins	111
4.17 Staff amenities	111
4.17.1 Fuel allowance	111

CHAPTER - 5

Personnel Planning

5 Personnel planning	112
5.1 Out sourcing	119
5.2 Manpower on contract	119
5.3 Manpower on deputation	120

5.4	Brief resume of personnel required for operation of zoo	120
-----	---	-----

CHAPTER – 6

Disaster Management

6	Disaster management	126
6.1	Disaster management team	126
6.2	Fire	127
6.3	Flood	127
6.4	Earth quake	129
6.5	Thunder storm	129
6.6	Law & order problem	129
6.7	Precautionary measures	129

CHAPTER – 7

Contingency Plan

7	Contingency plan	131
7.1	Escape of animal from enclosure	131
7.2	Monkey & Dog menace	134
7.3	Arrangement of food in case of strike	135
7.4	Snake bite	135
7.5	Visitor getting injured / falling inside enclosure	135
7.6	Fighting among animals	136
7.7	Break down of power supply	136
7.8	First aid	137
7.9	For warning people about emergencies	137
7.10	Break down of safari vehicle	138

-VIII-

CHAPTER – 8

Capacity Building

8	Capacity building	139
8.1	In house training	139
8.2	Keepers training program	140
8.3	Administrative training program	140
8.4	Top / middle level training	140
8.5	Training to the Director	141
8.6	Zoo veterinarian training	141
8.7	Zoo educator training	141
8.8	Zoo volunteer training	141
8.9	Regional committee of experts	141

CHAPTER – 9

E-Governance

9	E-governance	143
----------	---------------------	------------

CHAPTER – 10

Budget Analysis

10	Budget analysis	146
10.1	Construction and development	146
10.2	Day to day maintenance	148

Annexure

Annexure No. 1	CZA's letter of approval of DPR.
Annexure No. 2	Hon'ble Supreme Court order of approval to establish zoo and rescue centre at Gorewada
Annexure No. 3	Soil Test Report
Annexure No. 4	List of Flora
Annexure No. 5	List of Fauna
Annexure No. 6	Contour map
Annexure No. 7	Master Layout Plan
Annexure No. 8	Entrance plaza layout plan
Annexure No. 9	Layout plan of Day Time Safari
Annexure No. 10	Layout plan of Night Safari
Annexure No. 11A & 11B	Layout plan of Bio-Park
Annexure No. 12A & 12B	Layout plan of Bird Park
Annexure No. 13	Water Reservoir
Annexure No. 14	Water Test Report
Annexure No. 15	Layout Plan of Water Supply (Potable Water)
Annexure No. 16	Layout Plan of Water Supply (Non-Potable Water)
Annexure No. 17	Layout Plan of Sewage Disposal System
Annexure No. 18	Layout Plan of Storm Water Drainage System
Annexure No. 19	Layout Plan of Electric Supply System
Annexure No. 20	Layout Plan of Service Block

-X-

Acknowledgement

We are grateful to many people in making this master layout plan of "Zoological Park and Rescue Centre at Gorewada". Firstly we would like to thank "Forest Development Corporation of Maharashtra Ltd.", the managing authority, for giving us the opportunity to work on such magnificent project. We would like to acknowledge with thanks the intellectual guidance provided by Mr. Praveen Pardeshi, Principle Secretary, Revenue and Forests Department (Forest), Govt. of Maharashtra for finalizing the Concept Master Plan. We would also like to thank the followings for their constant support & contribution for data and comments: Mr. A. K. Nigam, Managing Director, F.D.C.M. Ltd; Mr. R. S. Yadav, General Manager, F.D.C.M. Ltd., W.F.P. & Afforestation Region; Mr. T. K. Choubey, General Manager, F.D.C.M. Ltd., Nagpur Region; Mr. S. P. Wadaskar, Divisional Manager, F.D.C.M. Ltd., Nagpur Region and all other officials of Forest Development Corporation of Maharashtra Ltd.

We would also like to extend our sincere thanks to our Foreign Associate from Australia – Mr. Peter Stroud for sharing his expertise and directing us in Planning of Zoo, Safari Park & selection of species. Thanks are also due, to Mr. Vishwanath Iyer, Mr. Sudhir Sood, Mr. Tapan Chakraborty, Mr. M. I. Shaikh, Mr. Ranjan Biswas for their valuable assistance and timely guidance. Last but not the least; we would like to thank the entire team of Ashfaque Ahmed Consultancy Services Pvt. Ltd. for their invaluable support.



Ashfaque Ahmed

Managing Director

Ashfaque Ahmed Consultancy Services Pvt. Ltd.



Preface

Nagpur, also known as Orange City, is the largest city in Central India and the second capital of state of Maharashtra. Nagpur boasts of vast forests and tiger sanctuaries within a radius of few hundred kilometers. In fact, Nagpur has been declared as "TIGER CAPITAL" of the country. Some famous national parks surrounding Nagpur include: Tadoba-Andhari Tiger Reserve (Maharashtra); Pench National Park; Nagzira-Navegaon Tiger Reserve (Maharashtra); Melghat Tiger Reserve (Maharashtra); Bor Tiger Reserve (Maharashtra). Tiger tourism is witnessing a good growth in the city.

Gorewada being located at the fringes of Nagpur city has rich biodiversity. The impressive wildlife and natural history of the central India region is at the heart of the Gorewada project. The Reserve at Gorewada will provide a high-quality and intensely personal wildlife experience involving an intimate immersion in the ecosystems of central India.

The preparation of Master Layout Plan for the project of Zoological Park and Rescue Centre at Gorewada is a complex subject which involves inputs from zoo professionals, architects, veterinarians and wild lifers. Forest Development Corporation of Maharashtra Ltd., the Managing Authority, through tender process appointed Consultant - Ashfaque Ahmed Consultancy Services Pvt. Ltd. of National repute. Consultant with his strong in-house team of Designers & Planners and other specialized experts (Zoo experts – Indian & International, Architects, Landscape Architects, Engineers, Environmentalists etc.) have carried out various study, surveys, workshops, etc. to compile this Master Layout Plan. During the various meetings & discussions at three days workshop conducted by the Consultant at Nagpur, Mr. Ashfaque Ahmed, Team Leader and Managing Director of AACS Pvt. Ltd.; Mr. Peter Stroud, Zoo Expert from Australia; Mr. Sudhir Sood, Former PCCF (Maharashtra State) and Advisor to AACS Pvt. Ltd.; Mr. Ranjan Biswas, Wildlife Biologist; Mr. Tapan Chakraborty, Scientist and Environmentalist; a'XYKno, Financial analyst & Consortium Partners; Mr. M. I. Shaikh, Former Executive Director, Irrigation Dept. and Advisor to AACS Pvt. Ltd.; Ms. Priti Chokhani, Senior Architect & Zoo Designer; Ms. Tejal Rakshamwar, Landscape Architect; Ms. Sheetal Totlani, Business Development Manager and many other consultants along with FDCM officials viz. Mr. T. K. Choubey, General Manager, F.D.C.M. Ltd., Nagpur Region; Mr. S. P. Wadaskar,

-XII-

Divisional Manager, F.D.C.M. Ltd., Nagpur Region did brain storming sessions on the project and conceptualized the Draft Master Plan. Based on the same, the report has been prepared for the development of this site over a period of 10 years incorporating the vision, mission, theme of display and objectives.

The salient features of the Master Layout Plan include displaying the biodiversity of regional and national planes and displaying animals in their natural environment. The proposed zoo and safaris have various attractions like Bio-park, Indian Safari, African Safari, Night Safari, Bird Park and walking trails. This integrated park is proposed to be of international standards in context of animal display, visitor's facilities and services. The approach towards designing and planning was to achieve maximum attributes of international standards conforming to the guidelines of CZA .

The unique display and barrier free vision of animals in the naturalistic enclosures, giving a mesmerizing experience to the visitors, will be the key factor of the project. Physical barrier will be of dry moats, chain link or power fencing. The zoo & safari will have clear segregation of visitors and service paths. The theme of display is largely region wise. The Gorewada Zoo will be a combination of entertainment, education and science of zoos, aquariums, botanical gardens etc. all put at one place. The visitors will be taken in the safaris in specially designed vehicles.

The whole Park has been divided into 8 sections viz animal, veterinary, sanitation & horticulture, security, store & kitchen, construction & maintenance, education, research and administration. Each section will be headed by a well qualified and professional incumbent which is in tune with the recommendation of expert committee on zoos.

The park is proposed to display over 300 species comprising of about 4500 specimen. The quality of animal care, exhibits and conversation education will be of higher level.

A well equipped veterinary hospital with diagnosing and testing facilities, supported by adequate technical man power has been proposed apart from Rescue Centre at Gorewada. The veterinarian will take a daily round of the safari to observe the health, feeding and general hygienic condition of the animals.

-XIII-

The education wing will enhance the knowledge and create awareness among visitors through signages, published material, lectures and guided tours. Research wing will conduct studies on behavior, growth and nutrition requirement of animals.

About 21 lakh visitors are expected to visit this place every year. This number is likely to increase in future. Efforts have been made to provide adequate facilities like cafeteria / kiosk, parking, toilets, shelters and drinking water points for the visitors for their smooth and rewarding visit.

In order to meet unforeseen incidents a detailed disaster management plan and contingency plan have been incorporated. A plan to upgrade the skill of animal keepers and other staff, a capacity building plan has also been prepared. With the development in IT sector, e-governance has also been proposed. This will help to maintain the record and data of animals and related issues for easy interaction with national and international experts and institutes.

The Establishment of International Standard Zoo & Night Safari, Gorewada will be one of the role models in terms of facilities, infrastructures and management practices. Moreover, it will showcase the rich biodiversity of state of Maharashtra in an intangible way. The total estimated budget for development of zoo and rescue centre would be Rs. 451.35 Cr. over a period of 10 years.


Mr. A. K. Nigam
Managing Director,
F.D.C.M. Ltd., Nagpur

Foreword

The increasing urbanization and patterns of development have created enormous pressures on our natural resources. A number of species are thus disappearing from the earth. The Government of India took initiative to conserve the wild life by establishing a network of national park, wild life sanctuaries and zoological parks in the country.

The zoo movement in India is one of the oldest in the world. The first zoo was established in 1800 at Barrackpore, Kolkata. This was followed by a zoo in Chennai in 1855, Trivandrum 1857, Mumbai 1863, Jaipur 1876 and Udaipur 1878. In the post-independence era also the movement received an impetus and a number of important zoos were set up such as the Municipal Hill garden Zoo, Ahmedabad 1851, Delhi Zoological park 1955, Himalayan Zoological park, Darjeeling 1958, Nehru Zoological park, Hyderabad 1959, Assam state zoo, Gawhati 1960 to mention only a few.

Indian board for wild life was constituted in 1954 to advice the Govt. of India about the management of wild life in India. On the recommendation of Indian board for wild life (Now National Board for wild life), an expert committee was constituted to formulate norms and guidelines for the improvement of the management of existing zoos in 1973. This committee prepared a report – Management of zoos in India and submitted to Govt. of India which was accepted. To continue with the process of improvement of management of wild animals in captivity, a Central Zoo Authority was established to oversee the functioning of zoos and to formulate standards and norms to display the wild life in captivity in 1992 by Government of Indian, Ministry of Environment and Forest.

Maharashtra state is also a pioneer state in the national movement for conservation of flora and fauna. The State Government setup a network of in-situ and ex-situ conservation areas under the provision of the wildlife (Protection) Act, 1972. Nagpur is not known for its orange but also for wild life sanctuary and national park around it. The zoo and rescue centre, Gorewada is located about 07 KM on Katol – Nagpur highway will be a hub for wild life and nature lovers.

This master plan has outlined the development of the Zoological Park and Rescue center, Gorewada, Nagpur from its start to future development in the next 10 years. I am happy to note that this plan will

-XV-

take care of animals, visitors and staff. This has ably been done by a team of M/s Ashfaque Ahmed Consultancy Services Pvt. Ltd., Nagpur, Foreign Consultant and forest officials.

I congratulate all the team members of consultants, experts and forest officials for their hard work for bringing out this master plan.



Mr. A. K. Nigam,
Managing Director,
F.D.C.M. Ltd, Nagpur

Abbreviations

FDCM	Forest Development Corporation of Maharashtra Limited
CZA	Central Zoo Authority
AACS	Ashfaque Ahmed Consultancy Services Private Limited
a'XYKno	a'XYKno Capital Services Ltd.
VGf	Viability Gap Funding
DPR	Detailed Project Report
GOM	Government of Maharashtra
TOR	Terms of Reference
RFP	Request for Proposal
RFQ	Request for Quotation
PPP	Public Private Partnership
SPV	Special Purpose Vehicle
SOR	Schedule of Rates
NPV	Net Present Value
IRR	Internal Rate of Return ² .x
DSCR	Debt Service Coverage Ratio
EBIDTA	Earnings Before Interest, Depreciation, Taxes, Amortisation
FC	Forest Conservation
FTL	Full Tank Level
HFL	Highest Flood Level
INR	Indian National Rupee
CSR	Corporate Social Responsibilities
O&M	Operation and Maintenance
PLR	Prime Lending Rate
WACC	Weighted Average Cost of Capital
PIM	Project Information Memorandum

Part - I

Chapter - 1

The Zoological Park and Rescue Centre, Gorewada will be a place to promote nature conservation, scientific research and public education about natural resources. It will be developed as tourist hub in Vidarbha region, having great potential for watching wildlife. Nagpur has been declared as 'Tiger Capital' of the country and is a gateway for various wildlife reserves and national parks. The major attractions of the Zoological Park at Gorewada are bio-park, day time safaris, night safari, bird park and various walking trails. The zoo and rescue centre, Gorewada will cater the need of wild lifers and nature lovers, thereby reducing the pressure on our natural forest and wildlife.

There are about 198 facilities keeping wild animals in captivity in the country at present. They were established at different times, beginning from the middle of the last century to the present, hence their objectives reflect the philosophy prevalent at the time of their establishment. In the absence of any accepted norms or standards for the zoos in the country, the quality and performance of management of captive animals differ widely from institute to institute.

The Central Zoo Authority was established by the Govt. of India in 1992 to oversee the functioning of zoos in the country by providing technical and other assistance for their proper management and development on the scientific lines. The Zoo and Rescue center at Gorewada (Maharashtra) has been planned keeping in view of CZA's norms for its development, objectives and maintenance.

1.1 History: - In the year 2005, Government of Maharashtra had taken a decision, in principle, to set up an International Standard zoo and Bio Park at Gorewada (Nagpur, Maharashtra) on 1914 ha. of forest land vide its resolution (G.R) No. WLP-1099/C.R.89/F-1 dated 12 Dec 2005. Principal Chief Conservator of forest (wildlife), Maharashtra State, Nagpur had submitted a proposal to establish a zoo and rescue centre vide PCCF (WL) M.S. Nagpur's letter no. Desk 22 (6)/Plan/1044/2009-20 dated 03.02.2010. Accordingly a detailed project report (DPR) was prepared by M/S Bernard Harrison & Friends Ltd and revised by Forest Development Corporation of Maharashtra (FDCM) Ltd, Nagpur. The DPR was submitted to Central Zoo Authority (CZA) for scrutiny and its approval. The DPR along with Master Layout Plan was

examined by expert group on zoo design of CZA. Later on the proposal was examined by the technical committee of CZA, the meeting of which was held on 22 March 2013. The technical committee recommended its approval with certain conditions. The CZA letter of approval is placed as **Annexure – 1**. One of the main conditions was to obtain approval of Hon'ble Supreme Court to establish a new Zoological Park and Rescue Centre at Gorewada, Nagpur.

The Government of Maharashtra obtained the approval of Hon'ble Supreme Court to establish a new zoo and rescue centre at Gorewada and is placed as **Annexure – 2**.

After following due tender process, M/s. Ashfaque Ahmed Consultancy Services Private Limited (AACS) have been engaged as a Consultant by FDCM for preparing a fresh DPR, which has to be technically feasible, financially viable and compatible with guidelines issued by CZA from time to time, for establishing an International Standard Zoo at Gorewada, in PPP mode of financing, as per the issued revised Government Resolution on 29th November, 2011. Besides preparation of the DPR, AACS will also prepare Bid documents and assist FDCM in Bid Process Management for selection of Joint Venture Company to form Special Purpose Vehicle (SPV) under FDCM with the State and Private partner's stake in the ratio of 51:49 where 51% share is of FDCM. Govt. of Maharashtra also decided to provide Rs. 100 crore as Viability Gap Funding (VGF) and 25.57 Ha non-forest land to be developed as commercial tourism zone for the proposed project. (The actual quantum of VGF can be increased depending on the final financial requirement.)

1.2 Vision: - A journey through the forests with animals and birds is compliment to conservation, education, awareness and recreation. The proposed Zoo of international standards will be integrated attractions which will house various animal species in innovatively created areas thus attempting to establish one of its kinds Zoo thereby making the sightseer's visit a lifetime experience. This zoo will be a showcase of nature for the visitors.

1.3 Mission: - The Park will volunteer natural conservation, scientific research, and public education of the floral and faunal species of great importance of Gondwana land. The place will conduct enlightening activities for the visitors to bring betterment in their outlook towards animals. The Gorewada Zoo will be a combination of entertainment, education and science of zoos, aquariums, botanical gardens, etc. all put at one place.

1.4 Strategy: - The proposed zoo and rescue centre will be a unique establishment to assist in such a project by stressing appreciation of the wonders of nature and by providing glimpses of how to preserve the ecological balance and to achieve the objectives of this park.

1.5 Objectives: - A professionally run zoological park serves a variety of roles to benefit both the animals, its houses and the visiting public. Carefully planned breeding programmes can help propagate endangered species and continue gene pools for species whose habitats have been obliterated. Pure as well as applied research on animals in captivity can benefit not only the animals in the zoos but also in the wild. Educational programmes can help foster the respect that wild animals deserve and familiarize the visitors with the important role these animals play in the ecosystem. Large scale habitat destruction has resulted in the extinction of many species. Zoos may have to serve as the last bastion for threatened and endangered species.

The zoo shall work for the conservation of the rich bio-diversity of the state to the following objectives:

1. To promote wildlife conservation (Scientific breeding of endangered species and releasing them into wild).
2. Care and rehabilitation of injured, sick and orphan wild animals.
3. To collect and collate the scientific data on the biology, behaviour and health care of various species of wild animals housed in the zoo and use the same in future management of the zoo.
4. To assist in conservation of the in-situ population of various species of endangered animals and their habitat by sensitizing the people.
5. To promote research and education on wildlife conservation
6. To create amongst the visitors empathy towards wild animals through appreciation and better understanding.
7. To promote international eco-tourism.
8. To create the opportunities of employment / self-employment.

1.6 Physical features

The site proposed for Gorewada Zoo & Night Safari is spread over 1914 Ha forest land located on the fringes of Nagpur city in its north-west corner. The site is just 7 kms away from the Zero Milestone. Nagpur-Katol State Highway No. 248 passes through this forest land and bifurcates it into two parts. Gorewada Lake, which meets about 80% drinking water needs of Nagpur city, is situated very close to the proposed site.

1.6.1 Topography: - The topography of the site is gentle slope to undulating. The plateau land form ranges from 300 meter to 350 meter above MSL. The scattered weathered materials mainly consist of boulders, at some part created rough topography near to the proposed site. The proposed site is classified as Southern Tropical Dry Deciduous Forest (5A/C3) according to Champion's and Seth's Classification of forests.

1.6.2 Geology: -The study of geology broadly reveals the Basalt originated in Deccan Trap associated with sediments belonging to lower Eocene to Upper Cretaceous.

1.6.3 Rock and Soil: - Basalt originated in Deccan Trap soil is shallow, well drained and clayey with moderate erosion. The texture of soil is clayey in nature. To evaluate the usability of soil, samples were collected from the area and sent to laboratory for testing. The results are appended as **Annexure - 3**.

1.6.4 Flora and Fauna: - Flora is given in the **Annexure - 4** and fauna in **Annexure - 5**.

1.6.5 Climate: - Climate is markedly periodic and is characterized by dry and increasing hot summer from April to June, warm monsoon from July to September and cold- dry winter from November to March.

1.6.6 Rainfall: - Maximum rainfall occurs between June to mid August. Wettest period of year is July. Normal annual rainfall in Gorewada is approximately 1064 mm. Rainfall of higher intensity occurs mainly in July and August and occasionally in September.

1.6.7 Season: - Season is marked by hot, dry and humid summer from April to September and cold dry winter from October to March.

Master Plan of Zoological Park and Rescue Centre, Gorewada

1.6.8 Approach: - The proposed site falls under the jurisdiction of FDCM Ltd, Nagpur. It is about 7 KM from the Zero Milestone of Nagpur city on Nagpur - Katol highway. Nagpur is well connected by air, road and rail.

Being located on the Nagpur-Katol State Highway, the proposed site is very well connected with the city. It is also well connected with the nearby villages.

LANDMARK	APPROX DISTANCE FROM PROJECT SITE
Zero Mile	7 kms
ST Bus Stand	9 kms
Nagpur Railway Station	7 kms
Nagpur Airport	14 kms
Kalmeswar Railway Station	17 kms
Wadi Naka	8 kms
Godhani Railway Station	5 kms

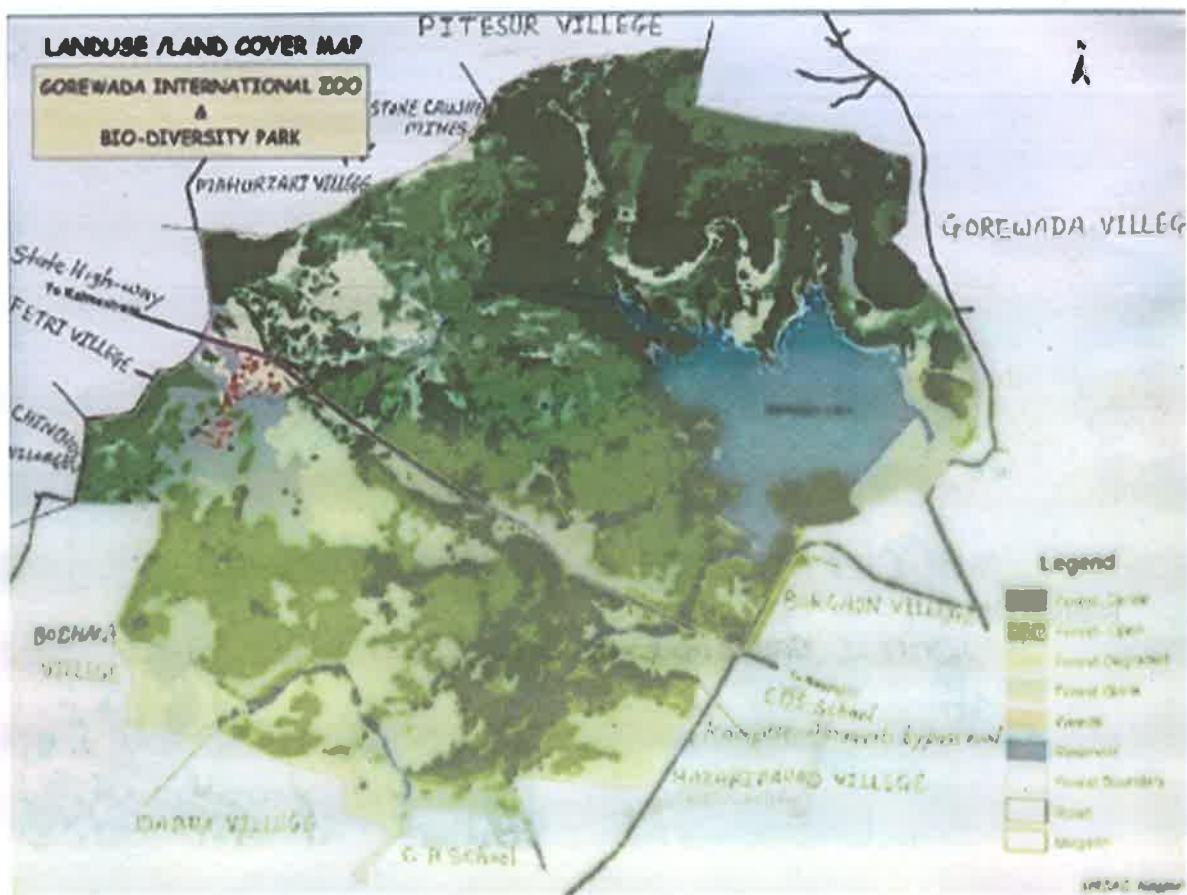


1.6.9 Demography of surrounding area: - The adjoining area of Gorewada is mainly private area comprising of agriculture land, residential buildings and municipal corporation land. There are 9 villages surrounding this forest land. Borgaon and part of Gorewada village are situated on the eastern side, Bodhala, Chicholi and part of Fetri village are on western side, Pitesur and Mahurzariare on the northern side and Hazaripahad and Dabha villages are situated on the southern side.

Gorewada forest land falls in the new metro region created by Nagpur Improvement Trust. The site appears to be free of all encumbrances, water logging, sewage and storm water drains.

Demography of the surrounding area:

Nagpur District	Year 2011
Total Population	46.53 Lakh
Area in Sq. Km.	9897
Density of population	470 / sq. km.
No. of Villages	1874



1.7 Legal status of land: - The land of the proposed Zoo and Rescue centre belongs to FDCM Ltd, Nagpur. The proposed site is notified under section 4 of Indian Forest Act, 1927 intending to constitute as reserve forest (proposed) and remaining protected forest. The main road from Nagpur to Katol bisects the site into two parts. The northern portion is 1064 ha. and the southern portion is about 850 ha. It does not have any human habitation and is free of all encumbrances.

1.8 Sources of Pollution: - The site is away from Nagpur and strategically situated. Water pollution is negligible as there are no streams or nalas carrying sewage water from the nearby villages. Industrial zone is also not in the vicinity; therefore the site is almost free from air pollution.

The site is divided into two parts i.e. southern and northern, by Nagpur-Katol highway. The Gorewada lake falls into Northern side. The planning has been done in such a way that most of the activities are on southern side, whereas the night safari which is planned on the northern side has been kept 20 mts above the lake and 500 mts away from the lake. Moreover, STP and other method of treatments will be adopted. Hence there are no chances of lake contamination.

Since the site is located on State Highway, the possibility of sound pollution is there. Hence to protect animals from sound pollutions, the activities have been planned at min. 150 mts. from highway with 100 mt buffer zone on road side and 50 mt buffer zone on all the other sides.

Chapter-2

2.1 Appraisal of the present arrangement and constraints: - This is a new zoo and rescue centre, so the question of appraisal of the existing infrastructure does not arise.

Part-II

Chapter-3

3.1 Future objectives: - There is no change in future objectives, vision and mission as given in **Part-I, Chapter –I** as this is a new zoo, however the same is reproduced as under :-

A professionally run zoological park serves variety of roles to benefit both the animals it houses and the visiting public. Carefully planned breeding programmes can help propagate endangered species and continue gene pools for species whose habitats have been obliterated. Pure as well as applied research on animals in captivity can benefit not only the animals in the zoos but also in the wild. Educational programmes can help foster the respect that wild animals deserve and familiarize the visitors with the important role these animals play in the ecosystem. Large scale habitat destruction has resulted in the extinction of many species. Zoos may have to serve as the last bastion for threatened and endangered species.

The zoo shall work for the conservation of the rich bio-diversity of the state to the following objectives:

1. To promote wildlife conservation (Plan breeding of endangered species and releasing them into wild).
2. Care and rehabilitation of injured, sick and orphan wild animals.
3. To collect and collate the scientific data on the biology, behaviour and health care of various species of wild animals housed in the zoo and use the same in future management of the zoo.
4. To assist in conservation of the in-situ population of various species of endangered animals and their habitat by sensitizing the people.
5. To promote research and education on wildlife conservation
6. To create amongst the visitors empathy towards wild animals through appreciation and better understanding.
7. To promote international eco-tourism.
8. To create the opportunities of employment / self-employment.

3.2 Vision: - A journey through the forests with animals and birds is compliment to conservation, education, awareness and recreation. The proposed Zoo of international standards will be integrated attractions which will house various animal species in innovatively created areas thus attempting to establish one of its kinds Zoo thereby making the sightseer's visit a lifetime experience. This zoo will be a showcase of nature for the visitors.

3.3 Mission: - The Park will volunteer natural conservation, scientific research, and public education of the Floral and Faunal species of great importance of Gondwana land. The place will conduct enlightening activities for the visitors to bring betterment in their outlook towards animals. The Gorewada Zoo will be a combination of entertainment, education and science of zoos, aquariums, botanical gardens, museums, etc. all put at one place.

3.4 Theme: - The zoo and rescue centre, Gorewada has the following exhibit components:-

1. Indian Safari
2. African Safari
3. Bio-park
4. Bird-park
5. Night Safari
6. Deep time trail
7. Tribal Village trail
8. Trail of senses

The display of animals has largely been done zone wise in bio-park, night safari, day time safaris (Indian & African) and habitat wise in bird park. The visitors will be able to see the animal of a particular zone in one location for better understanding of their behaviour and differences. The animals will be grouped according to biological themes. The focus will be on creating inherently educational settings that provide multiple opportunities for educational messages and information, performances and art works of quality so that the visitors will have exciting experience of safaris, bio-park, bird park and night safari. The component of each exhibit is given as under: -

Master Plan of Zoological Park and Rescue Centre, Gorewada

1. Indian Safari: -

- a) Tiger Safari
- b) Sloth Bear Safari
- c) Leopard Safari
- d) Herbivore Composite Safari

2. African Safari: -

- a) Lion Safari
- b) Herbivore Composite Safari

3. Bio-park: -

- a) African Zone
- b) Central India Zone
- c) South India Zone
- d) North India Zone
- e) North East India Zone
- f) Nocturnal Animal House
- g) Insectariums
- h) Reptile House
- i) Mouse Town
- j) Butterfly Park
- k) Aquarium
- l) Amphibian

4. Birds Park: -

- a) Aviary - I
- b) Walk-in Aviary

- c) Aviary - II
- d) Exotic Birds
- 5. **Deep time trail: -**
 - a) Evolutionary theory
- 6. **Tribal trail: -**
 - a) Lifestyle, cultural & traditional display of local Gond and Madia tribes.
- 7. **Trail of senses: -**
 - a) Sound
 - b) Sight
 - c) Taste
 - d) Touch
 - e) Scent
- 8. **Night Safari: -**
 - a) Asian zone
 - b) Exotic zone
 - c) Walking Trails

3.5 Strategy to achieve the objectives: -

- 1) **Ex-situ Conservation: -** This zoo will display a number of endemic species like tiger, lion, panther, Jackal, wolf, different kinds of primates, crocodile, gharial, poisonous & non - poisonous snakes, herbivores and a number of birds' species. They will be provided adequate space for movement and balance diet for their breeding and longevity. Special care will be taken to enrich the exhibits to check the boredom.
- 2) **Education and awareness: -** In order to achieve the objectives, an education wing will be created in the park with adequate man power and infrastructure like interpretation center, published material and audio-visuals.

This section will develop an education and awareness programme as under:-

1. To develop interactive signages.
 2. To prepare animal signages – giving basic information & their characteristics.
 3. Providing of general information signages at prominent places.
 4. To conduct guided tour, organize lectures, talks and competitions.
 5. To publish guide book, brochures, guide map & leaflets about the Zoo and its inmates.
 6. To organize orientation programmes for the selected groups.
 7. To conduct various competitions on the eve of wildlife week and other specific days.
 8. To involve volunteers, NGO'S to take up awareness activities.
- 3) Research on wildlife: - The zoo offers ample opportunities for conducting research on wild life in captivity. For that a research section will be created with adequate staff & infrastructure. The section will be responsible to conduct research in ex-situ and in-situ conditions and also interact with other institutes for collaboration in formulation and conducting research. The probable research projects that can be taken up are as under:-
1. Reproductive biology, Food and Nutrition, Habitat, Diseases and Cures, Physiology and Genetics.
 2. Flora of the park and adjoining area.
 3. Fauna of the zoo and its surrounding area.
 4. Breeding behavior of endangered species.
 5. To study the parasites of zoo animals.
 6. To identify the medicinal plants & their advantages.
 7. Population behavior in safaris.
 8. **Pure and applied research of endemic species.**

Chapter-4

Future action plan

4.1 Future planning: - The future planning is aimed of providing directions for development of the Zoological Park and Rescue center, Gorewada, Nagpur for 10 years from i.e. 2014-2015 to 2024-2025 and will be reviewed thereafter. The proposal of development is based on the site requirements, visitors' profile, availability of water & electricity, vegetation, climatic conditions & resources available with the management. The guidelines of CZA and advice from zoo experts have been taken into consideration in the formulation of action plan. The development has been planned keeping in view the strategy to achieve the prescribed objectives.

4.2 Animal collection plan: - The Zoological Park, Gorewada aims to display animals keeping in view the local habitat, climatic conditions and the resources available. The required animals as per the below list will be procured through Animal Exchange Programme, from rescue centers and the exotic species will be purchased from the foreign Zoos. This zoo and rescue center is going to be a large zoo. The CZA has formulated guidelines for animal collection for large zoo as under:-

- | | |
|---------------------------------------|---------------------------------|
| (1) Species of local area / ecosystem | 30% of the total sp. displayed. |
| (2) Species of region | 30% of the total sp. displayed. |
| (3) Species of nation | 30% of the total sp. displayed. |
| (4) Exotic species | 10% of the total sp. displayed. |

Master Plan of Zoological Park and Rescue Centre, Gorewada

The animal collection plan of the Zoo and rescue center, Gorewada has been prepared exhibit wise which will give clear picture of the animal life there. Therefore the animal collection plan is given as under:-

Sr. No.	Species	Existing stock				Proposed collection				Animals to be acquired				Area proposed (sq.mt.)
		M	F	US	Total	M	F	US	Total	M	F	US	Total	
1. Bio Park														
a) African Zone														
1	Cheetah (Acinonyx jubatus)	-	-	-	-	2	3	-	5	2	3	-	5	1000
2	Hippopotamus (Hippopotamus amphibius)	-	-	-	-	2	3	-	5	2	3	-	5	2000
3	Zebra (Equus burchelli)	-	-	-	-	2	3	-	5	2	3	-	5	2000
4	Giraffe (Giraffa camelopardalis)	-	-	-	-	2	3	-	5	2	3	-	5	3000
5	African Lion (Panthera leo)	-	-	-	-	2	3	-	5	2	3	-	5	3000
6	Sacred baboon (Papio hamadryas)	-	-	-	-	2	3	-	5	2	3	-	5	1500
b) Central India														
7	Rhesus macaque (Macaca mulatta)	-	-	-	-	2	3	-	5	2	3	-	5	1000
8	Cheetal (Axis axis)	-	-	-	-	4	6	-	10	4	6	-	10	4000
9	Fox (Vulpes bengalensis)	-	-	-	-	2	3	-	5	2	3	-	5	500
10	Tiger (Panthera tigris)	-	-	-	-	2	3	-	5	2	3	-	5	3000
11	Four-Horned antelope (Tetracerus quadricornis)	-	-	-	-	2	3	-	5	2	3	-	5	500
12	Jackal (Canis aureus)	-	-	-	-	2	3	-	5	2	3	-	5	500
13	Hyena (Hyena hyena)	-	-	-	-	2	3	-	5	2	3	-	5	800

Master Plan of Zoological Park and Rescue Centre, Gorewada

14	Bonnet Macaque (<i>Macaca radiata</i>)	-	-	-	-	2	3	-	5	2	3	-	5	540
15	Ratel (<i>Mellivora capensis</i>)	-	-	-	-	2	3	-	5	2	3	-	5	350
16	Indian Lion (<i>Panthera leo</i>)	-	-	-	-	2	3	-	5	2	3	-	5	3000
17	Black Buck (<i>Antelope cervicapra</i>)	-	-	-	-	5	10	-	15	5	10	-	15	4000
c) South India														
18	Nilgiri Langur (<i>Presbytis johni</i>)	-	-	-	-	2	3	-	5	2	3	-	5	1000
19	Guar (<i>Bos gaurus</i>)	-	-	-	-	2	3	-	5	2	3	-	5	2500
20	Mugger (<i>Crocodylus palustris</i>)	-	-	-	-	2	4	-	6	2	4	-	6	1000
21	Wild dog (<i>Cuon alpinus</i>)	-	-	-	-	2	3	-	5	2	3	-	5	1000
22	Lion Tailed Macaque (<i>Macaca silenus</i>)	-	-	-	-	2	3	-	5	2	3	-	5	540
d) North India														
23	Wolf (<i>Canis lupus</i>)	-	-	-	-	2	3	-	5	2	3	-	5	800
24	Sloth Bear (<i>Melursus ursinus</i>)	-	-	-	-	2	3	-	5	2	3	-	5	3000
25	Himalayan Black Bear (<i>Selenarctos thibetanus</i>)	-	-	-	-	2	3	-	5	2	3	-	5	3000
26	Wild boar (<i>Sus scrofa</i>)	-	-	-	-	2	3	-	5	2	3	-	5	1500
27	Leopard (<i>Panthera pardus</i>)	-	-	-	-	2	3	-	5	2	3	-	5	1000
28	Gharial (<i>Gavialis gangeticus</i>)	-	-	-	-	2	3	-	5	2	3	-	5	500
29	Barasingha (<i>Cervus duvauceli</i>)	-	-	-	-	4	6	-	10	4	6	-	10	4000
e) North - East India														
30	White Tiger (<i>Panthera tigris</i>)	-	-	-	-	2	3	-	5	2	3	-	5	3000
31	Hoolock Gibbon (<i>Hylobates hoolock</i>)	-	-	-	-	2	3	-	5	2	3	-	5	540

Master Plan of Zoological Park and Rescue Centre, Gorewada

32	Indian Soft Shell Turtle (Lissemys punctata)	-	-	-	-	4	6	-	10	4	6	-	10	100
33	Mouse Deer (Tragulus meminna)	-	-	-	-	2	3	-	5	2	3	-	5	300
34	Stump Tailed Macaque (Macaca speciosa)	-	-	-	-	2	3	-	5	2	3	-	5	540
35	One Horned Rhinoceros (Rhinoceros unicornis)	-	-	-	-	2	3	-	5	2	3	-	5	6000
f) Nocturnal Animal House														
36	Hog Badger (Arctonyx collaris)	-	-	-	-	2	2	-	4	2	2	-	4	300
37	Leopard Cat (Felis bengalensis)	-	-	-	-	2	3	-	5	2	3	-	5	200
38	Binturong (Arctictis binturong)	-	-	-	-	2	3	-	5	2	3	-	5	300
39	Small Indian Civet (Viverricula indica)	-	-	-	-	2	3	-	5	2	3	-	5	200
40	Palm Civet (Paradoxurus hermaphroditus)	-	-	-	-	2	3	-	5	2	3	-	5	200
41	Spotted Owlet (Athene brama)	-	-	-	-	2	3	-	5	2	3	-	5	100
42	Porcupine (Hystrix indica)	-	-	-	-	2	3	-	5	2	3	-	5	300
43	Slow-loris (Nycticebus coucang)	-	-	-	-	2	3	-	5	2	3	-	5	100
44	Pangolin (Manis crassicaudata)	-	-	-	-	2	3	-	5	2	3	-	5	300
45	Indian Flying Fox (Bat) (Pteropus giganteus)	-	-	-	-	2	3	-	5	2	3	-	5	150
46	Giant Squirrel (Ratufa indica)	-	-	-	-	2	3	-	5	2	3	-	5	150
g) Reptile House														2000
47	Indian Starred Tortoise (Geochelone elegans)	-	-	-	-	4	6	-	10	4	6	-	10	150

Master Plan of Zoological Park and Rescue Centre, Gorewada

48	Indian Monitor Lizard (Varanus bengalensis)	-	-	-	-	4	6	-	10	4	6	-	10	100
49	Dhaman Rat Snake (Ptyas mucosa)	-	-	-	-	4	4	-	8	4	4	-	8	40
50	Vine Snake (Oxybelis fulgidus)	-	-	-	-	4	4	-	8	4	4	-	8	40
51	Tree Snake (Dendrelaphis Punctulata)	-	-	-	-	4	4	-	8	4	4	-	8	40
52	Indian Cobra (Naja naja)	-	-	-	-	4	4	-	8	4	4	-	8	40
53	King Cobra (Ophiophagus hannah)	-	-	-	-	3	3	-	6	3	3	-	6	40
54	Sand Boa (Eryx sp)	-	-	-	-	5	5	-	10	5	5	-	10	40
55	Russel Viper (Vipera russelli)	-	-	-	-	3	3	-	6	3	3	-	6	40
56	Banded Krait (Bungarus fasciatus)	-	-	-	-	3	3	-	6	3	3	-	6	40
57	Rock Python (Python molurus)	-	-	-	-	3	3	-	6	3	3	-	6	80
58	Reticulated Python (Python reticulatus)	-	-	-	-	3	3	-	6	3	3	-	6	80
59	Water Snake (Cerebellum sp)	-	-	-	-	3	3	-	6	3	3	-	6	40
60	Indigenous Lizard (Varanus sp)	-	-	-	-	4	4	-	8	4	4	-	8	40
h) Rodents (Mouse Town)														1500
61	Spiny Mouse (Acomys)	-	-	-	-	4	6	-	10	4	6	-	10	80
62	Indian Squirrel (Ratufa indica)	-	-	-	-	2	3	-	5	2	3	-	5	150
63	Palm Squirrel (Funambulus pennanti)	-	-	-	-	2	3	-	5	2	3	-	5	150
64	Metad or Field rats (Millardia meltada)	-	-	-	-	4	6	-	10	4	6	-	10	80
65	Bandicoot Rat (Bandicota indica)	-	-	-	-	4	6	-	10	4	6	-	10	80
66	Bush Rat (Golunda ellioti)	-	-	-	-	4	6	-	10	4	6	-	10	80

Master Plan of Zoological Park and Rescue Centre, Gorewada

67	Indian Mole Rat (Bandicota bengalensis)	-	-	-	-	4	6	-	10	4	6	-	10	80
68	Indian Gerbil (Tatera indica)	-	-	-	-	4	6	-	10	4	6	-	10	80
69	Himalayan Pika (Ochotona himalayana)	-	-	-	-	4	6	-	10	4	6	-	10	80
70	Bay Bamboo Rat (Cannomys badius)	-	-	-	-	4	6	-	10	4	6	-	10	80
71	Black Naped Hare (Lepus nigricollis)	-	-	-	-	2	3	-	5	2	3	-	5	250
i) Insectariums														750
72	Centipedes (Chilopoda)	-	-	-	-	8	12	-	20	8	12	-	20	
73	Millipedes (Diplopoda)	-	-	-	-	8	12	-	20	8	12	-	20	
74	Small Ants (Formicidae)	-	-	-	-	8	12	-	20	8	12	-	20	
75	Large Ants (Camponotus pennsylvanicus)	-	-	-	-	8	12	-	20	8	12	-	20	
76	Termites (Termitidae)	-	-	-	-	8	12	-	20	8	12	-	20	
77	Grasshoppers (Caelifera)	-	-	-	-	8	12	-	20	8	12	-	20	
78	Crickets (Gryllidae)	-	-	-	-	8	12	-	20	8	12	-	20	
79	Cockroaches (Blattaria)	-	-	-	-	8	12	-	20	8	12	-	20	
80	Praying mantis (Mantodea)	-	-	-	-	8	12	-	20	8	12	-	20	
81	Leaf Insect (Phylliidae)	-	-	-	-	8	12	-	20	8	12	-	20	
82	Dung beetle (Phanaeus vindex)	-	-	-	-	8	12	-	20	8	12	-	20	
83	Butterflies (Rhopalocera)	-	-	-	-	8	12	-	20	8	12	-	20	
84	Moths – Atlas moth (Attacus atlas)	-	-	-	-	8	12	-	20	8	12	-	20	
85	Scorpion (Scorpiones)	-	-	-	-	8	12	-	20	8	12	-	20	
86	Whip Scorpion (Thelyphonida)	-	-	-	-	8	12	-	20	8	12	-	20	
87	Slugs (phylum Mollusca)	-	-	-	-	8	12	-	20	8	12	-	20	
88	Snails (Gastropoda)	-	-	-	-	8	12	-	20	8	12	-	20	

Master Plan of Zoological Park and Rescue Centre, Gorewada

89	Spiders – Tarantula (Aphonopelma sp.)	-	-	-	-	8	12	-	20	8	12	-	20	
90	Earthworm (Lumbricidae)	-	-	-	-	8	12	-	20	8	12	-	20	
91	Leeches (Hirudinea)	-	-	-	-	8	12	-	20	8	12	-	20	
92	Indigenous Indian Scorpion (4 sp)	-	-	-	-	8	12	-	20	8	12	-	20	
93	Exotic Beetle (10 sp)	-	-	-	-	20	30	-	50	20	30	-	50	
94	Exotic Scorpion (10 sp)	-	-	-	-	20	30	-	50	20	30	-	50	
j) Aquarium													1500	
95	Minor Carp (Labeo bata)	-	-	-	-	10	10	-	20	10	10	-	20	
96	Boggut Labeo (Labeo Boggut)	-	-	-	-	10	10	-	20	10	10	-	20	
97	Chola Barb (Puntius Chola)	-	-	-	-	10	10	-	20	10	10	-	20	
98	Golden Dwarf Barb (Puntius Titco)	-	-	-	-	10	10	-	20	10	10	-	20	
99	Ticto Barb (Puntius Ticto)	-	-	-	-	10	10	-	20	10	10	-	20	
100	Half Banded Hill Trout (Barilius Vagra)	-	-	-	-	10	10	-	20	10	10	-	20	
101	Moustached Danio (Danio Dangila)	-	-	-	-	10	10	-	20	10	10	-	20	
102	Slender Barb (Rasbora Daniconius)	-	-	-	-	10	10	-	20	10	10	-	20	
103	Ring Loach (Schistura Dayi)	-	-	-	-	10	10	-	20	10	10	-	20	
104	Victory Loach (Schistura Scaturigina)	-	-	-	-	10	10	-	20	10	10	-	20	
105	Marine Invertebrates (10 sp)	-	-	-	-	20	30	-	50	20	30	-	50	
106	Marine Reet (10 sp)	-	-	-	-	20	30	-	50	20	30	-	50	
107	Small Generic (10 sp)	-	-	-	-	20	30	-	50	20	30	-	50	
108	Fresh Water Lake Fish (20 sp)	-	-	-	-	40	60	-	100	40	60	-	100	

Master Plan of Zoological Park and Rescue Centre, Gorewada

109	Fresh Water Asian Tropical Fish (20 sp)	-	-	-	-	20	30	-	50	20	30	-	50	
110	Fresh Water South American Tropical Fish (20 sp)	-	-	-	-	40	60	-	100	40	60	-	100	
k) Amphibians														1500
111	Ornate narrow-mouthed frog (Microhyla Ornata)	-	-	-	-	5	5	-	10	5	5	-	10	
112	Black-spectacled toad (Duttaphrynus melanostictus)	-	-	-	-	5	5	-	10	5	5	-	10	
113	Common Indian tree frog (polypedates maculatus)	-	-	-	-	10	10	-	20	10	10	-	20	
114	Fungoid frog (hylarana malabarica)	-	-	-	-	5	5	-	10	5	5	-	10	
115	Short-legged Frog (Indirana brachytarsus)	-	-	-	-	5	5	-	10	5	5	-	10	
116	Jerdon's Narrow-mouthed Frog (Ramanella montana)	-	-	-	-	5	5	-	10	5	5	-	10	
117	Periah Peak caecilian (Gegeneo phis carnosus)	-	-	-	-	5	5	-	10	5	5	-	10	
118	Indian burrowing frog (Sphaerotheca breviceps)	-	-	-	-	5	5	-	10	5	5	-	10	
119	Himalayan Newt (5 sp)	-	-	-	-	10	15	-	25	10	15	-	25	
120	Indigenous Frog (6 sp)	-	-	-	-	12	18	-	30	12	18	-	30	
l) Butterfly Park														10000
121	Crimson Rose (Pachliopta hector)	-	-	-	-	25	25	-	50	25	25	-	50	
122	Common Rose (Pachliopta aristolochiae)	-	-	-	-	25	25	-	50	25	25	-	50	

Master Plan of Zoological Park and Rescue Centre, Gorewada

123	Blue Bottle (Graphium sarpedon)	-	-	-	-	25	25	-	50	25	25	-	50	
124	Common Jay (Graphium agamemnon)	-	-	-	-	25	25	-	50	25	25	-	50	
125	Sport Sword Tail (Graphium nomius)	-	-	-	-	25	25	-	50	25	25	-	50	
126	Common Mime (Papilio clytia)	-	-	-	-	25	25	-	50	25	25	-	50	
127	Lime Butterfly (Papilio demoleus)	-	-	-	-	25	25	-	50	25	25	-	50	
128	Common Mormon (Papilio polytes)	-	-	-	-	25	25	-	50	25	25	-	50	
129	Blue Mormon (Papilio polymnestor)	-	-	-	-	25	25	-	50	25	25	-	50	
130	Common Emigrant (Catopsilia pomona)	-	-	-	-	25	25	-	50	25	25	-	50	
131	Mottled Emigrant (Catopsilia pyranthe)	-	-	-	-	25	25	-	50	25	25	-	50	
132	Grass Yellow (Eurema hecabe)	-	-	-	-	25	25	-	50	25	25	-	50	
133	Common Jezebel (Delias eucharis)	-	-	-	-	25	25	-	50	25	25	-	50	
134	Psyche (Leptosia nina)	-	-	-	-	25	25	-	50	25	25	-	50	
135	Common Gull (Cepora nerissa)	-	-	-	-	25	25	-	50	25	25	-	50	
136	Pioneer (Anaphaeis aurota)	-	-	-	-	25	25	-	50	25	25	-	50	
137	White Orange Tip (Ixias marianne)	-	-	-	-	25	25	-	50	25	25	-	50	
138	Yellow Orange Tip (Ixias pyrene)	-	-	-	-	25	25	-	50	25	25	-	50	
139	Common Wanderer (Pareronia valeria)	-	-	-	-	25	25	-	50	25	25	-	50	
140	Tawny Coster (Acraea violae)	-	-	-	-	25	25	-	50	25	25	-	50	
141	Common Leopard (Phalanta phalantha)	-	-	-	-	25	25	-	50	25	25	-	50	
142	Common Castor (Ariadne merione)	-	-	-	-	25	25	-	50	25	25	-	50	

Master Plan of Zoological Park and Rescue Centre, Gorewada

143	Plain Tiger (Danaus chrysippus)	-	-	-	-	25	25	-	50	25	25	-	50	
144	Blue Tiger (Tirumala limniace)	-	-	-	-	25	25	-	50	25	25	-	50	
145	Striped Tiger (Danaus genutia)	-	-	-	-	25	25	-	50	25	25	-	50	
146	Common Crow (Euploea core)	-	-	-	-	25	25	-	50	25	25	-	50	
147	Red Pierrot (Talicada nyseus)	-	-	-	-	25	25	-	50	25	25	-	50	
148	Brown Awl (Badamia exclamationis)	-	-	-	-	25	25	-	50	25	25	-	50	
149	Three-spot Grass Yellow (Eurema blanda)	-	-	-	-	25	25	-	50	25	25	-	50	
150	Gaint Redeve (Gangara thyrasis)	-	-	-	-	25	25	-	50	25	25	-	50	
151	Indian Skipper (Spialia galba)	-	-	-	-	25	25	-	50	25	25	-	50	
152	Spotless Grass Yellow (Eurema laeta)	-	-	-	-	25	25	-	50	25	25	-	50	
153	Crimson Tip (Colotis danae)	-	-	-	-	25	25	-	50	25	25	-	50	
154	Common Sailer (Neptis hylas)	-	-	-	-	25	25	-	50	25	25	-	50	
155	Malabar Tree Nymph (Idea malabarica)	-	-	-	-	25	25	-	50	25	25	-	50	
156	Common Pierrot (Castalius rosimon)	-	-	-	-	25	25	-	50	25	25	-	50	

Master Plan of Zoological Park and Rescue Centre, Gorewada

2. Indian Safari														
Sr. No.	Species	Existing stock				Proposed collection				Animals to be acquired				Area proposed
		M	F	US	Total	M	F	US	Total	M	F	US	Total	
	Mammals													
157	Indian Tiger (Panthera tigris)	-	-	-	-	4	6	-	10	4	6	-	10	25 ha
158	Sloth Bear (Melursus unsinus)	-	-	-	-	4	6	-	10	4	6	-	10	25 ha
159	Leopard (Panthera pardus)	-	-	-	-	4	6	-	10	4	6	-	10	25 ha
Herbivore:-														
160	Cheetal (Axis axis)	-	-	-	-	5	15	-	20	5	15	-	20	} 40 ha
161	Sambhar (Cervus unicolor)	-	-	-	-	5	10	-	15	5	10	-	15	
162	Indian Gaur (Bos gaurus)	-	-	-	-	4	6	-	10	4	6	-	10	
163	Black Buck (Antelope cervicapra)	-	-	-	-	5	10	-	15	5	10	-	15	
164	Nilgai (Boselaphus tragocamelus)	-	-	-	-	5	10	-	15	5	10	-	15	
165	Wild Ass (Equus hemionus)	-	-	-	-	4	6	-	10	4	6	-	10	

Master Plan of Zoological Park and Rescue Centre, Gorewada

3) African Safari														
Sr. No.	Species	Existing stock				Proposed collection				Animals to be acquired				Area proposed (Ha)
		M	F	US	Total	M	F	US	Total	M	F	US	Total	
166	African Lion (Panthera leo leo)	-	-	-	-	4	6	-	10	4	6	-	10	25 ha.
African Herbivore:-														
167	Giraffe(Giraffa camelopardalis)	-	-	-	-	4	6	-	10	4	6	-	10	} 40 ha.
168	Zebra (Equis burcheli)	-	-	-	-	4	6	-	10	4	6	-	10	
169	Wild beast (Connochaetes gnou)	-	-	-	-	4	6	-	10	4	6	-	10	
170	Impala (Aepyceros melampus)	-	-	-	-	4	6	-	10	4	6	-	10	
171	White Rhino (Ceratotherium simum)	-	-	-	-	4	6	-	10	4	6	-	10	
172	Ostrich (Struthio camelus)	-	-	-	-	3	7	-	10	3	7	-	10	

Master Plan of Zoological Park and Rescue Centre, Gorewada

4) Night Safari:																
Sr. No.	Species	Existing stock				Proposed collection				Animals to be acquired				Area proposed (Sq. Mt.)		
		M	F	US	Total	M	F	US	Total	M	F	US	Total	Holding Area	Display Area	
Exotic Species (African & American)																
173	Giraffe (Giraffa camelopardalis)	-	-	-	-	2	3	-	5	2	3	-	5	2000	2000	
174	Zebra (Equus burchelli)	-	-	-	-	2	3	-	5	2	3	-	5	2000	2000	
175	Barbery Sheep (Ammotragus lervia)	-	-	-	-	2	3	-	5	2	3	-	5	1500	1000	
176	Eland (Taurotragus oryx)	-	-	-	-	2	3	-	5	2	3	-	5	1500	1000	
177	Impala (Aepyceros melampus)	-	-	-	-	2	3	-	5	2	3	-	5	1000	750	
178	Blesbok (Damaliscus pygargus dorcas)	-	-	-	-	2	3	-	5	2	3	-	5	1000	750	
179	Capybara (Hydrochoerus hydrochaeris)	-	-	-	-	2	3	-	5	2	3	-	5	100	100	
180	Jaguar (Panthera onca)	-	-	-	-	2	3	-	5	2	3	-	5	1000	1000	
181	Llama (Llama llama)	-	-	-	-	2	3	-	5	2	3	-	5	750	1000	
182	Cavy (Caviidae)	-	-	-	-	2	3	-	5	2	3	-	5	100	100	
183	Bearded Pig (Sus barbatus)	-	-	-	-	2	3	-	5	2	3	-	5	750	1000	
184	Guanaco (Lama guanicoe)	-	-	-	-	2	3	-	5	2	3	-	5	750	1000	
Birds (Walking Trail)																
185	Ostrich (Struthio camelus)	-	-	-	-	2	4	-	6	2	4	-	6	-	600	
186	Emu (Dromaius Novaehollandiae)	-	-	-	-	2	4	-	6	2	4	-	6	-	500	
187	Rhea (Rhea Americana)	-	-	-	-	2	4	-	6	2	4	-	6	-	500	
188	Cassowary (Casuaris)	-	-	-	-	2	4	-	6	2	4	-	6	-	500	

Master Plan of Zoological Park and Rescue Centre, Gorewada

Asian Zone																
189	Malayan Tapir (Tapirus indicus)	-	-	-	-	2	3	-	5	2	3	-	5	-	500	
190	Sloth Bear (Melursus ursinus)	-	-	-	-	2	3	-	5	2	3	-	5	-	1500	
191	Leopard (Panthera pardus)	-	-	-	-	2	3	-	5	2	3	-	5	-	1000	
192	Tiger (Panthera tigris)	-	-	-	-	2	3	-	5	2	3	-	5	-	1500	
193	Hyena (Hyena hyena)	-	-	-	-	2	3	-	5	2	3	-	5	-	1000	
194	Spotted Deer (Axis axis)	-	-	-	-	5	15	-	20	5	15	-	20	6000	6000	
195	Gaur (Bos gaurus)	-	-	-	-	2	3	-	5	2	3	-	5	2500	2500	
196	Sambhar (Cervus unicolor)	-	-	-	-	4	6	-	10	4	6	-	10	3000	3000	
197	Jackal (Canis aureus indicus)	-	-	-	-	2	3	-	5	2	3	-	5	-	850	
198	Wolf (Canis lupus)	-	-	-	-	2	3	-	5	2	3	-	5	-	850	
199	Palm Civet (Paradoxurus Hermaphroditus)	-	-	-	-	2	3	-	5	2	3	-	5	-	500	
200	Leopard Cat (Felis bengalensis)	-	-	-	-	2	3	-	5	2	3	-	5	-	500	
201	Jungle Cat (Felis chaus)	-	-	-	-	2	3	-	5	2	3	-	5	-	500	
202	Turtle (Testudines)	-	-	-	-	2	3	-	5	2	3	-	5	-	300	
203	Crocodile (Crocodylinae)	-	-	-	-	2	3	-	5	2	3	-	5	-	600	
204	Great Flamingo (Phoenicopterus roseus)	-	-	-	-	3	3	-	6	3	3	-	6	-	500	

Master Plan of Zoological Park and Rescue Centre, Gorewada

5) Birds Park														
Sr. No.	Species	Existing stock				Proposed collection				Animals to be acquired				Area proposed
		M	F	US	Total	M	F	US	Total	M	F	US	Total	
a) Aviary – I (Pheasants)														1500
205	Silver Pheasant (Lophura nycthemera)	-	-	-	-	2	3	-	5	2	3	-	5	
206	Kalij Pheasant (Lophura leucomelanos)	-	-	-	-	2	3	-	5	2	3	-	5	
207	Golden Pheasant (Chrysolophus pictus)	-	-	-	-	2	3	-	5	2	3	-	5	
208	Lady Amhersel Pheasant (Chrysolophus amherstiae)	-	-	-	-	2	3	-	5	2	3	-	5	
209	Sonnerat's Jungle Fowl (Gallus sonneratii)	-	-	-	-	2	3	-	5	2	3	-	5	
210	Grey Partridges (Francolinus pondicerianus)	-	-	-	-	2	3	-	5	2	3	-	5	
211	Great Indian Bustard (Choriotis nigriceps)	-	-	-	-	2	3	-	5	2	3	-	5	
212	Black Partridge (Francolinus francolinus)	-	-	-	-	2	3	-	5	2	3	-	5	
213	Red Jungle Fowl (Gallus gallus)	-	-	-	-	2	3	-	5	2	3	-	5	
214	Cheer Pheasant (Catreus wallichii)	-	-	-	-	2	3	-	5	2	3	-	5	
215	Ring Necked Pheasant (Phasianus colchicus)	-	-	-	-	2	3	-	5	2	3	-	5	

Master Plan of Zoological Park and Rescue Centre, Gorewada

b) Walk - in aviary														20000
216	Sarus Crane (Grus antigone)	-	-	-	-	4	6	-	10	4	6	-	10	
217	Black necked Crane (Grus nigricollis)	-	-	-	-	4	6	-	10	4	6	-	10	
218	Common Crane (Grus grus)	-	-	-	-	4	6	-	10	4	6	-	10	
219	Adjutant Stork (Leptoptilos dubius)	-	-	-	-	4	6	-	10	4	6	-	10	
220	Open billed stork (Anastomus oscitans)	-	-	-	-	4	6	-	10	4	6	-	10	
221	Painted Stork (Mycteria leucocephala)	-	-	-	-	10	10	-	20	10	10	-	20	
222	Black necked stork (Ephippiorhynchus asiaticus)	-	-	-	-	4	6	-	10	4	6	-	10	
223	White Stork (Ciconia ciconia)	-	-	-	-	4	6	-	10	4	6	-	10	
224	Large, Intermediate & Small Egret (Ardea alba, A.intermedia, A.garzetta)	-	-	-	-	10	10	-	20	10	10	-	20	Each sp
225	Pond Heron (Ardeola grayi)	-	-	-	-	10	10	-	20	10	10	-	20	
226	Grey Heron (Ardea cinerea)	-	-	-	-	10	10	-	20	10	10	-	20	
227	Purple Heron (Ardea purpurea)	-	-	-	-	10	10	-	20	10	10	-	20	
228	Oriental Darter or Snakebird (Anhinga melanogaster)	-	-	-	-	10	10	-	20	10	10	-	20	
229	White Ibis (Threskiornis melanocephalus)	-	-	-	-	10	10	-	20	10	10	-	20	
230	Black Ibis (Pseudibis papillosa)	-	-	-	-	10	10	-	20	10	10	-	20	

Master Plan of Zoological Park and Rescue Centre, Gorewada

231	Cormorant (Phalacrocorax niger)	-	-	-	-	10	10	-	20	10	10	-	20
232	Pelican (Pelecanus philippensis)	-	-	-	-	10	10	-	20	10	10	-	20
233	Ducks (Sp)	-	-	-	-	5	5	-	10	5	5	-	10 each sp
234	Hoopoe (Upupa epops)	-	-	-	-	4	6	-	10	4	6	-	10
235	Wood pecker (Sp)	-	-	-	-	4	6	-	10	4	6	-	10
236	Koel (Eudynamys scolopacea)	-	-	-	-	4	6	-	10	4	6	-	10
237	Grey Hornbill (Tockus birostris)	-	-	-	-	4	6	-	10	4	6	-	10
238	Pitta (Pitta brachyura)	-	-	-	-	4	6	-	10	4	6	-	10
239	Golden Oriole (Oriolus oriolus)	-	-	-	-	4	6	-	10	4	6	-	10
240	Black headed Oriole (Oriolus xanthornus)	-	-	-	-	4	6	-	10	4	6	-	10
241	Crimson Breasted Barbet (Megalaima haemacephala)	-	-	-	-	4	6	-	10	4	6	-	10
242	Brahminy Mynah (Sturnus pagodarum)	-	-	-	-	4	6	-	10	4	6	-	10
243	Pied Mynah (Sturnus contra)	-	-	-	-	4	6	-	10	4	6	-	10
244	Ringed neck Dove (Streptopelia decaocto)	-	-	-	-	4	6	-	10	4	6	-	10
245	Babblers (Timaliidae)	-	-	-	-	4	5	-	10	4	6	-	10
246	Red Vented Bulbul (Pycnonotus cafer)	-	-	-	-	4	6	-	10	4	6	-	10
247	Red Whiskered Bulbul (Pycnonotus leucogenys)	-	-	-	-	4	6	-	10	4	6	-	10

Master Plan of Zoological Park and Rescue Centre, Gorewada

248	White Eye (Zosterops palpebrosa)	-	-	-	-	10	10	-	20	10	10	-	20	
249	Sun birds (Sp)	-	-	-	-	5	5	-	10	5	5	-	10	
250	Indian Robin (Saxicoloides fulvicata)	-	-	-	-	5	5	-	10	5	5	-	10	
c) Aviary														1500
251	Alexandrine Parakeet (Psittacula eupatria)	-	-	-	-	4	6	-	10	4	6	-	10	
252	Rose Ringed Parakeet (Psittacula krameri)	-	-	-	-	4	6	-	10	4	6	-	10	
253	Blossom headed Parakeet (Psittacula cyanocephala)	-	-	-	-	4	6	-	10	4	6	-	10	
254	Lorikeet (Loriculus vernalis)	-	-	-	-	4	6	-	10	4	6	-	10	
255	Budgerigar (Melopsittacus undulatus)	-	-	-	-	10	10	-	20	10	10	-	20	
256	Cockatiel (Nymphicus hollandicus)	-	-	-	-	10	10	-	20	10	10	-	20	
257	Red Munia (Estrilda amandava)	-	-	-	-	10	10	-	20	10	10	-	20	
258	Spotted Munia (Lonchura punctulata)	-	-	-	-	10	10	-	20	10	10	-	20	
259	Love birds (Sp)	-	-	-	-	5	5	-	10	5	5	-	10 each sp	
260	Green Pigeon (Treron phoenicoptera)	-	-	-	-	5	5	-	10	5	5	-	10	
261	Barn Owl (Tyto alba)	-	-	-	-	5	5	-	10	5	5	-	10	
262	Indian Great Horned Owl (Bubo bubo)	-	-	-	-	5	5	-	10	5	5	-	10	
263	Cuckoo (Cuculus varius)	-	-	-	-	5	5	-	10	5	5	-	10	

Master Plan of Zoological Park and Rescue Centre, Gorewada

264	Spotted Owllet (Athene brama)	-	-	-	-	5	5	-	10	5	5	-	10	
d) Exotic Birds													2500	
265	Ostrich (Struthio camelus)	-	-	-	-	2	3	-	5	2	3	-	5	
266	Emu (Dromaius novaehollandiae)	-	-	-	-	2	3	-	5	2	3	-	5	
267	Cassowary (Casuarius casuaris)	-	-	-	-	2	3	-	5	2	3	-	5	
268	Kiwi (Apteryx australis)	-	-	-	-	2	3	-	5	2	3	-	5	
269	Rhea (Rhea americana)	-	-	-	-	2	3	-	5	2	3	-	5	
270	Grey Parrot (Psittacus erithacus)	-	-	-	-	2	3	-	5	2	3	-	5	
271	Macaw Military (Ara militaris)	-	-	-	-	2	3	-	5	2	3	-	5	
272	Macaw Blue and Yellow (Ara ararauna)	-	-	-	-	2	3	-	5	2	3	-	5	
273	Macaw Illiger's (Ara maracana)	-	-	-	-	2	3	-	5	2	3	-	5	
274	Love bird Peach Faced (Agapornis roseicollis)	-	-	-	-	2	3	-	5	2	3	-	5	
275	Cokatoo Lesser Sulpher Crested (Kokato sanguinea sulphurea)	-	-	-	-	2	3	-	5	2	3	-	5	
276	Cokatoo Bare Eyed (Kokato sanguinea)	-	-	-	-	2	3	-	5	2	3	-	5	

4.3 Description of layout plan of the zoo: - The Zoological Park and Rescue Centre, Gorewada is a new zoo situated on Nagpur – Katol highway and is about 7 Km from the Zero milestone of Nagpur city. This zoo has been proposed to be developed on modern concept of zoo management. It is anticipated to be of International Standards. An area of 1914 ha. presents thick wood land vegetation and a number of herbs and shrubs. The master layout plan has been drawn by M/s Ashfaque Ahmed Consultancy Services Pvt. Ltd., Nagpur in consultation with the experts on zoo design and zoo officials etc.

To prepare the master layout plan, various surveys such as field survey, contour survey, traffic survey, potential visitor's survey, etc. were carried out. On the basis these surveys, the proposed Master Layout Plan have been finalized. The layout plan has been drawn on scale of 1:12000 with contour interval of 2 mtr. (Copy of the contour map of site is annexed as **Annexure - 6**).

The Master Layout Plan includes approach road to Day Time Safaris, Bio-park, Bird park, Deep time trail, Tribal village trail, Trail of senses, night safari, parking area, entrance plaza, offices, roads paths, interpretation center, animal enclosures, water bodies, veterinary hospital, rescue centre, water works, and power station. The display of animals has largely been done zone wise in bio-park, night safaris and safaris. (Copy of the Master Layout Plan is annexed as **Annexure - 7**).

The major components of the zoo and rescue centre are as under: -

1. Entrance Plaza and Parking
2. Indian Safari
3. African Safari
4. Night Safari
5. Bio-park
6. Bird park
7. Deep time trail
8. Tribal village trail

9. Trail of senses

10. Rescue centre

11. 25.57 Ha Non-Forest Land

- 1. Entrance Plaza and Parking:** - Entrance Plaza is the first impact face value of project. As the project is about establishing an international standard zoo and safari park, it should have all facilities, infrastructure and amenities planned and designed up to the international standards.

All the activities (pick-up, drop-off, parking, information centre, ticketing, etc.) shall be located near the entrance plaza so as to reduce the approach distance for visitors and making their journey comfortable. Studying the visitor circulation, various activities are proposed and located on site to complement each other. Separate entry and exit gates with security system are designed. Separate parking areas for buses, 4-wheelers and 2-wheelers are planned with appropriate pick-up and drop-off points in a way to avoid intersection points and minimize the traffic congestion at junctions. Adequate parking space has been provided for keeping in view the peak load of vehicles as per survey feedback. After going through the ticketing and security check, visitor enters into huge landscaped area assisted with education and interpretation centers, cafeteria, rest rooms, etc. From the entrance plaza, routes have been diverted to various activities. (A copy of proposed Entrance Plaza layout plan is annexed as **Annexure - 8**)

- 2. Indian Safari:** - The Indian safaris would be explored by specially designed vehicles. These will consist of:

- Tiger Safari - 25 ha
- Leopard Safari - 25 ha
- Sloth Bear Safari - 25 ha
- Herbivore Composite Safari (Sambhar, Cheetal, Barking Deer, Gaur, Barasingha, Black Buck etc.) - 40 ha

The animals have been displayed in spacious enclosure. The visitor will enter into the tiger safari and will cover distance about 1.5 Km, then Sloth bear safari with a distance of 1.50 Km, followed by visit to Leopard safari and Herbivore safari covering a distance of 1.50 Km and 2.00 Km respectively. Service and visitor roads are kept separate with minimum intersection

points. Other facilities for safari will include animal holding area, kraal area, service block, etc. (A copy of layout for day time safari is annexed as **Annexure – 9**)

3. **African Safari:** - After visiting herbivore safari the visitor will stop for 15-20 minutes at break point where they can relax, have refreshments, etc. From break point, the vehicle will travel through African safari. This will consist of:

- African Lion Safari - 25 ha
- Herbivore Composite Safari (Giraffe, Zebra, White rhino, Ostrich, Impala, Barbary Sheep, Ankole cattle) - 40 ha

The journey through Lion and herbivore safaris will cover a distance of 1.50 Km and 2.00 Km respectively. This will take one and half hour to complete the visit of safaris.

4. **Night Safari:** - On the North side of highway, there will be Night Safari comprising of 65 ha. It is located about 2 km from the Nagpur – Katol highway. It would be the first of its kind of night spotting activities in India, thus attracting more tourists. The visitors will have rewarding experience to see the animals in dark. The night safari will have animals of African continent, American continent, Asian continent and Indian sub continent. The animals have been broadly classified as Asian & Exotic species displayed in taxonomical form. The timings of the night safari will be from evening to 11 pm. The animals will be displayed in the naturalistic exhibit areas under the stimulated moonlight. The visitors will have option to see the zoo in specially designed vehicles. The journey will cover a distance of around 5.30 km.

The Night Safari will have High mast Lighting which will be Umbrella type. This will reduce enhance the dark sky effect and reduce spill over light to the horizon which is a grave environmental concern. The luminaires used in these High masts will be Dark Sky Compliant and the light source will be LED. This type of fixtures is environmental friendly. The entire lighting in the exhibit area will be based on dimming in co-relation with waxing and waning of moonlight under real time clock. The lights will be programmed to shut off automatically a pre-determined time of night when the night safari closes. This will ensure the body clocks (Circadian rhythm) of the exhibits are not disturbed. Thus leading to happier exhibits and an adventurous environment for the tourist.

A few Machaans are also located at intervals to give an aerial view of the beautiful scenic locations. The total area of night safari is 65 ha. All the activities are planned in 45 ha of land leaving sufficient area in the vicinity for future expansion. (A copy of layout plan of Night Safari is annexed as **Annexure – 10**).

- 5. Bio-Park:** - The Bio-park will be of 30 ha. area with various types of species displayed in natural looking enclosures. The visitors can visit bio-park in battery operated vehicle or on foot. The one round of bio-park comprises of 4.50 Km of distance. It will take 2-3 hours to see the animals.

Geographic location will be the thread linking the display of species. Each zone shall have different style of vegetation and environment reflecting a particular geographic location. During their journey the visitors will explore various kinds of spaces making their overall experience more exciting. Other than the attractive and entertaining behavior of species, they will also have an educational impact on visitors. The various zones created within the bio-park are Central Indian zone, African zone, South Indian zone, North Indian zone and North-East Indian zone. Remaining species have been clubbed separately as Insectariums, Aquarium, Reptiles, Mouse Town and Butterfly Park in separate zones. Within these zones planning is done on the basis of compatibility study of exhibits, sequencing of species to generate visitor interest, clubbing of activities for the ease of maintenance, etc. Focus would be on creating natural environment for each exhibit with different habitats and barrier free vision. A centrally located plaza is proposed to have a central connectivity with each zone, thus reducing the visitor movement and creating a comfort zone. The bio-park can be explored by walking or battery operated vehicles. The overall planning is done with a view of having sufficient area in the surrounding for future expansion. (A copy of layout for bio-park is annexed as **Annexure – 11A & 11B**).

- 6. Bird-Park:** - The bird park of 7 ha. is planned comprising a variety of Indian and exotic species. The display of birds have been proposed in aviaries and in walk in aviary type exhibit. The visitor will proceed from aviary exhibit to walk in aviary, it creates an unexpected transition of space, moving from a closed site to large open areas. This approach of design will make the experience of visitors much more memorable and inviting. (A copy of layout for bird-park is annexed as **Annexure – 12A & 12B**)

- 7. Deep Time Trail:** - The deep time trail will be fully accessible, interpretive walking timeline trail located near the entrance plaza. It will be more of an educative and interpretative form of walking trail in which visitors will experience evolution of life on Earth with the help of some architectural interventions and sensory experiences. It will display diverse geology of the region.

The Deep Time Trail will give a visceral feel for the age of the Earth and how human timescales interface with geologic time. It will display the evolutionary changes that occurred millions of years ago and the existence of Gondwana and Deccan trap stories through the use of graphics and artifacts. It will help visitors frame their inquiry, foster a greater passion for science and geology and gain an understanding of geologic time and key processes of the region's geologic evolution.

- 8. Tribal Village Trail:** - This trail will showcase the life of the Gond and Madia tribe of India through the typical vernacular architecture of their houses and shelters. The tribes are known worldwide for their culture and tradition.

The arts and crafts of the Gond people shall be displayed in this area which will exhibit the innovative use of natural materials made by them. In addition, the weapons and tools used by the tribal people for hunting and farming, traditional musical instruments, type of clothes they dress in, their culture and traditions will be demonstrated to the urbanized population. Few live activities such as their traditional dancing and music will also be held to amuse the visitors.

Their lifestyle, which is in more harmony with nature, might help the modernized citizens to understand how much they have misused nature and its components which are increasingly becoming hazardous to the life on Earth.

- 9. Trail of Senses:** - Nature should be smelled, heard, touched, tasted and seen. The trail of senses will be a park where there will be explanatory signs explaining about these five senses. It will be designed to stimulate one's sensory responses to the environment and giving general information about the various healing herbs and the local wildlife. An amalgamation of color and fragrance, texture and form will evoke the awareness of touch, smell, sight, sound and taste. It will also display dynamic works of art. Walking this trail will be an educational experience

for the visitors. The trail of senses have been located along the proposed water reservoir which would support the quick growth of plantation.

Sight

This zone will focus on growing some striking colorful flowering and non-flowering plants that would seek the attraction of visitors and stimulate the eye-sight. Some beautiful butterflies and birds can also be attracted towards the flower and fruit bearing trees which might offer mesmerizing sight to the visitors. The details of the trees and plants will be displayed with their common name, botanical name and description for the benefit of the common man who will take a walk around.



Growing Colourful Flowers That Stimulates Eye Sight

Sound

Small naturally approaching birds that make soft and pleasant sound can be found in this particular zone. Certain artificial water bodies such as waterfalls and cascades shall be incorporated. The soothing sound created by these elements would certainly aid in refreshing the mood of visitors and make them feel stress-free and relaxed.



Flowing Water to Stimulate Hearing Sense

Taste

This zone will consist of plants of edible fruits and nuts with a variety of sour, sweet and bitter sensation to their tongues to activate the sense of taste.



Plants of Edible Fruits Which Activates Taste

Touch

Plants with range of textures of leaves, flowers, bark of trees shall be included in the touch zone. Architectural inventions such as textured pathways, water features and stone sculptures will also be integrated to stimulate the sense of touch. It will offer variety of textures ranging from soft, soaked and smooth to hard, dry and rough.



Allowing Contact with plants & Water Body that stimulates touch

Scent

The scent zone will incorporate lots of herbs and medicinal plants and fragrant flowers to activate the smelling power.



Incorporate Lots of Fragrant Flowers to Activate Smelling Power

10. **Rescue Centre:** - A number of animals which become threat to human life or property or get injured require housing and treatment facilities. This facility is to be provided by the Forest Department of Maharashtra. All seized, rescued, sick or injured young wild animals not fit for release shall be brought for treatment and subsequent release in the wild. Study and scientific research on behavior of the rescued wild animal shall also be carried out here.
11. **25.57 Ha Non-Forest Land:** - As this project will be taken ahead in PPP mode, Maharashtra Govt. has decided to provide this 25.57 Hectares non-forest land reserved for commercial tourism activities by leasing out land to the private operators. This would be an amazing arena for housing hotels, resorts, club house, theme parks, virtual zoo, children's play zone, night trail, etc. serving visitors with a complete package making it memorable experience for them. Most importantly this will make it a financially sustainable venture and will also generate employment for many indigents, thus leading towards enhancement of the society.

4.4 Visitor circulation: - The visitors will enter the zoo & safari park on the southern side from the Nagpur - Katol highway. From the entrance gate, the visitors lead towards the parking areas with pick - up and drop - off points in between where visitors can get down and further lead towards the information center for orientation. After visiting the information center, the visitors

will come across the ticketing booths and other facilities at the entrance plaza like administrative building, interpretation centre, baby care units, cafeteria, etc. adjoining the ticketing booth. The entrance plaza will also comprise of huge landscape areas, OAT, children's play area, etc. Thereafter, the visitors will reach at a spot where they have the choice to move safari and deep time trail or Bio-park or Bird park or Tribal trail and trail of senses.

The visitor circulation is well defined and is from right to left in the Indian and African safaris. The visitors will move in a specially designed and well protected vehicle through different safaris. They will cover a distance of nearly 12 Km in 2-3 hours. In between there will be a break for refreshment for 20 minutes.

The visitors will see the bio-park from left to right and move along the visitor road that will cover a distance about 4.50 Km. The animals in the bio-park would be displayed zone wise in the naturalistic habitat.

Similarly, the bird park will be visited from left to right. The birds have been displayed in aviary and walk in aviary exhibit. Here the visitors will have to cover a distance of 1.80 Km. There is no change in the direction of circulation in tribal trail and trail of senses.

As far as night safari is concerned the visitors will reach the entrance plaza by the proposed approach road. From the entrance plaza the visitors will enter the night safari moving from left to right covering a distance of 5.30 Km in specially designed vehicle. The visitor will find the animals displayed on taxonomic theme. In between, the visitors will come across a break point where visitors can relax, have refreshments and experience the two amusing walking trails displaying exotic bird species & small Asian species covering a walking journey of around 0.8 kms and further resume their journey for the forthcoming exhibits. It will be an exciting experience for the visitors to see and know about endemic and exotic animals.

4.5 Services: - The zoo proposes to provide services for its operation and maintenance in the following ways:-

1. **Supply of feed and essential items:** - For this a service gate has been proposed from the Nagpur - Katol highway. Majority of the services will be under taken through this gate. Service roads parallel to main loop road but behind the enclosures have been created for

unobstructed movement of service vehicle for supply of feed items to animals. The service gate and the network of service roads can be seen in the layout plan.

2. Internal services like water management system, sewerage system, drainage system and electricity system are described below.

4.5.1 Solid waste disposal: - The solid waste of the park will consist of following materials.

- (1) Leftover food
- (2) Fecal matter
- (3) Fallen leaves
- (4) Grasses
- (5) Visitors left over
- (6) Office waste.

It has been proposed to segregate the non bio-degradable waste. This waste will be disposed off by the authorized outsourced agency at the authorized corporation site. The bio-degradable waste will be used to make manure and for vermiculture and the same will be used for horticulture purpose.

4.5.2 Water Management System / Source of Water: -

Water is lifeline for the human beings, animals & plants. Therefore, it is essential that sufficient water is available for animals, visitors, staff members and irrigation to gardens, plants and nursery. The yearly average rainfall at Gorewada site is about 955 mm. The rainy days vary from 40 to 90 during monsoon (i.e. June to Oct). Many a times there are long dry spells also. Hence it is appropriate to have a permanent water supply source capable to provide water throughout the year, especially during non-monsoon period.

As per the Master Layout Plan, majority of activities except the Night Safari are on southern side of Gorewada forest land. However no water body exists in this part of the site. But the project is spread over a large area with lot of landscaped areas. It also has various amenities which will encourage need of both potable and non-potable water in large quantity. Therefore creating a separate permanent water source would be preferable for long term. Hence apart from

few bores / wells, it is proposed to create an independent water source on the southern side with the following objectives:

1. To cater to the needs of animals in zoo.
2. To cater to the drinking water, hygiene & sanitation needs of tourists & staff.
3. Irrigation facility for gardens, plants, plant nursery & plants to be raised on barren land / bushy forest.
4. To develop & preserve aquaculture.
5. To increase the scenic beauty of the zoo area.

The other incidental benefit of this water source will be as follows:

1. Increased ground water level in the area; and,
2. Reduction in deposition of sediments in Gorewada lake

This site is located on local Nalla about 0.75 km upstream of existing road bridge on Nagpur Katol state highway. After construction of Dam, this site will have large water spread area of 21 ha at full tank level (FTL) i.e., 226.00 mt. and 5.33 ha water spread at the end of summer and 0.803 Mm³ maximum water storage at FTL. (The location of proposed water body have been annexed as Annexure – 13)

Water Requirement: -

The provision of safe drinking water takes precedence in order for provision of basic amenities of the visitor but sanitation and waste water disposal and management are equally necessary. The importance of low cost on-site sanitation for the waste water which will be generated by the use of the toilets will have to be considered so that it can be treated and properly reused for flushing, washing and landscaping purpose.

The requirement of water has been calculated in such a manner that it will be able to cater the needs up to 30 years from the present date as per CPHEEO manual.

The water requirement calculation for desired no. of users is as shown below: -

For visitors:

Sr. No.	No. of visitors expected on peak day in initial years	Increase in no. of visitors expected during subsequent years
1	10000 head counts	10000 X 2 = 20000

Master Plan of Zoological Park and Rescue Centre, Gorewada

For staff:

Sr. No.	Initial staff including floating staff	Increased no. expected during subsequent years
1	400 + 600 = 1000 Persons	1000 X 1.25 = 1250

Out of the total staff of 1250, 150 have been assumed to be residing at the premises. They & their family members (Total: 150 X 5 = 750 persons) will consume around 155 liters of water per day. The water requirement for the remaining staff members (About 1100 persons) has been added to the requirement of the visitors. Hence the total number of visitors to be taken for calculation of water requirement will be 20000 + 1100 = 21100.

The drinking water requirement of Animals works out as approximately 10000 liters per day.

The calculations for *potable* water requirement are shown in the table below:-

Sr. No.	Description	No of Persons/ Seats	Standard Consumption per person / seat per day (LPCD)	Total
1	Staff	750	155 LPCD	116250
2	Drinking water for visitors	21100	5	105500
3	Restaurant	4000 Seats	70 Liters per seat	280000
4	Wash Basins in toilets	10000	5 Liters per head	50000
5	Drinking water requirement for animals		L.S.	100000
6	Veterinary Hospital	35 Nos	155	5425
7	Laundry		L.S.	10000
8	Animal Houses		L.S.	40000
Total Water Requirement Per Day				707175 Liters Per day
Say				710000 Liters Per Day

The total potable water requirement per day works out to 7.1 lakhs litres per day that means for 365 days the total requirement will be 7.1 X 365 = 2592 lakh litres i.e. 260 ML per year.

Master Plan of Zoological Park and Rescue Centre, Gorewada

For staff:

Sr. No.	Initial staff including floating staff	Increased no. expected during subsequent years
1	400 + 600 = 1000 Persons	1000 X 1.25 = 1250

Out of the total staff of 1250, 150 have been assumed to be residing at the premises. They & their family members (Total: 150 X 5 = 750 persons) will consume around 155 liters of water per day. The water requirement for the remaining staff members (About 1100 persons) has been added to the requirement of the visitors. Hence the total number of visitors to be taken for calculation of water requirement will be 20000 + 1100 = 21100.

The drinking water requirement of Animals works out as approximately 10000 liters per day.

The calculations for *potable* water requirement are shown in the table below:-

Sr. No.	Description	No of Persons/ Seats	Standard Consumption per person / seat per day (LPCD)	Total
1	Staff	750	155 LPCD	116250
2	Drinking water for visitors	21100	5	105500
3	Restaurant	4000 Seats	70 Liters per seat	280000
4	Wash Basins in toilets	10000	5 Liters per head	50000
5	Drinking water requirement for animals		L.S.	100000
6	Veterinary Hospital	35 Nos	155	5425
7	Laundry		L.S.	10000
8	Animal Houses		L.S.	40000
Total Water Requirement Per Day				707175 Liters Per day
Say				710000 Liters Per Day

The total potable water requirement per day works out to 7.1 lakhs litres per day that means for 365 days the total requirement will be 7.1 X 365 = 2592 lakh litres i.e. 260 ML per year.

The components of the water supply will be as below: -

- 1) Jack well cum Intake well with overhead pump house in the water body with matching contours so that the water can be pumped to water treatment plant at any season. The well will be of 6.0 mts dia and 8.0 mts below the G.L.
- 2) Approach bridge of 4.5 mts width so that the water can be transmitted to the Water treatment plant and can be used as an approach for the maintenance of pumping machinery. The approach bridge will be at least 1.2 mts above the HFL.
- 3) Raw Water Pumping Machinery probably Submersible pumps with 100% standby of appropriate capacity will be installed in the Jack Well.
- 4) Water Treatment Plant (Unconventional Type) of 1.0 MLD capacity with Underground sump of minimum capacity of 2.0 Hrs i.e 1.0 Lakh capacity will be constructed.
- 5) Pure water pumping machinery of required capacity will be installed to fill the RCC ESR.
- 6) Pure water rising main DI / HDPE to fill the RCC ESR.
- 7) RCC ESR of Capacity 15.00 Lakhs litres of 18.00 Mts staging height. The capacity of RCC ESR is taken as 15.00 Lakhs litres so that we have an extra storage of around 10.00 Lakhs litres so that in case of any breakdown, the visitors and animals will not have to suffer for the short fall for at least total of 3 days. Moreover the extra stored water can be used for natural calamity such as to control the fire, if it occurs.
- 8) Distribution system either of DI / HDPE pipes of various diameters as per the design.
- 9) Bore wells at required points. The quality of bore well water is tested and the results from the Public Health Laboratory, Govt. of Maharashtra are attached in **Annexure - 14** for ready reference. As per the report the water is fit for consumption after some primary treatment. So the bore wells also can be dug to cater to the short fall if any for requirement of potable water.

(The layout plan of potable and non-potable water supply have been annexed as **Annexure - 15 & Annexure - 16** respectively)

4.5.3 Sewerage System: -

The daily Sewerage generation will be 80% of the water supply of 710000 plus the sewerage generated from the flushing of urinals and WC which will be 10 litres per usage of around 10000 i.e. 100000 liters per day. That means that the sewerage to be treated will be $568000 + 100000 = 668000$; say 770000 LPD. (The plan of sewage disposal system has been annexed as **Annexure - 17.**)

The components of the sewage system will be as below:-

- 1) Network of HDPE SN8 of required diameters as per the detailed design with chambers at 30 mts intervals and at turning points.
- 2) Decentralized STP 5 nos at different locations each of capacity 200 CuM either of SBR, MBBR or technology of NEERI, Nagpur so as to reduce the BOD concentration to below 5.00. The treated water will have to be disinfected before using it for toilets. But the treated water that will be used for landscaping need not be disinfected.
- 3) Conveyance of the treated water with the help of network of HDPE SN8 Pipes.

4.5.4 Storm Water Network: -

To avoid water logging and ensure speedy flow of rain water it is essential to lay a proper network of storm water drainage with chambers at regular intervals. If the layout is not proper the water logging will take place and it will be harmful for the animals. It is also essential to ensure uninterrupted Zoo operations throughout the year. (The plan of storm water disposal system has been annexed as **Annexure - 18.**)

The components of Storm water network pipes will be as below: -

- 1) Network of non pressure HDPE SN8 with chambers with proper grillage so that water only enters through the openings at 30 mts interval and at turning points.
- 2) Proper water filter unit before releasing water into the water body.

4.5.5 Electricity supply system:

Lighting ideation of Gorewada Zoo: -

The Lighting Concept / Design Basis: The basic approach to lighting design in this project of National Importance would be as under.

- Areas like parking points would comply to IS 1944 (pt-1):1970 for group A & B roads as well IS 1944 (pt-5): 1980 for group D roads.
- Retail Spaces and other common area's (Indoor) would comply to IS 3636 (Part 1):1990 and subsequently different sections under this standard for relevant portions.
- The light sources used will have low mercury content avoiding / reducing environmental impact as per new green building norms.
- The streetlight in many places in service roads, watch towers etc. would be LED based luminaires with self-generating solar energy panel integrated to the units, thus leading to green energy usage and green lighting.
- The landscape lighting will be based on selective highlighting to create contrasts and will avoid light pollution.
- The Night Safari will have High mast Lighting which will be Umbrella type. This will reduce enhance the dark sky effect and reduce spill over light to the horizon which is a grave environmental concern. The luminaires used in these High masts will be Dark Sky Compliant and the light source will be LED. This type of fixtures is environmental friendly. The entire lighting in the exhibit area will be based on dimming in co-relation with waxing and waning of moonlight under real time clock. The lights will be programmed to shut off automatically a pre-determined time of night when the night safari closes. This will ensure the body clocks (Circadian rhythm) of the exhibits are not disturbed. Thus leading to happier exhibits and an adventurous environment for the tourist.

To sum it up the proposed lighting is task based, conforming to latest green norms, and are exhibit friendly. (The plan of electricity supply system has been annexed as **Annexure - 19.**)

Master Plan of Zoological Park and Rescue Centre, Gorewada

Power requirement of each component is as given below:

Zoological Park and Rescue Centre at Gorewada DG Load Forecast					
Sr. No.	Zone	Grid power in watts	Solar power in watts	Total power in watts	Emergency power through generator in watts
1	GOREWADA RESERVE	0	13820	13820	0
2	INDIAN SAFARI				
	Service Road 4m wide	1800		1800	1800
	Entrance Gate 2 Nos (Entry and Exit)		48	48	
	A - Tiger safari				
	Entrance Double Gate 2 Nos (Entry and Exit) of size 20 m X 8 m		48	48	
	Animal House		5540	5540	
	Exhibit area, Holding Area, Feeding Area	180		180	180
	Equipment & Materials	2500		2500	1000
	B - Bear Safari				
	Entrance Double Gate 2 Nos (Entry and Exit) of size 20 m X 8 m.		48	48	
	Creation of Ponds/water bodies/water holes	345		345	
	Animal House	180		180	180
	Equipment & Materials	2500		2500	1000
	C - Leopard Safari				
	Entrance Double Gate 2 Nos (Entry and Exit) of size 20 m X 8 m		48	48	
	Animal House		5540	5540	
	Exhibit area, Holding Area, Feeding Area	180		180	180
	Equipment & Materials	2500		2500	1000
	Signages	1800		1800	
	D - Herbivore Safari Composite				
	Entrance Double Gate 2 Nos (Entry and Exit)		48	48	
	Chain Link fencing 2.5 m high. Wire mesh size 7.5 cm X 7.5 cm X 10 g.	5220		5220	1000
	Beautification and Landscaping near Entrance/ Exit of safari & Break Point	500		500	500
	Sprinklers and Irrigation system	50		50	
	Animal House & Kraal area		2500	2500	
3	AFRICAN SAFARI				
	Outer Chain link fencing 2.5 M Height	5220		5220	1000
	Visitors Road 4 m wide	2400		2400	2400

Master Plan of Zoological Park and Rescue Centre, Gorewada

	Service Road 4 m wide		2465	2465	
	Entrance Gate 2 Nos (Entry and Exit)		48	48	
	A - Lion Safari				
	Entrance Double Gate 2 Nos (Entry and Exit) of size 20 m X 8 m.		48	48	
	Animal House		2500	2500	1000
	B - Herbivore Safari Composite				
	Entrance Double Gate 2 Nos (Entry and Exit)		48	48	
	Chain Link fencing 2.5 m high. Wire mesh size 7.5 cm X 7.5 cm X 10 g.	5220		5220	1000
	Beautification and Landscaping near Entrance/ Exit of safari & Break Point	500		500	500
	Sprinklers and Irrigation system	50		50	
4	BIRD PARK				
	Beautification and Landscaping near Entrance/ Exit	500		500	150
	Sprinklers and Irrigation system	50		50	
	Creation of Pond	500		500	
	Creation of water bodies/water holes	500		500	
	Plantation 40% Of 8 ha	75000		75000	7500
	Exhibit Area:-It will be covered with wire mesh viewing will be through toughened glass of size 3 x 2 mtr.	12000		12000	4000
	Birds house (200 sqm) With Brickwork & fabrication grill in Front and side	18000		18000	5000
	Providing & fitting 0.8 ha area (4 X 2000 sq. mt. each) with net all around on a central pole of 20 m height. Side walls to be covered with net supported by M S pole & other required accessories. It will have plantation , fruit and seed bearing trees, bird houses etc.	7500		7500	1000
	Washrooms	1000		1000	1000
	Rest Area / Baby care	5310		5310	2000
	Kiosks & Sheds	10790		10790	3500
	Beautification and Landscaping	3600		3600	
5	ENTRY PLAZA (MAIN)				
	Entrance gate 2 nos 18 m wide	4800		4800	4800
	Security Posts	15400		15400	15400
	Concrete Road 0.708 Km 15 m wide	18000		18000	6000
	Plantation 30% of 15 Ha				
	Fountain / culture / hardscape	2000		2000	
	Signages / interpretive & Graphics	2250		2250	2250

Master Plan of Zoological Park and Rescue Centre, Gorewada

	Landscape, beautification, hardscape & related activities. 15% of 15 Ha	10000		10000	
	Pedestrian pathway 3.0 m wide of granite gattu on WBM road surface	1620		1620	1620
	Pickup & Drop. Point(Bus stop /Taxi Stand/Cars) with semi covered sheets	1620		1620	1620
	Entrance Plaza building (2000 sqm), Information centre (1000 sqm), Ticketing Booth (200 sqm), Rest room Wash rooms(300 sqm), Baby Care room (200 sqm), Coffee / Tea Shops (300 sqm), Cafeteria(500 sqm), Administrative Office(1000 sqm), Souvenir Shops (200 sqm), Cloak Room (200 sqm),First Aid room(100 sqm)	236000		236000	80000
	Museum/interpretation center (1000 sqm), open air theater(1000 sqm), Signages/graphics	95100		95100	5000
	Adventure Park, Children Play Area, wash rooms	18150		18150	5000
	Safari Pickup Point (Semi covered Sheds)	900		900	900
6	BUFFER ZONE & LAND DEVELOPMENT				
	Service Road 4.0 m wide	5160		5160	5160
	Watch Tower		48	48	
7	ANIMAL CARE CENTRE				
	Veterinary hospital	53400		53400	25000
	Quarantine	17500		17500	17500
	Laboratory	14900		14900	8000
	Recuperation Area	6900		6900	6900
	Commissary	6900		6900	6900
	Admin.	106800		106800	20000
8	NIGHT SAFARI				
	Visitors Road 4m wide	2520		2520	2520
	Service Road 4 m wide	2280		2280	2280
	Entrance Gate 2 Nos double safety		24	24	
	Animal House		76950	76950	
	Exhibit area, Holding Area, Feeding Area, Moats	42000		42000	42000
	Signages / interpretive & Graphics	1800		1800	1800
	BUFFER ZONE OF NIGHT SAFARI				
	Service Road 4.0 m wide	2400		2400	2400
	ENTRY PLAZA NIGHT SAFARI				
	Parking area development, Ground	2700		2700	2700

Master Plan of Zoological Park and Rescue Centre, Gorewada

	Development, Divider, Kerbing stones and B.T. surface area over W.B.M.			
	Pedestrian pathway 3.0 m wide of granite gattu on WBM road Surface	450	450	450
	Pickup & Drop Point(Bus stop /Taxi Stand/Cars) with semi covered sheets	270	270	270
	Entrance Plaza building (500 sqm) and Entrance gate, Information centre (300 sqm), Ticketing Booth (150 sqm), Rest room Wash rooms (250 sqm), Baby Care room (200 sqm), Coffee / Teashop (200 sqm), Cafeteria (400 sqm), Administrative Office (500 sqm), Souvenir Shops (200 sqm), Cloak Room (100 sqm), First Aid room (100 sqm)	236000	236000	75000
	Children Play Area.	7200	7200	2000
	Safari Pickup Point(Semi Curved Sheds)	900	900	900
	Landscape, Beautification, Hardscape & Related activities.	12500	12500	
9	BIO PARK			
	Entrance Gate 2 Nos Entry \ Exit	405	405	200
	Visitors Road 4m wide	2400	2400	2400
	Service Road 4m wide	1200	1200	1200
	Animal House	9000	9000	9000
	Exhibit area, Holding Area, Feeding Area, Moats etc.- Total area 81082 sqm	20000	20000	10000
	Fencing of exhibit area			
	Beautification and landscaping (5% of balance area i.e. 50.0-8.10 = 41.90)	12500	12500	
	Rest area / Baby care / Wash rooms	5000	5000	1000
	Kiosks & sheds	9560	9560	2500
	Signages / graphics	1800	1800	1800
10	TRAIL OF SENSES			
	Beautification and Plantation (60% of 10 Ha)	12500	12500	
	Signages /Audio systems	1800	1800	1800
	Rest area/wash area	8150	8150	2000
	Kiosks	10450	10450	
11	TRIBAL VILLAGE TRAIL			
	Wash Room\Tea coffee shop / kiosks	14000	14000	5000
	Signages	900	900	900
	10 scenes depicting various activities such as Live Village (12 to 15 Huts), Market Activity, Weapons display, Cultural Performance, Vegetation / animals display,	900	900	

Master Plan of Zoological Park and Rescue Centre, Gorewada

	Cultivations / cattle , Fishing / Boat display			
12	DEEP TIME TRAIL			
	Beautification and Plantation 10% of 5 Ha	12500	12500	
	Wash Room / Tea coffee shop / kiosks	14000	14000	5000
	Signages	900	900	900
	12 scenes depicting stages of evolution	900	900	
13	WATER SUPPLY SCHEME & DISTRIBUTION:			
	Water Treatment Plant	35000	35000	
14	SEWERAGE SYSTEM LINE			
	Sewage Treatment Plant	35000	35000	
15	Housing Area for staff and Administrative buildings			
	Housing area	212660	212660	50000
16	Service Block (Elevated Service Reservoir, Sump well & related development, Pump house, Office block)			
	Office Building	42532	42532	18000
	Pumping	19000	19000	19000
	Miscellaneous + African village	100000	100000	10000
	GRAND TOTAL	1677372	109771	1787143
				521960

Considering the above forecast and future requirements of the project, the total power requirement is anticipated to be 2000 Kw.

The auxiliary power in event of power failure will be provided through Silent Diesel Generating sets as approved by the government of India under latest noise pollution standards.

The capacity of the DG sets will be 3 nos 250 Kva under AMF and sync panel which will automatically start and shut down based on load sensing. This will save valuable diesel as it may not be necessary to use all the 3 nos DG at the same time.

4.6 Animal section: - The importance of a zoo depends upon the quality of exhibits rather than the number of species it displays. This section is responsible for the upkeep of animals and their houses so that they get a hygienic and naturalistic environment in the zoo. The animals will be kept in enclosures which provide them adequate space in quality and quantity and satisfy the biological needs of each individual species. Adequate measures will be taken to ensure the safety of animals, caretakers and visitors. Each enclosure will have proper drainage of excess water and arrangements for removal of excreta and residual waste so that a high standard of sanitation and hygiene would be maintained. The animals will be acquired from foreign and Indian zoos or through rescue.

4.6.1 Duties & responsibilities of this section will be as under:-

1. To ensure cleanliness and maintenance of enclosures, animal houses and surroundings.
2. To ensure daily optimum supply of ration and water to animals and birds and to submit regular ration requisition according to individual need.
3. To report and record of health, breeding and feeding conditions of animals daily.
4. To ensure safe capturing, crating and translocation of animals.
5. To keep liaison with Veterinary section for health problems and treatment of animals.
6. To keep liaison with construction and maintenance section for repairs of damaged enclosures, cages, doors, gates, other structures and miscellaneous works to prevent escape of animals.
7. To maintain records of all livestock, food distribution and inventories.
8. To prepare and submit report of animals section.

4.6.2 Equipment and vehicle requirement: - Following vehicles, equipments and implements will be required to run this section smoothly.

1. Animal crates (carnivore, herbivore, monkey, and birds) -15
2. Trolley for carrying animal crates – 2
3. Hand trolley – 50
4. Squeeze cage (mobile) – 2

Master Plan of Zoological Park and Rescue Centre, Gorewada

5. Pressure pumps -20
6. Basket – 100
7. Daav (meat cutter) – 20
8. Knife – 20
9. Broom – 100
10. Turmeric powder – 20 kg
11. Rubber pipe – 1000 mtr
12. Oil and grease - 5 kg
13. 4 wheeler – 2
14. 2 wheeler - 3
15. Bi-cycle – 3
16. Computer - 4
17. Furniture as per need
18. Telephone
19. Intercom
20. Miscellaneous items
21. Safari vehicle - 2

4.6.3 Staff requirement: - Following staff will be needed in this section:-

Proposed Staff			
S. No.	Post	No. of Post	Pay Scale
1	Curator (Animal) or ACF	2	9300 - 34800 + 4600 GP
2	Asst. Curator - or Range officer (Animal)	3	9300 - 34800 + 3600 GP
3	Deputy Ranger or Head Zookeeper	3	5200 - 20200 + 2100 GP
4	Driver (Curator vehicle)	2	5200 - 20200 + 1900 GP

Master Plan of Zoological Park and Rescue Centre, Gorewada

5	Indian Safari		
	Zoo keeper	4	4400 - 7440 + 1600 GP
	Asst Zoo Keeper	4	4400 - 7440 + 1300 GP
	Gate keeper	8	4400 - 7440 + 1300 GP
	Safari vehicle driver	2	5200 - 20200 + 1900 GP
	Safari vehicle attendant	2	4400 - 7440 + 1300 GP
	African Safari		
	Zoo keeper	2	4400 - 0 7440 + 1600 GP
	Asst zoo keeper	2	4400 - 7440 + 1300 GP
	Gate keeper	4	4400 - 7440 + 1300 GP
	Bio - Park		
	Zoo keeper	17	4400 - 7440 + 1600 GP
	Asst zoo keeper	35	4400 - 7440 + 1300 GP
	Birds Park		
	Zoo keeper	6	4400 - 7440 + 1600 GP
	Asst. zoo keeper	14	4400 - 7440 + 1300 GP
	Night Safari		
	Zoo keeper	9	4400 - 7440 + 1600 GP
	Asst. zoo keeper	15	4400 - 7440 + 1300 GP
	Deep Time Trail		
	Keeper	1	4400 - 7440 + 1600 GP
Asst. Keeper	4	4400 - 7440 + 1300 GP	
Trail of senses			
Keeper	1	4400 - 7440 + 1600 GP	
Asst. Keeper	4	4400 - 7440 + 1300 GP	
Tribal Trail			
Keeper	1	4400 - 7440 + 1600 GP	
Asst. Keeper	4	4400 - 7440 + 1300 GP	
6	Curator / ACF vehicle driver	2	5200 - 20200 + 1900 GP
7	Office Attendant	4	4400-7440+ 1300 GP
8	Weekly off and leaves 20% of total of zoo keeper and Asst. zoo keeper (refer page no. 83-84)		
	Zoo keeper	8	
	Asst. keeper	16	

4.6.4 Brief of animal enclosures to be constructed: -

The Zoological and Safari park at Gorewada is proposed to be of international standards and will follow world's-best-practice in zoo design at par with other world's renowned Zoos (like Singapore Zoo & Night Safari; Whipsnade Zoo, London; San Diego Zoo, USA; Hamburg Zoo, Germany, etc.) in terms of visitor's experience, exhibit display, animal management, park management, visitor's facilities, etc. Key criteria will be followed, including but not limited to:

The biological needs of the animals: Environments will be created that reflect the habitat of the species being displayed. The essential elements of suitably abundant space, appropriate landscape forms and natural vegetation will provide an engaging context for animal lives. The comfort and well-being of the animals will be the paramount concern, providing the foundation upon which the other essential elements of aesthetic and educational value and operational efficiency are built. Support facilities for animals will be focused on the professional delivery of their daily care and welfare, and will use materials and designs that provide utility and comfort for animals as well as ease and efficiency for animal care staff.

The exciting engagement of zoo visitors: Exhibits will be grouped according to biological themes. Exhibits will be designed and arranged to immerse visitors in simulated natural landscapes, using the elements of natural vegetation and apparent land forms to define exhibit areas, to contain animals, and to present an authentic experience of natural habitats and the way of life followed by each species. The focus will be on creating inherently educational settings that provide multiple opportunities for educational messages and information, performances and art works of quality.

The appreciation and utilization of the animals and their exhibits as a conservation resource: Exhibit-support facilities will be designed to support animal populations that directly contribute to breeding programs recognized by the Central Zoo Authority. This will require the selective creation of support facilities in which numbers of animals may be held for breeding purposes. These support facilities will meet the biological needs of animals to the same quality and standard as the exhibit displays, ensuring the health and well being of all of the animals in the zoo.

Sound environmentally sustainable design: Exhibits will be designed to minimize the ongoing use of energy and natural resources in their daily operation. Durable materials, with

the potential for future recycling, from sustainable sources, will be used wherever possible. The emphasis will be away from architectural statements and grand-designs towards sympathetic, naturalistic structures and forms that reflect the landscapes and natural history of India. Renewable energy sources will be employed wherever practical. The carbon footprint of the zoo will be minimized and its exemplary approach to environmental sustainability will, in itself, be openly featured.

The aesthetic integrity of the entire development: Everywhere the aim of the design will be to create a sense of harmony and unity of design. Discordant functional elements will be hidden. Fences, barriers, roof-lines and all structural elements will harmonize with the naturalistic exhibits.

Operational efficiency and life-span issues: Designs will be focused on ease of access for regular maintenance, replacement of components and future deconstruction of recycling and alternative use. It is a hallmark of progressive zoos that they change and evolve continuously. This will be recognized in the design of all facilities.

1. Indian Safari:-

Cell size (in mtr)			Area proposed for enclosure (sq mt)	Remarks
L	B	H		
Indian Tiger Safari	25 ha.			<p>This will be a drive through enclosure in which entry and exit will be through a system of double gates. There will be sufficient space between the gates to allow the entry of visitors' vehicle.</p> <p>The visitor vehicle will be a specially designed bus with adequate protective measures.</p> <p>This vehicle will move on the designated road inside the safari at low speed.</p> <p>The whole area of the safari will be covered by 5 cm x 5 cm x 8 g chain link fence of the height of 5 mtr and 1.5 mtr inverted at the top at 60 degree in</p>
2.75	1.80	3		
Sloth Bear Safari	25 ha.			
2.50	1.80	2.50		

Master Plan of Zoological Park and Rescue Centre, Gorewada

<p>Leopard Safari</p> <p>2 1.80 2.50</p>	<p>25 ha.</p>	<p>case of Tiger, however in sloth bear and leopard the inclined inverted steel plate of one meter width will be placed at 60 degree.</p> <p>For herbivore chain link fence of 3 mtr in height with 75 cm x 75 cm x 10 grams will be used. Hot wire along the inside of chain link fence will be provided. There will be 3-4 kraals of size between 60 sq mtr to 100 sq mtr will be provided for isolation and treatment.</p> <p>The whole area will have adequate vegetation & sheds. It will have scattered water bodies following contours.</p>
<p>Herbivore Safari</p> <p>Kraals of different size</p> <p>(Black buck, Cheetal, Sambhar, Nilgai, Gaur, Wild ass)</p>	<p>40 ha.</p>	

2. African Safari:-

Cell size (in mtr)	Area proposed for enclosure (sq mt)	Remarks
L B H		
<p>African Lion Safari</p> <p>2.75 1.80 3</p>	<p>25 ha.</p>	<p>As given in the Indian safari.</p>
<p>Herbivore Safari</p> <p>Kraals of different size</p> <p>(Giraffe, Zebra, Wild beast, Impala, Ostrich, White Rhino)</p>	<p>40 ha.</p>	<p>As given in the Indian safari except the height of fence which will be 6 mtr.</p>

3. Bio – Park :-

Cell size (in mtr)			Area proposed for enclosure (sq mt)	Remarks
L	B	H		
1. African Zone				
Cheetah				
2	1.80	2.50	1000	<p>The Cheetah will be displayed in open enclosure where the viewing will be through toughened glass fixed at atleast 2 places for unhindered viewing or through fence.</p> <p>The remaining sided will be fenced with 4 mt high chain link fence of 1.5" x 1.5" x 8 grams with inverted steel plate of 1 mtr width at top at 60 degree.</p> <p>The fenced sides will have over grown shrubs to conceal the metallic parts.</p> <p>Enrichment:</p> <p>(1) Shady trees of moderate height will be provided.</p> <p>(2) Scratching logs will be provided.</p> <p>(3) A wooden ladder will be provided to climb up.</p>
Hippo				
5	3	2.50	2000	<p>The whole area will have stone or brick wall of height 1.5 mtr from inside & elevated path for visitors from outside around it. The area will be divided into two parts with a partition wall and a sliding door for the movement of animals from one side to another side. Each part will have a water body of about 300 sq mtr with a depth of 2 mtr in the centre. The water body will be a saucer shape. It will have cemented floor. There will be provision for the inlet and outlet of water. Rest of the area will be kaccha except feeding kraal. The visitors will be able to see from the elevated path.</p>

Master Plan of Zoological Park and Rescue Centre, Gorewada

<p style="text-align: center;">Zebra</p> <p>3 2 2.50</p>	<p style="text-align: center;">2000</p>	<p>The front or viewing sides of enclosure will have V-shaped dry moat with a depth of 2.5 mtr and width of 6 mtr. The moats can be covered with vegetation to hide them and to create a naturalistic environment. The remaining sides will be covered with 7.5 cm x 7.5 cm x 10 gms chain link fence of 2.5 mtr high. The fenced sides will have over grown shrubs to conceal the metallic parts.</p> <p>Enrichment:</p> <p>(1) Groove of bushes will be provided. (2) Adequate trees will be planted for shade. (3) Salt lick blocks will also be kept. (4) Food will be provided at 2-3 places.</p>
<p style="text-align: center;">Giraffe</p> <p>8 5.50 6</p>	<p style="text-align: center;">3000</p>	<p>The front or viewing sides of the enclosure will have V-shaped dry moat with a depth of 2.5 mtr and width of 5 mtr. Remaining sides will be covered with 7.5 cm x 7.5 cm x 10 gms chain link fence of 2.5 mtr high.</p> <p>A rail barrier with 1 mtr high will be provided all along the moats and fence. This will help to check the falling of animal in to the moat. The fenced sides will have over grown shrubs to conceal the metallic parts.</p> <p>Enrichment:</p> <p>(1) Adequate trees will be planted for shade. (2) Food will be provided at height at 2-3 places.</p>

Master Plan of Zoological Park and Rescue Centre, Gorewada

<p style="text-align: center;">African lion</p> <p style="text-align: center;">2.75 1.80 3</p>	<p>3000</p>	<p>The viewing sides will have V-shaped dry moat with depth of 5 mtr and horizontal width at the top as 8 mtr. To rule out any chance of its escape by developing speed and crossing the moat in a long leap, the ground slope will be kept downward.</p> <p>The remaining sides will be covered with 5 cm x 5 cm x 8 g chain link fence, with height of 5 mtr and 1.5 mtr inverted at the top at 60 degree angle.</p> <p>The fenced sides will have over grown shrubs to conceal the metallic parts.</p> <p>Enrichment:</p> <ol style="list-style-type: none"> (1) Shady trees of moderate height will be provided (2) Groove of bushes will be provided (3) Shelters / den will be made (4) Scratching logs will be provided (5) Pools / streams will be made.
<p style="text-align: center;">Scared Baboon</p> <p style="text-align: center;">2 1.50 2.50</p>	<p>1500</p>	<p>The enclosure will be an island type having a U or V-shaped dry moat all around with a depth of 5 mtr and width of 7 mtr for langur or install a chain link fence of 5 cm x 5 cm x 10 g with 5 mtr in height having inward steel plate of 1.50 mtr in length at 60° all around.</p> <p>It will have moat wall of 0.90 mtr in height and stand of barrier. If moat is kept full of water, power fence will be provided on the inner sides of moat wall.</p> <p>Enrichment:</p> <ol style="list-style-type: none"> (1) Trees and logs shall be provided. (2) Small logs will be fixed in cubicles. (3) Adequate shelter will be provided. (4) Food will be provided 3- times a day.

2. Central India					
2	Rhesus Monkey	1.50	2.50	1000	<p>The enclosure will be an island type having a U or V-shaped dry moat all around with a depth of 4 mtr and width of 6 mtr or install a chain link fence of 5 cm x 5 cm x 10 grams with 5 mtr in height having inward steel plate of 1.50 mtr in length at 60° all around.</p> <p>It will have moat wall of 0.90 mtr in height and stand of barrier. If moat is kept full of water, power fence will be provided on the inner sides of moat wall.</p> <p>Enrichment:</p> <ol style="list-style-type: none"> (1) Trees and logs shall be provided. (2) Small logs will be fixed in cubicles. (3) Adequate shelter will be provided. (4) Food will be provided 3- times a day.
3	Cheetal	2	2.50	4000	<p>The front or viewing sides will have V-shaped dry moat with a depth of 2.5 mtr and width of 6 mtr. The remaining side will be covered with 7.5 cm x 7.5 cm x 10 g chain link fence of 2.5 mtr high. The moats will be covered with plantation whereas fenced sides will have over grown shrubs to conceal the metallic parts.</p> <p>Enrichment:</p> <ol style="list-style-type: none"> (1) Groove of bushes will be provided. (2) Adequate poles / logs to rub horns / antlers and scratching will be fixed. (3) Salt lick blocks will also be kept. (4) Food will be provided at 2-3 places.

Master Plan of Zoological Park and Rescue Centre, Gorewada

<p style="text-align: center;">Fox</p> <p>2 1.50 2.50</p>	<p style="text-align: center;">500</p>	<p>The front or viewing side will have V-shaped dry moat (flat bottomed) with depth of 2.6 mtr and width of 5 mtr.</p> <p>The remaining sides will be covered with 5 cm x 5 cm x 10 gms chain link fence of 2.5 mt high.</p> <p>The fenced sides will have over grown shrubs to conceal the metallic parts.</p> <p>Enrichment:</p> <ol style="list-style-type: none"> (1) Burrows / dens will be made. (2) Small old logs will be fixed for playing. (3) Carcass feeding will be done. (4) Groove of bushes will be provided.
<p>Tiger and White Tiger</p> <p>2.75 1.80 3</p>	<p style="text-align: center;">3000</p>	<p>The front or viewing sides will have V-shaped dry moat with depth of 5 mtr and horizontal width at the top 8 mtr.</p> <p>To rule out any chance of its escape by developing speed and crossing the moat in a long leap, the ground slope will be kept downward.</p> <p>The other sides will be covered with 5cm x 5cm x 8g chain link fence, with height of 5 mtr and 1.5 mtr inverted at the top at 60 degree angle.</p> <p>The fenced sides will have over grown shrubs to conceal the metallic parts.</p> <p>Enrichment:</p> <ol style="list-style-type: none"> 1. Shady trees of moderate height will be provided 2. Groove of bushes will be provided 3. Shelters / den will be made 4. Scratching logs will be provided 5. Pools / streams will be made.

Master Plan of Zoological Park and Rescue Centre, Gorewada

Four horned antelope	1500	As given in cheetal.
3 2 2.50		
Jackal	500	As given in fox.
2 1.50 2.50		
Hyena	800	As given in fox.
2 1.50 2.50		
Bonnet Macaque	1000	As given in Rhesus monkey.
2 1.50 2.50		
Ratel	350	The viewing will be through huge toughened glass fixed at one place for unhindered viewing or through fence. The enclosures will be covered on remaining sides with 1.5" x 1.5" chain link fence. The fenced sides will have over grown shrubs to conceal the metallic parts. Enrichment: (1) Small bushes will be provided. (2) Burrows / dens will be made. (3) Wooden ladder will be provided. (4) Cubicles will have darkness.
2 1.50 2.50		
Indian Lion	3000	As given in Tiger.
2.75 1.80 3		
Black buck	4000	As given in Cheetal.
3 2 2.50		
3. South India		
Gaur	2500	As given in Zebra.
3 2 2.50		

Master Plan of Zoological Park and Rescue Centre, Gorewada

Marsh Crocodile -----	1000	<p>The enclosures will have water body of about 300 sq mtr with a depth of 2 mtr will be developed. The rest of the area will have sand and soft soil. There will be an inlet and outlet to maintain the water level. The visitors will view the exhibits from the elevated path from outside around it.</p> <p>It will be covered by 2" x 2" chain link fence all around. The height of the chain link fence will be 2.50 mtr.</p> <p>There will be a service gate towards the service road in each exhibit.</p> <p>Enrichment:</p> <ul style="list-style-type: none"> (1) Shady trees will be provided. (2) Sand beds will be provided. (3) Flow of water will be maintained to check over heating in summer.
Wild dog 2 1.50 2.50	1000	As given in fox.
Lion tailed macaque 2 1.50 2.50	540	As given in Rhesus monkey.
4. North India		
Wolf 2 1.50 2.50	800	As given in fox.

Master Plan of Zoological Park and Rescue Centre, Gorewada

<p style="text-align: center;">Sloth bear</p> <p>2.50 1.80 2.50</p>	<p style="text-align: center;">3000</p>	<p>The front or viewing sides will have U-shaped dry moat with a depth of 2.5 mtr and width of 5.5 mtr</p> <p>The rest of sides will be covered with brick wall of 4mtr in height or chain link fence of 5cm x5cm x 8g with inclined inward steel plate of one meter width on top at 60 degree.</p> <p>Enrichment:</p> <ol style="list-style-type: none"> (1) The arena will be provided with natural vegetation including trees and tree logs, a pool, elevated wooden platform. (2) Groove of bushes will also be provided. (3) A cave will be provided for breeding and shelter. (4) A ladder to climb up to log will be made. (5) Concealed food will be kept at 2-3 locations.
<p>Himalayan black bear</p> <p>2.50 1.80 2.50</p>	<p style="text-align: center;">3000</p>	<p>As given in sloth bear.</p>
<p style="text-align: center;">Wild boar</p> <p>2 1.50 2.50</p>	<p style="text-align: center;">1500</p>	<p>As given in Cheetal.</p>
<p style="text-align: center;">Leopard</p> <p>2 1.80 2.50</p>	<p style="text-align: center;">1000</p>	<p>As given in Cheetah.</p>
<p style="text-align: center;">Gharial</p> <p style="text-align: center;">-----</p>	<p style="text-align: center;">1000</p>	<p>As given in Crocodile.</p>
<p style="text-align: center;">Barasingha</p> <p>3 2 2.50</p>	<p style="text-align: center;">4000</p>	<p>As given in cheetal.</p>

4. North – East India		
<p>Indian Soft shell turtle</p> <p>---</p>	<p>150</p>	<p>The enclosures will have a water body of 50 sq mtr with a depth of 2 mtr. The rest of the area will have sand and soft soil. There will be an inlet and out let to maintain the water level.</p> <p>The sides will be covered by 2"x 2" chain link fence all around. The height of the chain link fence will be 2.50 mtr.</p> <p>There will be a service gate towards the service road in each exhibit.</p> <p>Enrichment:</p> <ol style="list-style-type: none"> 1. Shady trees will be provided. 2. Sand beds will be provided. 3. Flow of water will be maintained to check over heating in summer.
<p>Mouse deer</p> <p>2 1.50 2.50</p>	<p>300</p>	<p>As given in Cheetal.</p>
<p>Stamped tailed macaque</p> <p>2 1.50 2.50</p>	<p>1000</p>	<p>As given in Rhesus monkey.</p>

Master Plan of Zoological Park and Rescue Centre, Gorewada

6. Nocturnal			
Leopard Cat			
2	1.50	2.50	200
			<p>The viewing will be through huge toughened glass fixed at one place for unhindered viewing or through fence.</p> <p>The remaining sides including top will be covered with 1.5" x 1.5" chain link fence</p> <p>The fenced sides will have over grown shrubs to conceal the metallic parts.</p> <p>Enrichment:</p> <ol style="list-style-type: none"> 1. Small bushes will be provided. 2. Burrows / dens will be made. 3. Small logs will be fixed. 4. Wooden ladder will be provided. 5. Cubicles will have darkness.
Palm civet			
2	1.50	2.50	200
			As given in leopard cart.
Indian small civet			
2	1.50	2.50	200
			As given in leopard cart.
Civet cat			
2	1.50	2.50	200
			As given in leopard cart.
Slow loris			
1.80	1.50	2	100
			It will be similar to the leopard cat but the top will be covered with fence.
Hog badger			
2	1.50	2.50	150
			As given in leopard cat.

Master Plan of Zoological Park and Rescue Centre, Gorewada

2	Pangolin	300	As given in leopard cat.
	1.50 2.50		
2	Porcupine	300	As given in leopard cat.
	1.50 1.50		
2	Indian flying squirrel	150	As given in leopard cat.
	1.50 2.50		
2	Giant squirrel	150	As given in leopard cat.
	1.50 2.50		
1.80	Owlet	100	As given in leopard cat.
	1.50 2		

7. Reptile house

There will be no cell.	Indian Starred Tortoise	- 40 sq mtr	An area of 1000 sq mtr has been kept for the development of reptile house. 10-15 enclosures with display area as per CZA norm will be made. The design of the display area will be such that half of the portion will have access to sun. The viewing will be through glass. A visit to zoo having reputed reptile house will be made and advice of experts will also be sought.
	Indian Monitor Lizard	- 80 sq mtr	
	Dhaman Rat Snake	- 40 sq mtr	
	Indian Cobra	- 40 sq mtr	
	Sand Boa (Eryx sp)	- 40 sq mtr	
	Russel Viper	- 40 sq mtr	
	Banded Krait	- 40 sq mt	
	Rock Python	- 80 sq mtr	
	Reticulated Python	- 80 sq mtr	
	Water Snake	- 40 sq mtr	
Indigenous Lizard	- 40 sq mtr		

8. Mouse Town		
As per Animal Collection Plan.	1500	The mouse town planned at Gorewada Zoo will house various species of the mouse, rats, squirrels, shrews & porcupines which fall in the category of rodents of the region. The exhibit will be designed for the visitors to have close encounter with the animals. Animal accommodation will be designed and managed to meet species-specific behavioural needs. Each species will have separate and independent paddock area measuring from 80 to 100 sq.mtr having huge toughened glass on the viewing side and remaining sides covered with chain link fence. The top will also be covered with chain link fence. Each species will have a small night house with feeding and nesting facilities.
9. Butterfly Park		
There will be no cell.	10000	<p>A butterfly park has been proposed in an area of 10000 sqm. This will be an open exhibit without any net or fence with seasonal flowering plants, herbs and shrubs. However, 2-3 kraal type close netted facilities will be created for rearing of larvae and pupae.</p> <p>Seasonal flowers like Dianthus, Cosmos, Dahlia, Sweet-pea, Nostrushm, Flask, Shoe flower, Bougainvillea, Zinnia, Verbena, Pency, Sweet sultan, Sun flower and Guldawri etc. will be</p>

		<p>planted. These flowering plants will provide food (nectar & sap), roosting and breeding sites.</p> <p>Sugar (liquid) soaked flaps will be provided at different location in the whole butterfly park area as additional source of food. Adequate water supply will be made through pipes and sprinklers.</p> <p>Local butterfly species like Common tiger (<i>Danais plexippus</i>), White tiger (<i>Danais melanippus</i>), Dark blue tiger (<i>Danais malissa</i>), Lepcha bush brown (<i>Mycaleis lepcha</i>), Jungle glory (<i>Thaumantis diores</i>), Black rajah (<i>Charaxes fabious</i>), Jewelled nawals (<i>Eriboea dolon</i>), Blue striped palm fly (<i>Elymnias patna</i>), Common palm fly (<i>Elymnias hypermnestra</i>) and Tiger palm fly (<i>Elymnias nesaea</i>) are expected to be attracted and stay in this park.</p> <p>Following provisions will be done for creating ideal habitat for butterfly:</p> <ol style="list-style-type: none">1. A varied ground flora for breeding butterflies and moths.2. Provision of host plants3. Provision of shady and moist areas4. Provision of sufficient water5. Protection from birds and other predators6. Artificial nectar feeder7. Dead wood habitat for moths8. Researcher and keepers room <p>The temperature and humidity in the habitat and enclosure of butterflies will be ensured as per the suitability of the species to be housed.</p>
--	--	---

10. Aquarium Area		
There will be no cell.	1500	<p>An area of 1500 sq mtr has been kept for the development of Aquarium zone.</p> <p>10-15 enclosures with adequate display area will be created.</p> <p>The fishes shall be exhibited in glass tanks of varied sizes depending on the size of fishes and number of fishes to be housed. The fishes shall be housed in social and viable groups. The exhibits shall be designed following the international and national guidelines.</p> <p>The experts shall be involved in design and development of the glass house and their enrichment. The water quality shall be maintained as of prescribed nationally and internationally norms. The fish exhibits shall be tested prior to opening to the visitors and the fish's behaviour shall be studied by the biologists. All animal welfare concern shall also be met. The exhibits shall be provided adequate signage, graphics, interpretation and interactive devices for the visitors to learn more about their diversity, biology, feeding habits, reproduction biology, migration and all environmental and ecological aspect will be highlighted which are affecting the population of fishes in the wild.</p>
11. Amphibian Area		
There will be no cell.	1500	<p>An area of 1500 sq.mt. have been reserved for the development of amphibian zone.</p> <p>The enclosures with display shall be built as per</p>

		<p>CZA guidelines and in consultation with the zoo expert.</p> <p>Commonly used amphibian enclosures are constructed of glass, acrylic, fiberglass, or other synthetic materials. Using non-porous, easily cleaned materials is important. All enclosures shall have a tight-fitting (e.g. screen) lid keeping ventilation in mind. The most commonly used enclosures are over-the-counter glass aquariums fitted with screen lids. Amphibian-specific terraria, despite their increased cost, are worth the extra cost for ease of cleaning and access. Acrylic enclosures, though initially more expensive, are lighter than glass and more resistant to cracking and breaking; in the long run. However the downside of plastic enclosures is that they scratch more readily and require frequent buffing to keep clear.</p> <p>For many terrestrial salamanders and smaller terrestrial frogs, 20 gallon-long aquariums with tight fitting lids shall work well. For arboreal species, tall aquaria or setting an aquarium on its side, to provide more vertical space, shall be made. Tree branches and plants to offer sufficient climbing and perching areas will be used.</p>
12. Insectariums Area		
<p>There will be no cell.</p>	<p>750</p>	<p>Glass and acrylic terrariums will provide wonderful enclosures for invertebrates. A lower profile terrarium will work well for terrestrial species and vertically oriented terrariums will be best suited for the tree dwelling, arboreal species. As the invertebrates grow, they will need larger enclosures.</p>

		<p>Aquariums, available in a variety of sizes, would be adapted as a terrarium for some species.</p> <p>Outdoor enclosures shall be provided for some part of the invertebrates. These enclosures in moderate climates provide the ultimate environment for invertebrate. Outdoor enclosures shall be provided with secure screen covers that allow sunlight in and keep predators out. Predators of invertebrates can take many different forms such as birds, cats, mice, and even ants.</p> <p>Upkeep of Invertebrates: Most of the invertebrates are very clean naturally and need to be cleaned only about once a month, or for some only every six months. At places where soil/sand mixture will be used in the substrate, many invertebrate's feces will decompose into crumbly black humus and blend into the substrate without any noticeable odor.</p> <p>One thing all invertebrate enclosures need is regular maintenance. This means any uneaten prey and noticeable debris shall be removed regularly. This will help to protect them from harmful micro-organisms and parasitic infestations. The pet's water and moisture shall be monitored regularly, misting the substrate or adding fresh water as necessary.</p>
--	--	--

4. Bird Park: -

Cell size (in mtr)			Area proposed for enclosure (sqr mtr)		Remarks
L	B	H	Area	Height	
1. Aviary – I (Pheasants)					
Pheasants. 1.10 1.10 1.30	Silver Pheasant		80	3	The total area of 1500 sq mtr and 1500 sq mtr is kept for the development of bird aviaries at two locations for pheasants and small birds respectively. The minimum prescribed size by CZA for the outdoor enclosures will be followed as indicated in the table. Some area will be kept as a buffer and for future development. The viewing will be through toughened glass of size of 3 mtr x 2 mtr or through fence.
	Kalij Pheasant		80	3	
	Golden Pheasant		80	3	
	Lady Amhersel Pheasant		80	3	
	Sonnerat's Jungle Fowl		80	3	
	Grey Partridges		80	3	
	Great Indian Bustard		80	3	
	Black Partridge		80	3	
	Red Jungle Fowl		80	3	
	Cheer Pheasant		80	3	
	Ring Necked Pheasant		80	3	
2. Aviary – II					
Parakeet, Green Pigeon & owls 1 1 1.20	Alexandrine Parakeet		80	6	Each aviary will be a covered exhibit with wire mesh of size of 1"x1" except munia, baya, finches and budgerigar where this size of wire mesh will be 1cm x 1 cm.
	Rose Ringed Parakeet		80	6	
	Blossom headed Parakeet		80	6	
	Lorikeet		80	6	
	Budgerigar		40	6	
	Cockatiel		40	6	
Munia & Love bird .75 .75 1.20	Red Munia		40	6	Enrichment: (1) Perches of bamboo of varying dia meter (2"-3")
	Spotted Munia		40	6	
	Grey Parakeet		40	6	

Master Plan of Zoological Park and Rescue Centre, Gorewada

	Green Pigeon	80	6	will be provided.
	Love birds	40	6	(2) Small size tree / bushes will be planted.
	Indian Great Horned Owl	100	6	
	Cuckoo	80	6	(3) Earthen pots or nest boxes will be kept.
	Spotted Owlet	80	6	
	Barn Owl	80	6	(4) Nesting material will be provided.
3. Walk – in – Aviary				
There will be no cell.	Sarus Crane Black necked Crane Common Crane Adjutant Stork Open billed stork Painted Stork Black necked stork White Stork Large, Intermediate & Small Egret Pond Heron Grey Heron Purple Heron Oriental Darter or Snakebird White Ibis Black Ibis Cormorant Pelican Ducks Hoopoe Wood pecker Koel Grey Hornbill	20000 sq.mt.	A netted area of 20000 sq.mtr will be created covering all the flora, water bodies and fauna. The visitors will move in a zigzag way on foot to see the different habitat and birds freely moving from one place to another. During the journey through walk-in-aviary there will be pathways, skywalks, water bridges, etc. making the visitor's experience more interesting. There will be double door entry and exit for the aviary. The following habitat will be created inside the netted aviary for different species: - 1. Wood land habitat. 2. Grass land habitat.	

Master Plan of Zoological Park and Rescue Centre, Gorewada

	Pitta Golden Oriole Black headed Oriole Crimson Breasted Barbet Brahminy Mynah Pied Mynah Ringed neck Dove Babblers Red Vented Bulbul Red Whiskered Bulbul White Eye Sun birds Indian Robin		3. Water body (deep). 4. Shallow water body. 5. Lawns
4. Exotic Species			
	Ostrich	2500 sq.mt.	The front or viewing sides will have V-shaped dry moat with a depth of 1.5 mtr and width of 3 mtr. The remaining sides will be covered with 2"x2" chain link fence of 2.5 mtr high. The fenced sides will have over grown shrubs to conceal the metallic parts. Enrichment: (1) Australian plants / groove of bushes will be planted for emu. (2) Grass land will be created. (3) Shallow water pool with fountain will be created. (4) Marble chips will be provided at 2-3 locations. (5) Soft soil / nesting material (dry hay) will also be provided.
3	2	2.50	
	Emu		
3	2	2.50	
	Kiwi		
3	2	2.50	
	Rhea		
3	2	2.50	
	Cassowary		
3	2	2.50	

Master Plan of Zoological Park and Rescue Centre, Gorewada

Grey Parrot 2 1.5 2.5		As given in Bird Aviary.
Macaw Military 2 1.5 2.5		
Macaw Blue and Yellow 2 1.5 2.5		
Macaw Illiger's 2 1.5 2.5		
Love bird Peach Faced 2 1.5 2.5		
Cokattoo Lesser Suplher Crested 2 1.5 2.5		
Cokattoo Bare Eyed 2 1.5 2.5		

5. Night Safari: -

Cell size (in mt) L B H	Area proposed for enclosure (sq mt)	Remarks
---	65 ha.	The night safari will be created in an area of 65 ha. The nocturnal animals that are likely to be displayed have been given in the animal collection plan. The design of each animal enclosures will got to be approved from CZA. The animals will be kept in large areas with almost equivalent display area to develop the appropriate habitat. The display area will be developed naturalistic depending on the requirement and behaviour of the animal to be housed. Leopard proof fence will be created

		<p>along the complete periphery of Night Safari.</p> <p>The illumination and lighting would be the key factor of this particular zone. The lighting provided will be similar intensity as that of moon light. The intensity of light would be flexible to maintain considering the intensity of moonlight from no moon to full moon day.</p> <p>The dimensions of cells will be as per the standard prescribed by the CZA.</p> <p>The visitor will enjoy the wildlife by stimulated moon light both on trolley and walking trail. Cameras would not be allowed in order to avoid any nuisance to the animals.</p>
--	--	---

4.6.5 Features of butter fly and mouse town: -

1) **Butter Fly:** - Understanding the life cycles of butterflies and moths provides an insight into what they need from natural habitats. Butterflies have always attracted mankind due to their color pattern, variety and their life cycle as well as they play important role in nature. India is home for more than 1400 species of butterflies belonging to following families:

Super Family Papilionoidea

- Papilionidae - swallowtail butterflies (84 species)
- Pieridae - yellow and white butterflies (81 species)
- Nymphalidae - brush-footed butterflies (439 species)
- Danainae (26 species)
- Morphinae (20 species)
- Satyrinae (176 species)
- Limenitidinae (99 species)

- Libytheinae (3 species)
- Charaxinae (16 species)
- Calinaginae (3 species)
- Heliconiinae (27 species)
- Cyrestinae (10 species)
- Pseudergolinae (1 species)
- Biblidinae (4 species)
- Apaturinae (17 species)
- Nymphalinae (37 species)
- Lycaenidae - blues, hairstreaks and gossamer-winged butterflies (318 species)
- Riodinidae - punches & judies (16 species)

Super family Hesperioidea

- Hesperiiidae - skipper butterflies (225 species)
- Coeliadinae (22 species)
- Pyrginae (69 species)
- Hesperiiinae (133 species)
- Heteropterinae (1 species)

All butterflies and moths go through a complex lifecycle from egg to larva (caterpillar) and then pupa (chrysalis) and adult. Some species spend much longer as an egg, larva or pupa than as an adult, and the habitat requirements of each stage may be very different. Indeed, adult butterflies may be encountered in parts of the habitat away from the vital breeding habitat, especially when searching for nectar. In general, Lepidoptera requires sheltered, warm sunny places as adults, often with a nectar source, as well as a suitable place to lay their eggs. The larvae will then require plentiful food plants, often growing in specific conditions, and will move to a sheltered or inconspicuous spot to pupate before emerging as an adult. The Zoo will house only common species of butterflies. However if required in future highly threatened species in particular, understanding where they spend each of these stages may be housed, and at what time of year,

can be the key to effective conservation. Land managers sometimes concentrate on providing the nectar-rich areas frequented by adult butterflies (where they are most often seen) at the expense of other habitat features. In fact it is rare that nectar is the factor limiting population growth, and suitable habitat for egg-laying and larval development is usually crucial.

For many butterfly species, the composition of tree species, shrub species in the coppice is not particularly important because it is the ground flora that supplies their larval food plants. However, the larvae of many moth species do feed on shrub and tree species. The presence of tall standard trees of different species will provide additional habitat.

It is probably not worth initiating coppicing within established habitat that has no history of that management or on sites where coppice has now developed into high vegetation. The response to coppice management is likely to be poor and these sites may have developed fauna and flora associated with mature habitat that will be damaged by cutting. The area of potential coppice must be large enough to support the coupe sizes, the rotation/s and also the layout of age classes needed to meet the management aims.

The butterflies require a continuous supply of newly cut areas, the coppice must still go through a long enough rotation to shade out vegetation as explained above. This problem can be overcome by cutting every other year, or by coordinating management across a group of adjacent vegetation in various units.

Requirement for creating ideal site for butterflies:

1. A varied ground flora for breeding butterflies and moths.
2. Availability of host plants
3. Availability of shady and moist areas
4. Availability of sufficient water
5. Protection from birds and other predators
6. Artificial nectar feeder
7. Dead wood habitat for moths

8. Researcher and Keepers Room

Make sure the temperature and humidity in the habitat and enclosure of your butterflies is suitable for the species housed. Especially the temperature is important.

2) Mouse town: - Mouse's are social animals. In the wild they live in colonies, which may consist of hundreds of rats and which have nesting sites and feeding grounds in common. Rats are nocturnal, usually with three activity periods, one at the beginning, one in the middle and one at the end of the night. Feeding for both adults and neonates takes place during these activity periods. Rats have highly developed senses of smell, hearing and touch. Rat behaviour and communication is strongly influenced by olfactory cues. Rats emit sonic as well as ultrasonic vocalisations and can hear frequencies at least up to 70 kHz. The use of ultrasound appears to be important for communication and may be used in behaviours such as controlling aggressive encounters, mating and mothering.

The mouse town planned at Gorewada Zoo will house various species of the mouse, rats, squirrels, shrews & porcupines which fall in the category of rodents of the region. The animals will be housed in such a way to attract the visitors. The exhibit will be designed for the visitors to have close encounter with the animals. Animal accommodation should be designed and managed to meet species-specific behavioural needs. Exhibits should ensure animal wellbeing and comfort. The following factors should be taken into account while planning and designing of mouse town.

- (i) species-specific behavioral requirements, including the availability and design of space to enable free
- (ii) movement and activity, sleeping, privacy, contact with others of the same species, and environmental enrichment;
- (iii) provision of single housing for animals when appropriate for the species and if necessary for the purpose of the project
- (iv) species-specific environmental requirements, such as lighting, temperature, air quality, appropriate day/night cycles and protection from excessive noise and vibrations;
- (v) the need to provide ready access to food and water;

- (vi) the need to clean the exhibit;
- (vii) protection from spread of pests and disease;
- (viii) the need to observe the animals readily be secure and escape-proof;
- (ix) protect animals from climatic extremes; not cause injury to animals;
- (x) be large enough for the species and the number of animals held; and
- (xi) be compatible with the behavioral needs of the species.

The number of animals in exhibits and the placement of these should enable social and environmental conditions for the species to be maintained. Where it is necessary to individually house animals of a species that normally exists in social groups, the impact and time of social isolation should be kept to a minimum.

Bedding and litter must be provided if appropriate to the species and should be comfortable, absorbent, safe, non-toxic, able to be sterilized if needed, and suitable for the particular scientific or educational aims. Pregnant animals must be provided with nesting materials, where appropriate.

There will be glass viewing exhibits shall be provided in such a setting where the visitors shall observe the activities of rats and shrews at close distance.

4.6.6 Management of animal section: The responsibility of managing the different components of animal section is given as under: -

- ACF / Curator animal – I

All animal components, Deep time trail, Tribal trail and Trail of senses.

- RO / Deputy Curator – I

Indian and African Safari and Bio-park.

- RO / Deputy Curator – II

Bird park, Deep time trail and Trail of senses.

- ACF / Curator animal – II

Night safari

- RO / Deputy Curator – III : - He will assists ACF –II in looking after the night safari.

4.6.7 Calculation of strength of zoo keepers and asst. zoo keepers: We have calculated the requirement of zoo keepers, asst zoo keeper taking into the consideration of parameter adopted by the National Zoological Park, New Delhi. We have divided animal enclosures of this zoo and rescue centre into different beats. Each beat will have 2-3 persons depending upon the quantum of work and upto 5 persons for trails and other components for day to day cleaning and care. The zoo keepers and asst. zoo keepers will be recruited on regular basis so that they are accountable for any mis-handling the animals. Mathematically the strength of zoo keepers, asst. zoo keepers and others is calculated as under: -

		Zoo Keeper	Asst. Zoo Keeper	Total
Indian Safari				
Beat - 1	Tiger, Sloth bear, Leopard and Herbivore safari	4	4	8
African Safari				
Beat - 2	African Lion and Herbivore safari	2	2	4
Bio-park				
Beat - 1	Cheetah, Hippo, Zebra, Giraffe	1	2	3
Beat - 2	African Lion, Baboon, Rhesus, Fox	1	2	3
Beat - 3	Cheetal, Tiger, Four horned antelope and Jackal	1	2	3
Beat - 4	Hyena, Bonnet, Ratel, Lion	1	2	3
Beat - 5	Black buck, Gaur, Crocodile and Lion tailed macaque	1	2	3
Beat - 6	Wild dog, Wolf, Sloth bear, Himalayan Black bear	1	2	3
Beat - 7	Wild boar, Leopard, Gharial, Barasingha	1	2	3
Beat - 8	Indian soft shell turtle, Mouse deer, Stump tailed macaque and White Tiger	1	2	3
Beat - 9 (Nocturnal - I)	Slow loris, Leopard cat, Palm civet, Indian small civet and Large civet cat	1	2	3
Beat - 10 (Nocturnal - II)	Owlet, Pangolin, Porcupine, Indian flying squirrel and Giant squirrel	1	2	3
Beat - 11	Amphibians	1	2	2
Beat - 12	Reptile House	1	2	3
Beat - 13	Mouse Town	1	2	3

Master Plan of Zoological Park and Rescue Centre, Gorewada

Beat - 14	Butter fly park	1	3	4
Beat - 15	Insectariums	1	2	3
Beat - 16	Aquarium	1	4	5
Bird Park				
Beat - 1	Aviary - I (Pheasants)	1	3	4
Beat - 2	Walk-in aviary	2	4	6
Beat - 3	Aviary - II	1	3	4
Beat - 4	Exotic species	2	4	6
Night Safari				
Beat - 1	Giraffe, Zebra and Barberrry sheep	1	2	3
Beat - 2	Eland, Llama, Impala and Blesbok	1	2	3
Beat - 3	Capybara, Cavy, Bearded Pig and Guanaco	1	2	3
Beat - 4	Spotted Deer, Sambhar and Gaur	1	2	3
Beat - 5	Sloth Bear, Leopard and Malayan tapir	1	2	3
Beat - 6	Tiger, hyena and Jaguar	1	2	3
Beat - 7	Jackal, Wolf, Leopard Cat and Jungle Cat	1	1	2
Beat - 8	Palm Civet, Turtle, Crocodile and Great Flamingo	1	1	2
Beat - 9	Ostrich, Emu, Rhea and Cassowary	1	1	2
Trails				
Beat - 1	Deep time trail	1	4	5
Beat - 2	Trail of senses	1	4	5
Beat - 3	Tribal trails	1	4	5
Total		41	82	123
Requirement for weekly off of zoo keeper & asst. zoo keeper = 10%		4	8	
Requirement for CL and EL for zoo keeper & asst. zoo keeper = 10 %		4	8	
Sub Total		49	98	147
Miscellaneous				
Safari gate keeper				12
Office attendant				3
Curator / ACF vehicle driver				2
Grand Total				164

4.7 Veterinary section: - The Zoo and Rescue Centre, Gorewada will have a well equipped hospital. The Rescue Centre which has been created on the northern side will serve the veterinary requirements of zoo. All modern facilities will be made available. Two full time veterinarians along with support staff will be appointed. The hospital will have a clinic with basic facilities for treatment and dressing of animals, standard surgical instruments, diagnostic equipments and dispensary with wide range of drugs. A separate facility will be created for hand rearing baby animals. Proper drainage and ventilation will also be provided. (Copy of Service Block Layout Plan is annexed as **Annexure – 20**)

4.7.1 Hospital facilities: -

- (1) A separate operation theatre for surgery and treatment.
- (2) An X-ray unit with dark room.
- (3) A dispensary / pharmacy with storage facility for wide range of medicines.
- (4) A nursery unit for hand rearing baby animals.
- (5) A self contained laboratory for conducting pathological tests.
- (6) Appropriate housing for in-door patients.
- (7) Quarantine / isolation ward.
- (8) Housing facilities for recuperating patients.
- (9) Offices, library, record room, toilets.
- (10) Stores and kitchen for animals feeds under treatment.

4.7.2 Duties and responsibilities: -

- (1) Inspection of the zoo animals, identification of sick animals and treating them.
- (2) To maintain the record of treatment of inpatient and outpatient animals.
- (3) Monitoring of pregnant animals till their successful delivery & post care.
- (4) Formulation of diet and quality control of feed issued to zoo animals.
- (5) To follow prophylactic protocol, periodical examination of fecal matter, blood, de-worming, vaccination and disinfection.
- (6) Planning breeding strategy of endangered species and their husbandry.
- (7) To take measures for preventive disease control in zoos.
- (8) Physical and chemical capture of zoo animals.
- (9) To check the quality of the food daily.

- (10) To maintain the inventory of the equipments and medicines.
- (11) To guide the rescue operation when needed.

4.7.3 Equipment and vehicle requirement:-

- (1) Treatment cages:
 - (i) 2 squeeze cages.
 - (ii) 5 cages for medicating and treating primates, carnivores and small animals.
- (2) Laboratory equipment:
 - (i) Microscopes.
 - (ii) Bacteriological incubator.
 - (iii) Glassware.
 - (iv) Chemical regents.
- (3) Sterile surgical equipment and other instrumentation for diagnosis and treatment.
- (4) Autoclave.
- (5) An X-ray unit, darkroom facilities and photographic material.
- (6) An incubator unit for baby animals.
- (7) Equipment and instrumentation for conducting post mortems.
- (8) Kitchen ware, mixer-cum-food processor, storage containers, special items like feeding bottles, nipples, cooking gas and stove.
- (9) Chain-pulley equipment for hoisting animal cages.
- (10) Room heaters, coolers etc. as per requirement.
- (11) Medicines and miscellaneous items.
- (12) Nets for capturing animals.
- (13) Ropes and poles etc.
- (14) Ambulance with equipment – 1
- (15) Four wheeler – 2
- (16) Hospital furniture.
- (17) Telephone and intercom.
- (18) Tranquilizing equipments & drugs: -

S. No.	Equipment, Accessories & Drugs	Quantity
1	Rifle model 60	1

Master Plan of Zoological Park and Rescue Centre, Gorewada

2	Blow Pipe	1
3	4 ml alum. Barrel for metal syringe	10
4	5 ml alum. Barrel for metal syringe	10
5	Rubber plunger	10
6	Needles with collar art. 3040	10
7	Stabilizer art. 3049	10
8	Art 2006 chargers for metal syringes	20
9	Art 2013 cartridge (yellow)	20
10	Cartridge (brown)	20
11	Mini inject 3 ml	5
12	Mini inject 5 ml	5
13	Woolen stabilizer art 3092	5
14	Needles art 3068	10
15	Ketamine -100	50 ml 1 x 2
16	Xylazine - 100	50 ml 1 x 2
17	Yohimbin hydrochloride	50 ml 1 x 2

4.7.4 Staff requirement: - Following staff will be needed in this section.

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Veterinary Officer	1	9300-34800 +5400 GP
2	Asst. Veterinary Officer	1	9300-34800 +4600 GP
3	Lab Technician	1	5200-20200 +2400 GP
4	X-Ray Technician	1	5200-20200 +2400 GP
5	Compounder	1	5200-20200 +2400 GP
6	Computer operator	1	5200-20200 +2000 GP
7	Driver	2	5200-20200 +1900 GP
8	*Zoo Keeper	2	4400-7440 +1600 GP
9	*Asst. Zoo Keeper	4	4400-7440 +1300 GP
10	Attendant *Will also look after rescue centre and quarantine wards	2	4400-7440 +1300 GP

4.7.5 Rescue Centre: - A number of animals which become threat to human life or property or get injured require housing and treatment facilities. This facility is to be provided by the Forest

Department of Maharashtra. So an area of 25 ha in the north part of Gorewada has been earmarked for rescue centre. A master plan for establishing a rescue centre at Gorewada zoo was sent to CZA for approval. The CZA has approved it on 29-08-2012 in principle with the condition to get clearance from the Hon'ble Supreme Court which had been obtained as annexed in annexure-2. This project is being pursued separately by FDCM Ltd. The work is in progress as per the guidance of FDCM Ltd.

4.7.6 Quarantine Wards:-

1. An area of 400 sq mt has been kept for quarantine wards.
2. Each cell will have light and air exposure.
3. Each cell will have provision for medication and temperature monitoring facilities.
4. The breakup of the area for different wards is given as under:

S. No.	Ward	Area (sq. mt.)
1	Ward-1	100
2	Ward-2	80
3	Ward-3	60
4	Ward-4	40

4.7.7 Post mortem room: -

- 1) A 40 sq mt post mortem room is proposed near incinerator.
- 2) It will have natural light, drainage, wash basin with water point and platform etc.

4.8 Sanitary Section: - It is an important section for the upkeep of zoo. The sanitary section will provide clean and pollution free environment. This section will be responsible to remove leftover food, dung, cut grasses, fallen leaves, weeds and other items. All roads, foot-paths, toilets, drinking water points and rain shelters will be cleaned and maintained. Disinfection schedule will be followed round the year. Sanitary section will also operate incinerator.

We propose a separate office with a store room in the composite office building for sanitary section. This composite office will house animal and horticulture sections also.

4.8.1 Duties and responsibilities: -

- (1) Cleaning of roads, paths, toilets & urinals.
- (2) To remove and disposal of garbage, leftover food, animals waste, bones, fallen leaves, cut grasses, weeds, tobacco pouches and plastic items.
- (3) Regular cleaning of drinking water coolers & tanks.
- (4) To spray malaria oil to check mosquito breeding.
- (5) To control flies in zoo premises.
- (6) To clean and dusting of all sections office and cleaning of residential area.
- (7) To carry fogging in the residential area and animal houses.
- (8) To control rodents by using traps.
- (9) To dispose of carcasses in incinerator or in burial site with salt and lime powder along with veterinary hospital staff.
- (10) To follow the disinfection schedule for animal enclosures

4.8.2 Equipment and vehicle requirement: -

- (1) Motor-cycle – 1
- (2) Dustbins – 100
- (3) Sitting benches – 100

Operation of Sanitary sections is to be outsourced. Hence, no equipments and consumables shall be required.

Note: - Department will provide store facilities to out sourced agency to keep its equipments and other items.

4.8.3 Staff requirement: - Following staff will be needed in this section.

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Asst. Curator (San) or Sanitary Inspector	1	9300-34800+3600 GP
2	Attendant	1	4400-7440+1300 GP

Note: - (1) Asst. Curator (san) or Sanitary Inspector will be appointed on regular basis and work of the section will be out sourced.

(2) The sanitary section will be under the administrative control of Curator (Horticulture and sanitation).

4.9 Horticulture Section: - This section will provide the naturalness in the park by maintaining natural flora. It will be responsible for all works related to plantation and maintenance of trees, gardens and lawns, etc. This section will also lay emphasis on the plantations of medicinal plants. A plant nursery will also be developed for in house consumption of seedlings and for sale.

A separate office will be made for horticulture in the composite office as stated before.

i. Duties and responsibilities: -

- 1) To maintain lawns, trees, hedges and plants.
- 2) To remove weeds from lawns and hedges etc.
- 3) To provide water to lawns, and trees.
- 4) To remove and collect all dry leaves from lawns.
- 5) To remove uprooted/dead trees when ever occasion arises.
- 6) To prepare seedlings of plants as per season.
- 7) To collect seeds and keep them for future use.
- 8) To maintain flowering and small plant earthen pots.
- 9) To develop and maintain fodder farm.
- 10) To maintain the record of manpower supplied, work under taken, and implements used by outsourcing agency.
- 11) To develop medicinal plant nursery and plant them in the park.

4.9.2 Equipment and vehicle requirement: -

- (1) A hydrant line will be provided along the ring road with provision of sub lines for sprinkling and watering the plants, trees and lawns etc.
- (2) Four wheelers - 1
- (3) Two wheelers - 1
- (4) Seeds and seedlings as per seasonal requirement.
- (5) No equipment and implement is to be provided as this work is proposed to be outsourced. The agency shall provide services inclusive of consumables, equipment and implements as per acre basis.

Note: - The agency should have the following equipments: -

- (1) Hedge trimmer
- (2) Bush cutter (non electric)
- (3) Lawn mower (mechanized)
- (4) Pit hover
- (5) Tractor with trolley
- (6) Shrub master
- (7) Harrow
- (8) Cultivator
- (9) Leveller
- (10) Mechanized pruning machine
- (11) Spray pump
- (12) Pipes
- (13) Sprinkler system
- (14) And Garden tools

Note: - The department will provide store facilities to the out sourced agency to keep the equipments and implements.

4.9.3 Staff requirement: - Following staff will be needed in this section.

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Curator (horticulture and sanitation)	1	9300-34800+4600 GP
2	Asst. Curator (Hor.) or Range officer (Hor.)	1	9300-34800+3600 GP
3	Driver	1	5200-20200+1900 GP
4	Attendant	2	4400-7440+1300 GP

Note: - (1) Curator (horticulture and sanitation), Asst. Curator (Hort.) or Range officer (Hort.) will be appointed on regular basis and the work of this section will be out sourced.

4.10 Security section: - This section will be responsible to safe guard zoo properties, animals and animal enclosures and to maintain law and order. It will also take care to check thefts, pick pocketing, trespassing, animal escape at night and entry of stray dogs and monkeys in the zoo premises and night safari.

A security control room will be built at the entrance with a small store, a toilet and rest room.

4.10.1 Duties and responsibilities: -

- 1) To patrol zoo area day & night.
- 2) To protect Govt. property, animals and visitors.
- 3) To check illicit cutting of trees.
- 4) To maintain law and order at entrance and inside zoo area.
- 5) To assist public in lost & found.
- 6) To interact with local police whenever needed.
- 7) To control vandalism, pick pocketing and teasing of animals.
- 8) To frisk visitors at entry point.
- 9) To man service & entry gates.

4.10.2 Equipment and vehicle requirement: -

- (1) To establish a network of CCTV for surveillance at the entrance and animal enclosures. This feed will be shared between security and animal section. Director and Deputy Director will have access to this facility in their offices.
- (2) To establish a network of public address system (PA) at entrance and different locations of zoo, veterinary hospital and night safari.
- (3) Internal communication system and wireless (wireless tower, handsets and fix sets)
- (4) Telephone lines.
- (5) A 2 wheeler for R.O. (security).
- (6) A computer with printer.
- (7) Office furniture.
- (8) No other equipment and machinery will be procured as this work is proposed to be outsourced.

Note: - Department will provide store facilities to out sourced agency.

4.10.3 Staff requirement: - Following staff will be needed in this section.

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Range officer (Security)	1	9300-34800+3600 GP
2	Deputy Range officer (Security)	2	5200-20200+2400 GP
3	Ticket Collector	4	5200-20200+1900 GP
4	Attendant	1	4400-7440 +1400 GP

Note: - (1) Range officer (security) and deputy range officer (security) and ticket collectors will be appointed on regular basis and the work of this section will be out sourced.

(2) Security section will work under the administrative control of Deputy Director or equivalent.

4.11 Store and Kitchen section: - A well developed store and kitchen is proposed to be constructed which will have ample space to store the food as well as maintenance material. It will have a storage room, feeding troughs, storage containers, kitchen, refrigeration room or

cold storage for the storage of items like meat, milk, fish, and fruit. It will have a weighing machine, and a platform for loading and unloading store items.

4.11.1 Duties and responsibilities: -

- (1) To procure, store and supply diet articles.
- (2) To get the quality of food checked by Veterinary officer or Assist. Veterinary officer daily.
- (3) To prepare daily ration as per schedule for all animals and distribute them.
- (4) To procure maintenance material as required by other sections.
- (5) To keep the record of purchase and disposal of all items.
- (6) To get the store audited every year.
- (7) To process for the write off of obsolete items.
- (8) Any other item required for running and maintenance of zoo.

4.11.2 Equipments and vehicles requirements: -

- (1) Food store container (capacity 100 kg - 10 nos, 200 kg - 5 nos and 500 kg - 5 nos.) - 20
- (2) Feeding trough - 20
- (3) Container for oil - as per need.
- (4) Jute bags - 100
- (5) Keema machine - 2
- (6) Fodder cutting machine - 2 (Power operated)
- (7) Utensils for kitchen - as per need
- (8) Weighting machine - 1
- (9) Dharma kanta - 1
- (10) 500 liter per day capacity solar water heating system.
- (11) A piped gas connection / cooking gas cylinder.
- (12) Truck-1
- (13) Office furniture as per need.
- (14) Computer - 1
- (15) Telephone.
- (16) Intercom.
- (17) A digital board for displaying of daily ration status.

4.11.3 Staff requirement: - Following staff will be needed in this section.

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Assistant Curator (Store) or RO (Store)	1	9300-34800+3600 GP
2	Store Clerk	2	5200-20200+2100 GP
3	Truck Driver	1	5200-20200+1900 GP
4	Cook cum food distributor	2	4400-7440 +1400 GP
5	Attendant	8	4400-7440 +1300 GP

Note: - (1) Assistant Curator (Store) or RO (Store) will be appointed on regular basis and rest of the manpower will be on contract basis.

(2) The section will work under the administrative control of Deputy Director.

4.12 Construction and maintenance section: - The section will undertake construction of buildings, animal enclosures, roads, path, laying of service lines, over head tank, bore wells, power supply system and maintenance thereof. This section will also take care to protect animals against summer and winter season.

There will be separate office and work shop with adequate space for keeping construction and maintenance material. The work shop will have all equipments required for the upkeep of building and animal enclosures. It will also have enough space for parking of vehicles and keeping of transport cages under shed.

4.12.1 Duties and responsibilities: -

- (1) Construction of buildings, animal enclosures, roads, path, and service lines.
- (2) Maintenance of all buildings, animal enclosures, service lines etc.
- (3) Repair and strengthening of steel sections, doors, partitions, up slides etc. by welding.
- (4) Lubrication of sliding/partition/gates/doors/pulleys/pressure pumps etc. to ensure their proper functioning.
- (5) Dewatering of moats/ponds/wallow pools/water bodies, as and when required.
- (6) Repair pressure pumps/heaters/coolers and other miscellaneous equipments and to maintain them functional.

- (7) Replacement of damaged steel wire ropes of up-slide partitions/gates of animal enclosures.

4.12.2 Equipments and vehicle requirement: -

- | | | |
|------|--------------------------------|--------------------|
| (1) | Tools for carpenter | as per requirement |
| (2) | Tools for welder | as per requirement |
| (3) | Tools for mason | as per requirement |
| (4) | Tools for plumber | as per requirement |
| (5) | Generator 40 KVA | 1 |
| (6) | Chain saw | 1 |
| (7) | Gas machine | 1 |
| (8) | Portable welding machine | 1 |
| (9) | Drill machine | 1 |
| (10) | Rotary Hammer | 1 |
| (11) | Pressure pump | 1 |
| (12) | Tong Tester | 1 |
| (13) | Spray gum | 1 |
| (14) | Air compressor (1000 psi) | 1 |
| (15) | 9-1"1 machine for Carpenter | 1 |
| (16) | Computer with printer | 2 |
| (17) | Vehicle 4 wheeler | 1 |
| (18) | Rickshaw | 1 |
| (19) | Office furniture – as per need | |
| (20) | Telephone | |
| (21) | Intercom | |

4.12.3 Staff requirement: - Following staff will be needed in this section.

<i>Proposed Staff</i>			
S. No.	Post	No. of Post	Pay Scale
1	Curator (Engg.) or Asst. Engineer	1	9300-34800+4600 GP
2	Asst. Curator or JE (Elec. & Civil)	2	9300-34800+3600 GP
3	Draft man	1	5200-20200+2800 GP

4.	LDC	1	5200-20200+2100 GP
5	Driver	1	5200-20200+1900 GP
6	Electrician	2	5200-20200+1900 GP
7	Black Smith/Welder	1	5200-20200+1900 GP
8	Plumber	1	5200-20200+1900 GP
9	Mason	1	5200-20200+1900 GP
10	Carpenter	1	5200-20200+1900 GP
11	Painter	1	5200-20200+1900 GP
12	Pump Driver	1	4400+7440 +1400 GP
13	Attendant	10	4400+7440 +1300 GP

Note: - (1) Curator (Engg.) or Asst. Engineer, Asst. Curator or JE (Elec. & Civil, Draft man will be on deputation and rest of manpower will be on contract basis. If the incumbents are not available on deputation, then these posts will be filled on contract basis.

(2) All the major construction works will be undertaken by inviting tenders as per state govt. rules.

4.13 Education section: - Zoo is a living educational Institute. It imparts firsthand knowledge and experience of nature to visitors. Zoo is also a place from where the visitors can get lot of information on wildlife and environment.

As per CZA's norms on zoo education, zoo should inspire empathy for wild life, understanding and awareness about need of conservation of natural re-sources besides maintaining ecological balance.

A separate education office with an interpretation center will be created near the entrance. The interpretation center will have an exhibit area, small auditorium with projector room and a class room. The office will have a office for education officer and its staff, store, library, toilets and drinking water facilities.

4.13.1 Duties & responsibilities:

- (1) To formulate and execute the educational programs of the zoo.
- (2) To conduct guided tour particularly for students from time to time.
- (3) To publish educational material like guide books, guide maps, brochure and leaf lets.
- (4) To prepare material for animal, directional and utility signages.

- (5) To produce interactive exhibits and signages.
- (6) To organize various awareness and orientation programs from time to time.
- (7) To provide information about wild animals to individual visitor and institutions.
- (8) To conduct training work shop for zoo keepers, trolleys operators and volunteers.
- (9) To help, in preparation of audio visuals on wild animals.
- (10) To help and guide students in preparations of their projects.
- (11) To conduct lectures and presentation for organized groups.
- (12) To look after the Zoo Library.
- (13) To look after public relation work.
- (14) To prepare monthly awareness / educational activities programmes and to execute.
- (15) To prepare the annual report of the park.

4.13.2 Equipment and vehicle requirement: -

- (1) Audiovisual equipments and films of wild life.
- (2) Power point projector with computer.
- (3) A photo copier.
- (4) Computer with internet facilities and printer.
- (5) PA system.
- (6) Published material.
- (7) Panels with stands.
- (8) A four wheeler
- (9) Books, news papers, periodical, and journal for library.
- (10) Office furniture.
- (11) Telephone.
- (12) Intercom.

4.13.3 Staff requirement: Following staff will be needed in this section.

<i>Proposed Staff</i>			
S. No.	Post	No. of Post	Pay Scale
1	Curator(Ed) or Edu - Officer	1	9300-34800+4600 GP
2	Asst. Curator (Ed) or RO (Edu)	1	9300-34800+3600 GP

Master Plan of Zoological Park and Rescue Centre, Gorewada

3	Library Asst	1	5200-20200+2400 GP
4	Audio- Visual operator	1	5200-20200+2100 GP
5	Computer operator	1	5200-20200+2100 GP
6	Driver	1	5200-20200+1900 GP
7	Attendant	4	4400-7440+1300 GP

Note: - (1) Curator (Edu.) or Edu- Officer, Asst. Curator (Edu.) or RO (Edu.) will be on regular basis and rest of the staff will be on contract.

4.14 Research Section: - Research on wild life in captive is one of the objectives. So a full-fledged research section is proposed to be established. It will have a office with a small laboratory facilities with toilets and drinking water point. It will interact with other institutes in formulation of research projects and their studies. It will collect data on behaviour, breeding biology, growth, hand rearing and population dynamics. This section will be located adjoining to education section near the interpretation centre.

4.14.1 Duties & responsibilities: -

- (1) To collect the data on behaviour, breeding, growth and analysis it.
- (2) To maintain the animal history card as per CZA format.
- (3) To maintain the stud book of endangered species.
- (4) To formulate research project and execute them.
- (5) To keep liaison with research institutes.
- (6) To study the utility of medicinal plants of the park.
- (7) To conduct work shop on research in the zoo.
- (8) To prepare replies to queries of visitor and institutes.
- (9) To publish research papers in the journals.
- (10) To maintain the record of all equipments.

4.14.2 Equipment and vehicle requirement: -

(1)	Computer with printer and internet facilities	1	
(2)	Photostat machine	1	
(3)	Microscope	1	
(4)	Binocular	2	

Master Plan of Zoological Park and Rescue Centre, Gorewada

- (5) Digital camera - 1
- (6) Digital weighing machine - 1
- (7) Four wheeler - 1
- (8) Laboratory reagents - as per need.
- (9) Office furniture
- (10) Telephone
- (11) Intercom

4.14.3 Staff requirement: - Following staff will be needed in this section.

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Curator (Res.) or Research Officer or Biologist	1	9300-34800+4600 GP
2	Asst. Curator or RO (Research)	1	9300-34800+3600 GP
3	Driver	1	5200-20200+1900 GP
4	Field Asst	2	4400-7440+1300 GP

Note: - (1) Curator (Res.) or Research Officer, Asst. Curator or RO (Research) will be on regular basis and rest of the staff will be on contract.

4.15 Administrative Section: - A new administrative section has been proposed which will include the office of Director, Deputy Director, administrative and account staff. A separate room will be created for each officer. The administrative and account sections will be in a hall. This building will have small conference room, store, parking, toilet and drinking water facilities.

Director will be a whole time officer and over all in charge of the zoo operation. He will be responsible to the Govt. and management committee. He will be assisted by the Deputy Director, Veterinary officer, Curators and other support staff for the smooth running of the zoo.

This section will have following two sub sections: -

(1) **Establishment.**

(2) **Account section.**

4.15.1 Duties and responsibilities of establishment section: -

- (1) To process recruitment of staff when required.
- (2) To maintain service book and ACRs of employees.
- (3) To maintain diary and dispatch of letters.
- (4) To invite tender for supply of diet and maintenance articles.
- (5) To invite tender for leasing out parking site, cafeteria/ kiosk, battery operated trolley and safari vehicle if required.
- (6) To process for out sourcing the various works and to engage man power on contract.
- (7) To coordinate various meetings.
- (8) To undertake correspondence with state ministries, CZA and other department.
- (9) To process pension cases in time.
- (10) To deal cases of ACP, promotion, disciplinary action and enquiries.
- (11) To process returns well in time.
- (12) To procure furniture, stationary liveries for employees etc.
- (13) To attend representations of SC, ST, OBC, etc.

4.15.2 Duties and responsibilities of account section: -

- 1) To prepare plan & non plan budget and revise estimates.
- 2) To process cases of GPF withdrawal and retirement benefits.
- 3) To prepare regular Pay, Arrear, DA and Bonus, LTC, TA, Medical, Gratuity, Leave encashment bills.
- 4) To issue salary slip, GPF statement and form 16 of Income Tax.
- 5) To process cases of loans for Scooter, Cycle and House building.
- 6) To maintain record of visitor data & revenue collected.
- 7) To submit monthly statement of expenditure to department.
- 8) To process telephone, water and electricity bills.
- 9) To prepare duty roaster for booking counters.
- 10) To maintain cash book, contingency register, cheque and challan register.
- 11) To deposit cash collected from gate.
- 12) To keep record of entry tickets.
- 13) To pass the bills of outsourced agencies.

4.15.3 Equipment requirement for establishment and account section: -

- (1) Office furniture as per requirement.
- (2) Computer with printer – 8
- (3) Photostat machine – 1
- (4) Almirah – 8
- (5) Telephone – 2
- (6) Intercom – 2
- (7) Stationary as per requirement.
- (8) Cooler – 2
- (9) Heaters – 4

4.15.4 Staff requirement for establishment section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1.	Office Supdt. Or Head clerk	1	9300-34800+3200 GP
2.	UDC	2	5200-20200+2800 GP
3.	LDC	4	5200-20200+2100 GP
4.	Peon	1	4400-7440+1300 GP

4.15.5 Staff requirement for account section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1.	Accountant	1	9300-34800+3200 GP
2.	UDC	1	5200-20200+2800 GP
3.	LDC (booking clerk)	4	5200-20200+2100 GP
4.	LDC (office)	2	5200-20200+2100 GP
5.	Cashier (LDC)	1	5200-20200+2100 GP
6.	Peon	1	4400-7440+1300 GP

4.15.6 Equipments and vehicles requirement for office of Director and Deputy Director: -

- (1) Four wheeler- 2
- (2) Computer with printer and internet facility – 4
- (3) Office furniture – as per need.

- (4) Refrigerator – 2
- (5) Air conditioner – 2
- (6) Telephone – 2
- (7) Intercom- 2
- (8) Photostat machine - 1

4.15.7 Staff requirement for office of the Deputy Director: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1.	Deputy Director	1	15600-39100+5400 GP
2.	Personnel Assistant Gr-II	1	9300-34800+2800 GP
3.	Driver	1	5200-20200+1900 GP
4.	Peon	1	4400-7440 +1300 GP

Note: - (1) Deputy Director and PA will be on regular basis and rest of the staff will be on contract.

4.15.8 Staff requirement for office of the Director: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1.	Director	1	15600-39100+7600 GP
2.	Personnel Assistant Gr-I	1	9300-34800+3600 GP
3.	Driver	1	5200-20200+1900 GP
4.	Peon	2	4400-7440 +1300 GP

Note: - (1) Director and PA will be on regular basis and rest of the staff will be on contract.

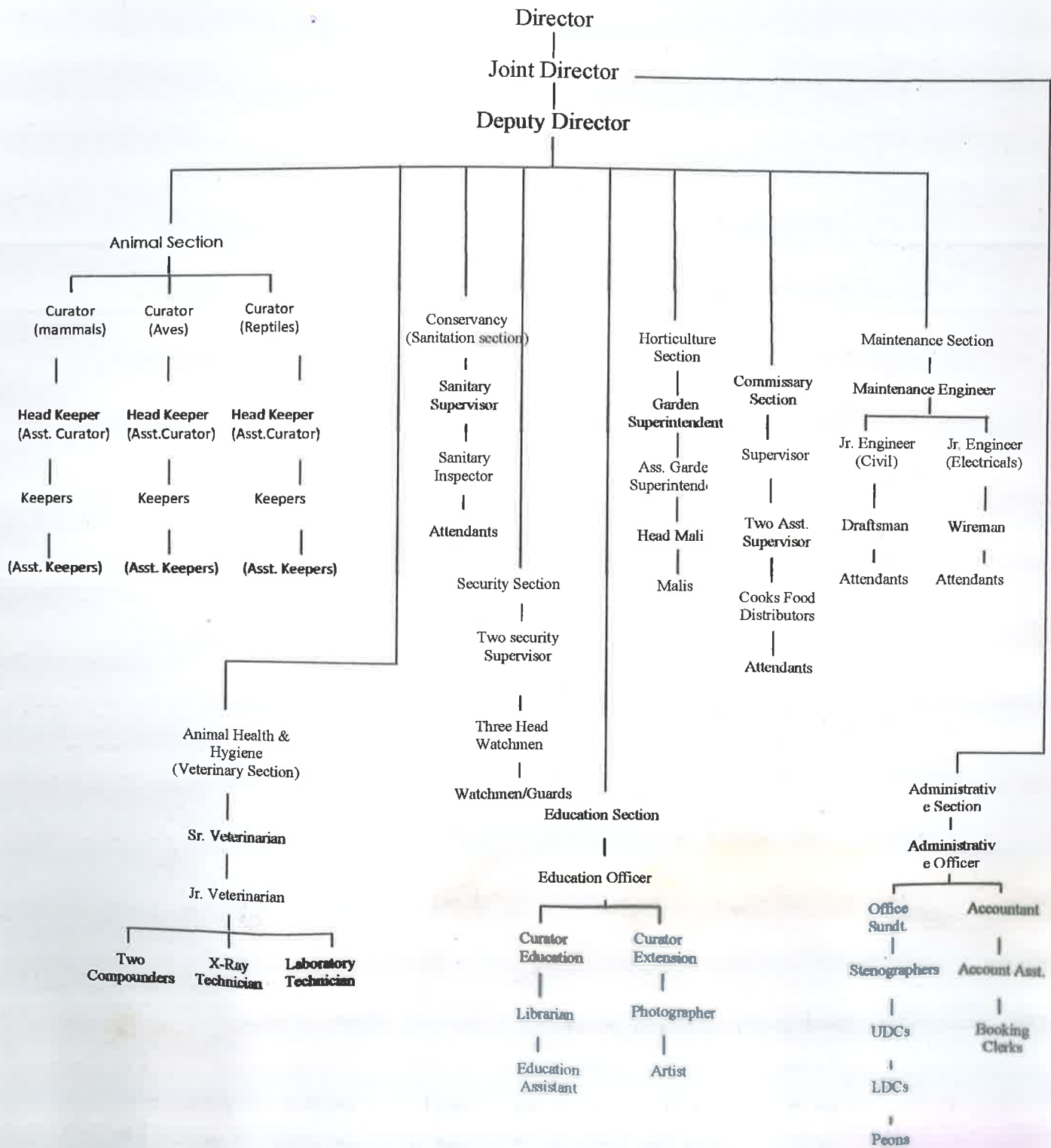
4.15.9 Justification for the staff and hierarchy: - On the recommendation of Indian board for wildlife in 1973, Govt. of India constituted an expert committee on zoos to suggest administrative pattern for various categories of zoos. This committee suggested that Director should be a whole time officer and should be overall in charge of the zoo operation at site. He is responsible to the governing body which may be the government or a departmental head or a management committee. He will have adequate administrative and financial power. There must be a second officer to assist the Director and to function as in- charge in his absence. In a zoo, the various branches should be headed by qualified and trained Curators, Veterinarian and

Master Plan of Zoological Park and Rescue Centre, Gorewada

Engineers. Separate staff is necessary for construction, maintenance of the buildings and gardens.

According to Wildlife Institute of India, Dehradun, the management of a zoo is a multidisciplinary team work which requires inputs from various disciplines such as personnel management, planning, finance, biology, veterinary science, horticulture, sanitation, security, public relations, education, research, engineering etc. The organizational set up of a zoo should, therefore be suitably structured so as to provide for professional inputs from these disciplines. A model administrative set up for a zoo with more than 100 hectares in area is given on the next page.

MODEL ADMINISTRATIVE SET UP FOR A MODERN ZOO WITH AN AREA OF MORE THAN 100 HECTARES



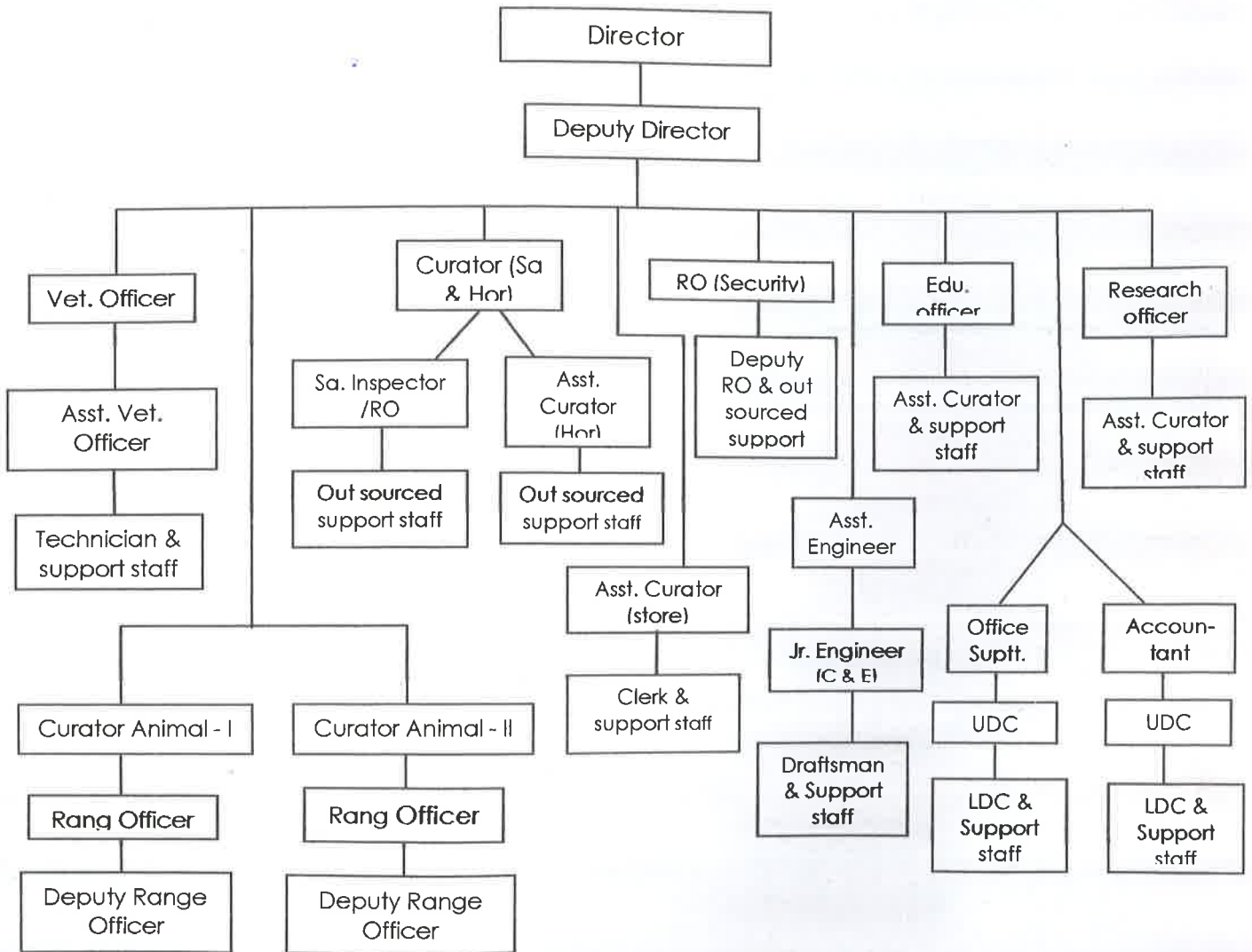
Master Plan of Zoological Park and Rescue Centre, Gorewada

Under the zoo recognition rules, CZA has prescribed the requirement of scientific & technical staff to support the officer in-charge of the zoo in carrying out the responsibility of housing, upkeep and healthcare of zoo animals, research and visitors education as specified in the table below:

Category of staff	Large Zoo	Medium Zoo	Small Zoo	Mini Zoo
Curator	1	1	1	Mini zoo shall avail the assistance of appropriately qualified individual available locally.
Veterinarian	2	1	1	
Education officer	1	1	1	
Biologist	1	1	1	

The Zoological Park and Rescue centre, Gorewada has an area of 1914 ha. It will display about 4500 animals comprising of 300 species. This organization will require inputs from administrator, veterinarian, engineer and curators to run it smoothly to achieve its objectives. We have, therefore, proposed the staff requirement and pattern in the tune of recommendations of Expert Committee on Zoos, CZA's rules for zoo recognition and WII Dehradun report – Standards / Guidelines for Indian Zoos requirements. The staffing pattern for this zoo is proposed on the next page.

4.15.10 Staffing pattern of Zoological Park and Rescue Center, Gorewada



4.15.11 Promotion opportunities: - Most of the posts in the zoo shall be manned by forest officials who have already in built promotion prospects. The post of Education officer, Research officer, and Curators will be taken as feeder cadre post for the promotion to the post of Deputy Director. Similarly the post of Asst. Curators can be taken as a feeder cadre post for the promotion to the post of curators. Further the recruitment rules may be made in such a way that each cadre should get at least three promotions in his service time. All the employees should be given pay scale as recommended by VI pay commission. The benefit of ACP (assured carrier promotion) should also be granted as per pay commission recommendation.

4.16 Visitor amenities:- The Zoo and Rescue Centre, Gorewada is likely to cater about 21 lakhs visitors annually. This will include adult, children, students, scientists, foresters, wild lifers, old, disabled and foreigners. It will be opened on all the days except Monday for the visitors. The following amenities will be developed:

4.16.1 Parking: - There are three parking areas as under: -

1. Parking for safari vehicles - 2 ha.
2. Parking for four wheelers - 3 ha.
3. Parking for buses and two wheelers - 3 ha.

The parking will be leased out.

4.16.2 Entry gate: - There will be two separate entry gate. One entry gate will be developed near the entrance plaza that will cater the safari, bio-park, bird park and trails etc. It will have following facilities:-

- (1) Ticket booking windows - 8 (with a provision to increase to 4) Cloak room - 2
- (2) Entry and exit gate for vehicle.
- (3) Security office.
- (4) Public address system.
- (5) A ramp

The second entry gate will be at the night safari which will also have the same facility as given in the entry gate - I.

4.16.3 Entry fee and other charges: -

Sr. No.	Item / particulars	Rate in Rs.
1.	Entry in to the zoo	
	Adult	50.00 per head.
	Child (up to 12 years)	25.00 per head.
	School / college / institute groups with staff / faculty	25.00 per head.
	Disabled	Free.
	Car / jeep	500.00 per car (For initial period or till battery operated trolley is made available).
2.	Battery Operated Vehicle ride for Bio-Park	
	Adult	100.00 per head.
	Child	50.00 per head.
3.	Day Safari Ride	
	Vehicle ride (Non AC)	
	Adult	250 per head
	Child	125 per head
	Vehicle ride (AC)	
	Adult	300 per head
4.	Night Safari Ride	
	Vehicle ride (Non AC)	
	Adult	500 per head
	Child	250 per head
	Vehicle ride (AC)	
	Adult	600 per head
5.	Video camera	
	Amateur	100 per day
	Professional	500 per day
	Still Camera	Free
	Film shooting	10000 per day

4.16.4 Zoo Timings: -

- (1.) April to October 9:00 am to 5:00 pm (last ticket to be issued at 4:30 pm)
- (2.) November to March 9:30 am to 4:30 pm (last ticket to be issued at 4:00 pm)

4.16.5 Night Safari Timings: -

Summer: - 6 PM to 11 PM.

Winter: - 5 PM to 10 PM.

4.16.6 Toilets and drinking water points: - These facilities are proposed to be provided near the following locations: -

1. Parking Area
2. Entrance Plaza – Southern Side
3. Break Points
4. Walking Trails
5. Central Plaza at Bio-Park
6. Central Plaza at Bird Park
7. Entrance Plaza – Northern Side

4.16.7 Cafeteria, kiosk and souvenir shop: - The visitors are likely to spend 3-4 hours to see the zoo and 1-2 hours for night safari. They are likely to take ride or walk on foot. The visitors will like to sit and rest and take light refreshment. So the facilities have been proposed for their relaxing. The location of these amenities is as under:

1. Entrance Plaza – Southern Side
2. Entrance Plaza – Northern Side
3. Break Points
4. Central Plaza at Bio-Park
5. Central Plaza at Bird Park

4.16.8 Battery Operated Vehicle ride: - A battery operated vehicle will be available near the interpretation centre for the zoo area and trails. Separate battery operated vehicle will also be available near the entrance for the night safari visit. The operation and maintenance of these

vehicles will be on contract basis. The ride charges per head are given in the above table and will be revised as per the circumstances at that moment.

4.16.9 Day safari ride: - The visitors will be taken in well protected specially designed buses in the safari. This ride will also be run on contract basis. The ride charges per head are given in the above table and will be revised as per the circumstances at that moment.

4.16.10 Wheel Chairs: - Four wheel chairs will be available at the entrance for the disabled visitors free of charges.

4.16.11 Sitting benches and shelters: - About 200 sitting benches and shelters will be provided at different locations for visitors in zoo area and night safari.

4.16.12 First-aid kit: - It will be available at the entrance with the security office, office, field office, safari entrance, reptiles' house and zoo veterinary hospital.

4.16.13 Dustbins: - About 200 dustbins will be placed at different locations to collect waste and left out.

4.17 Staff amenities: -

4.17.1 Fuel allowance: - We propose to provide fuel allowance on per month lump sum basis for all officers and supervisory staff of all sections which use their own vehicles, which is as under:

<i>Category</i>	<i>Fuel charges</i>	
	Four wheelers	Two wheelers
A and B	2000 pm or as per State Govt. rules	1200 pm or as per State Govt. rules
C	N.A	1200 pm or as per State Govt. rules

Fuel charges may be reviewed after every six months.

Chapter – 5

Personnel planning

The Zoo and Rescue centre, Gorewada has an area of 1914 ha and is likely to display about 4500 animals as per animal collection plan. This zoo expects about 21 lakh visitors of different walks of life per year. Development and expansion has been envisaged in the master plan for the years 2014-2015 to 2024-2025. A hierarchy of category of large zoo has been proposed. This includes animal, veterinary, sanitary & horticulture, education, research, store and kitchen, construction and maintenance sections. Besides animal enclosures, Indian and African safaris, Bio-park, Bird park, Trails and Night safari have been proposed. In order to maintain the park and to achieve its objectives, new posts in all sections have been proposed to be created with adequate support staff. A few sections will be out sourced for their operation. The norms of CZA to include technical staff in the personnel management has also been taken care of.

The proposed staffing pattern for this zoo is at page 107.

There is no existing staff as this zoo is to be developed afresh, however proposed staff requirement of different sections is given below:-

(1) Proposed staff requirement for animal section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Curator (Animal) or ACF	2	9300-34800 +4600 GP
2	Asst. Curator - or Range officer (Animal)	3	9300-34800 +3600 GP
3	Deputy Ranger or Head Zookeeper	3	5200-20200 +2100 GP
4	Driver (Curator vehicle)	2	5200-20200 +1900 GP
5	Indian Safari		
	Zoo keeper	4	4400-7440+ 1600 GP
	Asst. Zoo Keeper	4	4400-7440+ 1300 GP
	Gate keeper	8	4400-7440+ 1300 GP
	Safari vehicle driver	2	5200-20200+ 1900 GP

Master Plan of Zoological Park and Rescue Centre, Gorewada

	Safari vehicle attendant	2	4400-7440+ 1300 GP
	African Safari		
	Zoo keeper	2	4400-7440+ 1600 GP
	Asst. zoo keeper	2	4400-7440+ 1300 GP
	Gate keeper	4	4400-7440+ 1300 GP
	Bio – Park		
	Zoo keeper	17	4400-7440+ 1600 GP
	Asst. zoo keeper	35	4400-7440+ 1300 GP
	Birds Park		
	Zoo keeper	6	4400-7440+ 1600 GP
	Asst. zoo keeper	14	4400-7440+ 1300 GP
	Night Safari		
	Zoo keeper	9	4400-7440+ 1600 GP
	Asst. zoo keeper	15	4400-7440+ 1300 GP
	Deep Time Trail		
	Keeper	1	4400-7440+ 1600 GP
	Asst. Keeper	4	4400-7440+ 1300 GP
	Trail of senses		
	Keeper	1	4400-7440+ 1600 GP
	Asst. Keeper	4	4400-7440+ 1300 GP
	Tribal Trail		
	Keeper	1	4400-7440+ 1600 GP
	Asst. Keeper	4	4400-7440+ 1300 GP
6	Curator / ACF vehicle driver	2	5200-20200+ 1900 GP
7	Office Attendant	4	4400-7440+ 1300 GP

Master Plan of Zoological Park and Rescue Centre, Gorewada

8	Weekly off and leaves 20% of total of zoo keeper and asst. zoo keeper (refer page no 83-84)		
	Zoo keeper	8	
	Asst. keeper	16	

(2) Veterinary section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Veterinary Officer	1	9300-34800 +5400 GP
2	Asst. Veterinary Officer	1	9300-34800 +4600 GP
3	Lab Technician	1	5200-20200 +2400 GP
4	X-Ray Technician	1	5200-20200 +2400 GP
5	Compounder	1	5200-20200 +2400 GP
6	Computer operator	1	5200-20200 +2000 GP
7	Driver	2	5200-20200 +1900 GP
8	*Zoo Keeper	2	4400-7440 +1600 GP
9	*Asst. Zoo Keeper	4	4400-7440 +1300 GP
10	Attendant *Will also look after rescue centre and quarantine wards	2	4400-7440 +1300 GP

(3) Sanitary section:-

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Asst. Curator (Sani) or Sanitary Inspector	1	9300-34800+3600 GP
2	Attendant	1	4400-7440+1300 GP

Note: - (1) Asst. Curator (san) or Sanitary Inspector will be appointed on regular basis and work of the section will be out sourced.

(2) The sanitary section will be under the administrative control of Curator (horticulture and sanitation).

(4.) Horticulture Section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Curator (horticulture and sanitation)	1	9300-34800+4600 GP
2	Asst. Curator (Hor.) or Range officer (Hor.)	1	9300-34800+3600 GP
3	Driver	1	5200-20200+1900 GP
4	Attendant	2	4400-7440+1300 GP

Note: - (1) Curator (horticulture and sanitation) Asst. Curator (Hor.) or Range officer (Hor.) will be appointed on regular basis and the work of this section will be out sourced.

(5) Security section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Range officer (Security)	1	9300-34800+3600 GP
2	Deputy Range officer (Security)	2	5200-20200+2400 GP
3	Ticket Collector	4	5200-20200+1900 GP
4	Attendant	1	4400-7440 +1400 GP

Note: - (1) Range officer (security) and deputy range officer (security) and ticket collectors will be appointed on regular basis and the work of this section will be out sourced.

(2) Security section will work under the administrative control of Deputy Director

(6) Store and Kitchen section:-

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Assistant Curator (Store) or RO (Store)	1	9300-34800+3600 GP
2	Store Clerk	2	5200-20200+2100 GP

Master Plan of Zoological Park and Rescue Centre, Gorewada

3	Truck Driver	1	5200-20200+1900 GP
4	Cook cum food distributor	2	4400-7440 +1400 GP
5	Attendant	8	4400-7440 +1300 GP

Note: - (1) Assistant Curator (Store) or RO (Store) will be appointed on regular basis and rest of the manpower will be on contract basis.

(2) The section will work under the administrative control of Deputy Director.

(7) Construction and maintenance section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Curator (Engg.) or Asst. Engineer	1	9300-34800+4600 GP
2	Asst. Curator or JE (Elec. & Civil)	2	9300-34800+3600 GP
3	Draft man	1	5200-20200+2800 GP
4	LDC	1	5200-20200+2100 GP
5	Driver	1	5200-20200+1900 GP
6	Electrician	2	5200-20200+1900 GP
7	Black Smith/Welder	1	5200-20200+1900 GP
8	Plumber	1	5200-20200+1900 GP
9	Mason	1	5200-20200+1900 GP
10	Carpenter	1	5200-20200+1900 GP
11	Painter	1	5200-20200+1900 GP
12	Pump Driver	1	4400+7440 +1400 GP
13	Attendant	10	4400+7440 +1300 GP

Note: - (1) Curator (Engg.) or Asst. Engineer, Asst. Curator or JE (Elec. & Civil, Draft man will be on deputation and rest of manpower will be on contract basis.

(2) All the major construction works will be undertaken by inviting tenders as per state govt. rules.

(8) Education section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Curator(Ed) or Edu- Officer	1	9300-34800+4600 GP
2	Asst. Curator (Ed) or RO (Edu)	1	9300-34800+3600 GP
3	Library Asst.	1	5200-20200+2400 GP
4	Audio- Visual operator	1	5200-20200+2100 GP
5	Computer operator	1	5200-20200+2100 GP
6	Driver	1	5200-20200+1900 GP
7	Attendant	4	4400-7440+1300 GP

Note: - (1) Curator (Ed) or Edu- Officer, Asst. Curator (Ed) or RO (Edu) will be on regular basis and rest of the staff will be on contract.

(9) Research section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1	Curator (Res.) or Research Officer or Biologist	1	9300-34800+4600 GP
2	Asst. Curator or RO (Research)	1	9300-34800+3600 GP
3	Driver	1	5200-20200+1900 GP
4	Field Asst.	2	4400-7440+1300 GP

Note :- (1) Curator (Res.) or Research Officer, Asst. Curator or RO (Research) will be on regular basis and rest of the staff will be on contract.

(10) Administration section: -

(i) Establishment section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1.	Office Supdt. Or Head clerk	1	9300-34800+3200 GP
2.	UDC	2	5200-20200+2800 GP

Master Plan of Zoological Park and Rescue Centre, Gorewada

3.	LDC	4	5200-20200+2100 GP
4.	Peon	1	4400-7440+1300 GP

(ii) Account section: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1.	Accountant	1	9300-34800+3200 GP
2.	UDC	1	5200-20200+2800 GP
3.	LDC (booking clerk)	4	5200-20200+2100 GP
4.	LDC (office)	2	5200-20200+2100 GP
5.	Cashier (LDC)	1	5200-20200+2100 GP
6.	Peon	1	4400-7440+1300 GP

(iii) Office of Deputy Director: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1.	Deputy Director	1	15600-39100+5400 GP
2.	Personnel Assistant Gr-II	1	9300-34800+2800 GP
3.	Driver	1	5200-20200+1900 GP
4.	Peon	1	4400-7440 +1300 GP

Note: - (1) Deputy Director and PA will be on regular basis and rest of the staff will be on contract.

(iv) Office of Director: -

<i>Proposed Staff</i>			
<i>S. No.</i>	<i>Post</i>	<i>No. of Post</i>	<i>Pay Scale</i>
1.	Director	1	15600-39100+7600 GP
2.	Personnel Assistant Gr-I	1	9300-34800+3600 GP
3.	Driver	1	5200-20200+1900 GP
4.	Peon	2	4400-7440 +1300 GP

Note: - (1) Director and PA will be on regular basis and rest of the staff will be on contract.

5.1 Outsourcing: -

The project will be carried out in PPP mode and a SPV will be formed between FDCM and the private operator with major share of FDCM. Under the SPV, the following service will be managed or leased out by the private operator: -

- (1) **Sanitation:** (Cleaning and sweeping of roads path office buildings, cleaning of toilets and water points, collection of garbage, leftover, dry leaves, grasses and their disposal, cleaning benches, shelter and signages, mosquito, rodent and fly control and any other sanitation works).
- (2) **Horticulture:** (Development and maintenance of lawns, landscaping, plantation and nursery, pruning and cleaning of hedges, trees, preparation and maintenance of earthen pots, watering, sprinkling and manuring of lawns, hedges, trees and seedlings, collection of seeds, preparation of manure and other horticulture works).
- (3) **Security:** (Patrolling of zoo area, maintenance of law and order, frisking, control of entry of stray animals, duty at office and gates and other security related works).
- (4) Cafeteria, kiosk and souvenir shop.
- (5) Battery operated trolley.
- (6) Operation of Safari ride.
- (7) Parking.
- (8) Cloak room.

5.2 Manpower on contract: - (Lab. technician, x-ray technician, compounder, computer operators, store clerk, cook cum food distributors, truck driver, electrician, black smith / welder, plumber, mason, carpenter, painter, pump driver, library assistant, audio visual operator, UDCs, LDCs drivers, peons, attendants and field assistants except cashier and booking clerk, zoo keepers and asst. zoo keepers.)

5.3 Manpower on deputation: - (Veterinary Officer, Assistant Vet. Officer, Asst. Engineer, JE. (Civil and Electrical) and Draftsman. If manpower does not available on deputation than engagement on contract will be made).

5.4 Brief resume of personnel required for operation of the zoo: -

Sr. No.	Name of post	Required number	Pay scale	Basic qualification
1	Director	1	15600-39100+7600 GP	IFS or State cadre forest officer with Diploma in wildlife Management.
2	Deputy Director	1	15600-39100+5400 GP	IFS or State Cadre forest officer with Diploma in wildlife Management.
3	Veterinary Officer	1	9300-34800+5400 GP	M. Vsc in Medicine with 3 years working experience in the field.
4	Asst. Vet. Officer	1	9300-34800+4600 GP	B Vsc with 2 years working experience in the field or M. Vsc.
5	Curator (Animal) / ACF	2	9300-34800+4600 GP	M. Sc. In Zoology or Wildlife, or B.sc. (Bio) with 5 year of managing wild animals in captivity.
6	Curator (San & Hor) ACF	1	9300-34800+4600 GP	M. Sc. In Horticulture or Botany or B.Sc. in Horticulture or Botany with 5 year experience in the field.
7	Curator (Eng) or Asst. Eng	1	9300-34800+4600 GP	BE (Civil) or Diploma in Civil Engineering with 5 years working experience in the field.

Master Plan of Zoological Park and Rescue Centre, Gorewada

8	Curator (Ed) /Edu. Officer	1	9300-34800+4600 GP	M. Sc. In Zoology or Wildlife or B. Sc. (Bio) B. Ed with 5 years of teaching experience.
9	Curator (Re.) or Research officer or Biologist	1	9300-34800+4600 GP	M. Sc. In Zoology or Wildlife, preferably Ph.D in Zoology or wildlife.
10	Asst. Curator (Animal) or RO (Animal)	3	9300-34800+3600 GP	M. Sc in Zoology or Wildlife or B. Sc. With (Bio) with 5 years working experience in the field.
11	Asst. Curator (Sa.) or Sanitary Inspector	1	9300-34800+3600 GP	12 th pass with Diploma in Sanitary inspector or equivalent.
12	Asst. Curator (Horticulture) or RO (Hor.)	1	9300-34800+3600 GP	B. Sc with biology or horticulture.
13	Asst. Curator (security) or RO Security	1	9300-34800+3600 GP	Graduate from recognized university or ex-servicemen at least of the rank of Lt.
14	Asst. Curator (store)/RO Store	1	9300-34800+3600 GP	Graduate from recognized university with knowledge of procurement of store items and their disposals & knowledge of computer.
15	Asst. Curators (Civil & Ele) or JE (Civil & Ele)	2	9300-34800+3600 GP	1. Diploma in civil engineering with experience of construction work 2. Diploma in electrical engineering with experience of electrical work.

Master Plan of Zoological Park and Rescue Centre, Gorewada

16	Asst. Curator (Edu.) or RO(Edu)	1	9300-34800+3600 GP	M.Sc. in Zoology or Wildlife or B. Sc. (Bio) B. Ed.
17	Asst. Curator (Research) or RO (RE)	1	9300-34800+3600 GP	M. Sc. In Zoology or Wildlife.
18	Officer Supdt.	1	9300-34800+3600 GP	Graduate from recognized university with 5 years working experience in the cadre & knowledge of computer.
19	Accountant	1	9300-34800+3600 GP	B. Com from recognized university with 5 years working experience in the cadre & knowledge of computer.
20	Draftsman	1	5200-20200+2800 GP	12 th passed with trade certificate from ITI.
21	Personnel Assistant Gr. I	1	9300-34800+3600 GP	Graduate with English shorthand speed of 80 words / minute and English typing speed 40 wpm and 1 year working experience.
22	Personnel Assistant Gr. II	1	5200-20200+2800 GP	Graduate with English shorthand speed of 80 words / minute and English typing speed 40 wpm.
23	Lab. Technician	1	5200-20200+2400 GP	12 th passed with diploma in lab technology.
24	X-ray Technician	1	5200-20200+2400 GP	12 th passed with diploma in radiology.
25	Compounder	1	5200-20200+2400 GP	12 th passed with certificate of Vet. Compounder course or

Master Plan of Zoological Park and Rescue Centre, Gorewada

				equivalent.
26	Deputy Ranger (Security)	2	5200-20200+2400 GP	Graduate with knowledge of security management.
27	Library Asst.	1	5200-20200+2400 GP	B.A. or B. Sc. with diploma in library science.
28	UDC	3	5200-20200+2800 GP	Graduate from recognized university with 5 years experience of secretarial job or 12 th passed with 8 years experience of secretarial job.
29	Deputy Ranger/ Head zoo keeper	3	5200-20200+2400 GP	Science Graduate or 12 th passed with experience of 3 years in the field.
30	Computer Operator	2	5200-20200+2100 GP	Graduate with knowledge of commonly in use software's and their operation.
31	Store Clerk	2	5200-20200+2100 GP	Graduate or 12 th passed with knowledge of computer operation.
32	Audio visual operator	1	5200-20200+2100 GP	12 th passed with diploma in audio visual operation.
33	LDC	12	5200-20200+2100 GP	Graduate or 12 th passed with knowledge of computer operation.
34	Truck Driver (Store)	1	5200-20200+1900 GP	12 th passed with license to drive heavy and light vehicle. Should be aware of maintenance and minor repairs aspect.

Master Plan of Zoological Park and Rescue Centre, Gorewada

35	Driver (Officer's vehicle)	8	5200-20200+1900 GP	12 th passed with license to drive heavy and light vehicle. Should be aware of maintenance and minor repairs aspect.
36	Driver (Safari vehicle)	2	5200-20200+1900 GP	12 th passed with license to drive heavy and light vehicle. Should be aware of maintenance and minor repairs aspect.
37	Electrician	2	5200-20200+1900 GP	12 th passed with certificate course in the field from ITI.
38	Black Smith / welder	1	5200-20200+1900 GP	12 th passed with certificate course in the field from ITI.
39	Plumber	1	5200-20200+1900 GP	12 th passed with certificate course in the field from ITI.
40	Mason	1	5200-20200+1900 GP	12 th passed with certificate course in the field from ITI.
41	Carpenter	1	5200-20200+1900 GP	12 th passed with certificate course in the field from ITI.
42	Painter	1	5200-20200+1900 GP	12 th passed with certificate course in the field from ITI.
43	Zoo keeper	49	4400 - 7440+1600 GP	10 th passed or middle with 3 years of working experience in the field.
44	Ticket collector	4	5200-20200+1900 GP	10 th passed.
45	Cook cum food distributor	2	4400 - 7440+1300 GP	10 th passed or middle with knowledge of cooking.
46	Pump Driver	1	4400 - 7440+1300 GP	10 th passed or middle with knowledge pump deriving
47	Asst. Zoo Keeper	96	4400 - 7440+1300 GP	10 th passed or middle with 3 years working experience in the field

Master Plan of Zoological Park and Rescue Centre, Gorewada

48	Attendant	49	4400 - 7440+1300 GP	10th passed or middle with multi skilled aptitude
49	Field Assistant	2	4400 - 7440+1300 GP	10th passed or middle with multi skilled aptitude
50	Peon	5	4400 - 7440+1300 GP	10th passed or middle with multi skilled aptitude
	Total post.	281	----	----

Chapter – 6

Disaster Management

The disaster management act. 2005 defines it as means a catastrophe, mishap, calamity or grave occurrence affecting any area, arising from natural or man cause, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of property, or damage to, or degradation of environment, and is such a nature or magnitudes to be beyond the coping capacity of the community of the different area.

Disaster management involves continuous planning, coordinating and implementation of measures for: -

- (1) Preparation to deal with disaster situation.
- (2) To prevent danger of threat.
- (3) Capacity building.
- (4) Immediate response to calamities.
- (5) Evacuation, rescue, relief and rehabilitation.

The Zoological park and Rescue centre, Gorewada has an area of 1914 ha with lots of vegetation, reservoir. The undergrowth, dry leaves and twigs may pose problem of fire during summer. This zoo is likely to display over 4500 animals and about 21 lakhs visitors are expected to visit this zoo annually.

The potential hazards of this zoo are as under:-

- (1) Fire.
- (2) Flood.
- (3) Earth quakes.
- (4) Thunder storm.
- (5) Law and order problem.

6.1 Disaster management team: -

This should be formed well in advance. They should be well aware of the zoo topography, its inmates, facilities available and the contact person of other departments.

The team members can be: -

- (1) Director of Zoo – For making plan and taking decision.
- (2) Coordinator – Should hold a responsible position and be able to summon person and resources during emergencies. He has to ensure the implementation of the plan.
- (3) Unit coordinator – The zoo can be divided into different units or sections. Each section will work under the control and direction of unit coordinator as per plan.
- (4) Skilled / unskilled personnel – These include, para-vet staff, animal keepers, mali, guard, sweeper, drivers, cutter, plumber, electricians and labour. The number depends upon the magnitude of the problem.

6.2 Fire: - This could be the common hazard particularly in the summer season due to under growth, dry leaves and grasses. Regular cutting of fire line should be done before the onset of summer. Fire lines should be kept clean of dry leaves and grasses. The gates and road should be so designed that fire brigades can reach the spot without any hindrance. The zoo should acquire necessary fire extinguishing equipments in consultation with the fire services of the state and the staff must know how to operate fire extinguishing equipments. The water bodies and road network will act as a fire barrier.

6.3 Flood: - The terrain of zoo is largely plain, however the chances of flood cannot be ruled out. In the event of flood, following measures would be taken.

- (1) The animals would be displayed at higher level.
- (2) Keep staff, pumps, fuel and lubricants readily available during rainy season.
- (3) A truck with transport cages would also be kept ready.
- (4) Veterinary staff with medicine and equipments would be kept ready.
- (5) Co-operation of other departments would be sought.
- (6) Keep all drains and sewage lines clean.
- (7) Following equipments would be kept ready.

Master Plan of Zoological Park and Rescue Centre, Gorewada

S. No.	Items	No.
1	Flashlight / Torch light & Spare Batteries	8
2	First-aid Kit	4
3	Shovels	12
4	Axe	10
5	Generator (with sufficient fuel)	1
6	Tranquilizing Gun with drugs	2 sets
7	Welding machine (with sufficient welding rods)	1 sets
8	Ropes & Net	As per demand
9	Transport cages (different sizes)	10
10	Electric saw	1
11	Construction & repair material	As per demand
12	Gas cutter	1
13	Earth moving equipments	1
14	Ambulance	1
15	Truck	1
16	Diesel pump-portable (This should be periodically checked)	1
17	Folding ladder	2
18	Adequate stock of consumables	As per demands
19	Fixed & portable water jets	As per demands

The department shall keep the contact number of the persons dealing / supplying the following items:-

- (1) Transport company
- (2) Crane supplier
- (3) JCB supplier
- (4) Construction material supplier

(5) Electrical item supplier

Telephone numbers of all above would be made handy at more than one location.

6.4 Earth quake: - It can destroy and settle the building and its foundation in few seconds. To check this type of disaster, (1) earth quake resistant buildings will be constructed with the suggestion from a technical team. (2) The drawing of all the buildings, service lines will be readily available. (3) The telephone no. of technical officer like structural engineer will be handy. (4) The contact number of different items suppliers will be made handy as mentioned above.

6.5 Thunder storm: - April and May be the month of incidence of thunder storm. The thunder storm may be associated with violent squalls, accompanied by heavy rain. This may result in the uprooting of large number of trees which may fall on road and buildings. Immediate action to remove the fallen / uprooted trees will be undertaken. For this, implements as mentioned above table will be made available.

6.6 Law and order problem: - If the law and order problem arises with in zoo employees, assistance from the police would be sought. The security section would also monitor the situation. The law and order problem will be tackled by taking the following measures:-

- (1) Adequate storage facilities will be available to store feed items at least for 7 days
- (2) A deep freezer will be available to store beef for 2-3 days
- (3) The cleaning of enclosures and distribution of feed items will be got done by contract labour under the guidance of supervisors
- (4) In case the law and order problem arises in the city, it will be difficult for staff to reach the zoo so the essential staff like veterinarian, animal keepers, para-vet and sweeper will be provided residential accommodation near the zoo premises.

6.7 Precautionary measures: -

(1) Siren (alarm) system: - An alarm (siren) system will be fixed in the zoo premises with adequate range. It will be under the control of RO (security) and is located in the security office. The siren will be used when unpredicted incident happens in the zoo premises.

(2) Evacuation of the visitors: - The zoo shall have a detailed written protocol for evacuating visitors in hour of every crisis. There will be provision of emergency exits and a public address system to communicate to the visitors the routes to be followed to get out of the zoo in the event of any disaster / crisis. Directional boards will be fixed at appropriate locations leading to exit point for safely evacuation.

(3) Staff training and mock drill: - The zoo will arrange staff training of each category to have a clear idea of emergency protocols. Head of each section will be responsible for training of persons of his department. The park will also conduct unscheduled mock drill to assess capability viz-

- a. Preparation of various departments.
- b. Response time.
- c. Coordination.
- d. Time taken to resolve the issue.

Director will closely monitor the response.

Chapter 7

Contingency plan

It is very much needed by the zoo that they should have a well-documented technical contingency plans for specific and high priority animal diseases. Apart from it every zoo should prepare a resource and financial plan too for dealing with emergency situations as it is being practiced in all similar institutions.

7.1 Escape of animals from enclosure: -

As the animal enclosures at the zoo and rescue centre, Gorewada shall be protected by a compound wall of about 2.25 mtr, there shall be no chance of animals escaping from it. However, the zoo authorities shall conduct detailed patrolling inside and outside of the zoo periphery and the enclosures therein to avoid any such mishaps. The keepers of each and every enclosure thoroughly check the public exhibit areas, fences, night shelter rooms and service areas before releasing the animals in the exhibit area and after bringing them back to the night shelter. Public safety shall be on the highest priority; otherwise the damage caused by the escaped animals will be immense, in terms of the injuries/fatalities done to the zoo guests/staff of the zoo by the escaped animals and in terms of possible loss of the wild animal.

All the zoo keepers shall be sensitized about the issue of animal escapes during their zoo keepers training programmes and often during interactions with the technical staffs of the park.

The trees around the enclosures are trimmed to keep them in shape and to avoid falling of branches in to the exhibit which may serve as a escape route for the animals, thus the same should be monitored on regular basis and shall be trimmed.

Water in the wet moated enclosures, if any, shall be maintained to a level so that the animals housed in these wet moats can't cross the barrier.

The gates and windows are painted once in a year to avoid rusting of the same Barriers are designed, constructed and maintained to contain animals within enclosures.

Gates and doors to enclosures are strong and effective in containing the animals, as the rest of the enclosure barriers.

Gates and doors to animal enclosures where the public are admitted to any enclosure, standoff barrier are designed and maintained so as not to trap or otherwise injure visitors, particularly children or those with disabilities.

For dealing with animal escapes

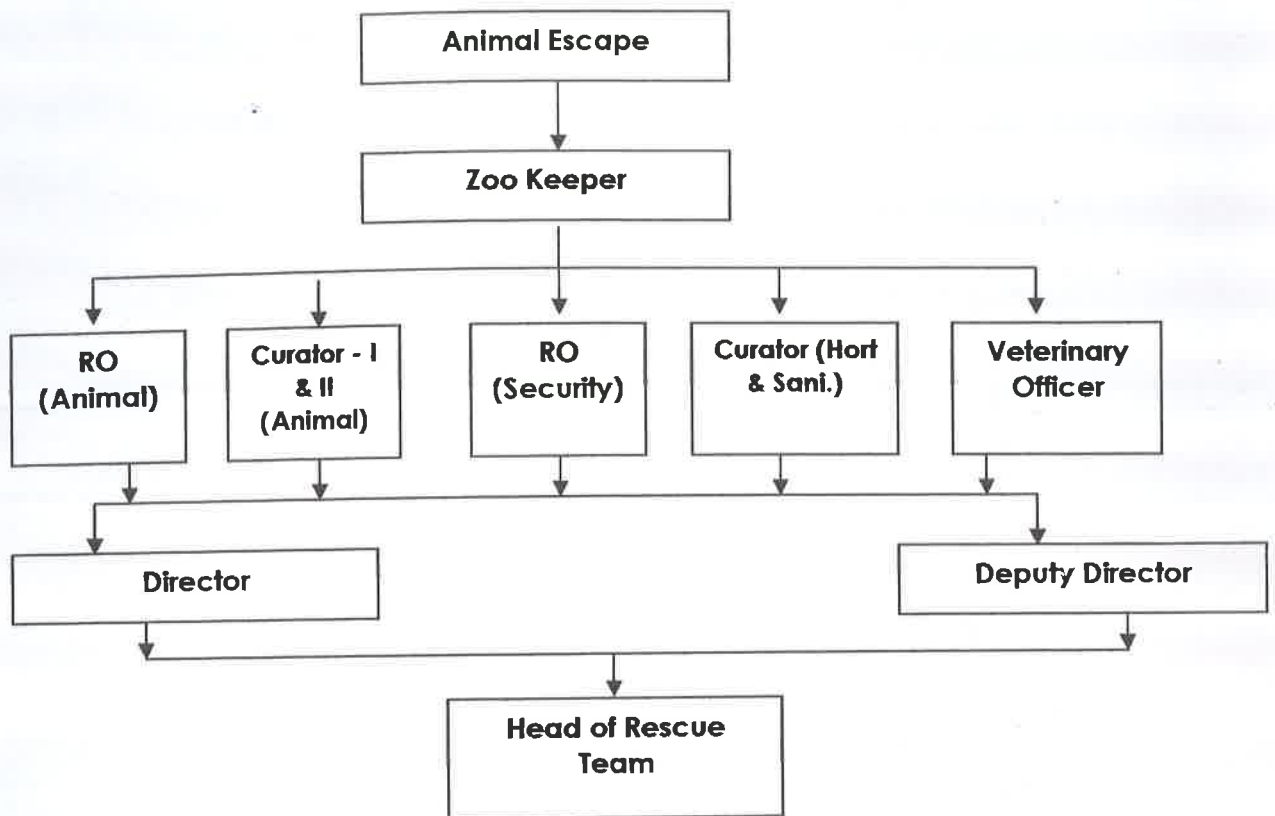
The equipments required pertaining to deal the escape of different captive animals are given in the table.

S. No.	Captive animals	Minimal requirement
1.	Large carnivores	Nets, pole syringes, snare, Projectile guns and darts, blow dart equipment, crates, squeeze cages etc
2.	Small carnivores	Nets, gloves, pole syringes, snare, crates, blow dart equipment, crates, squeeze cage etc
3.	Hoofed stock	Projectile guns and darts, blow dart equipment, crates etc
4.	Small mammals (e.g. primates)	Nets, gloves, pole syringe, snares, plastic tubes, blow dart equipment, crates, squeeze cage
5.	Large primates	Nets, gloves, pole syringe, projectile guns and darts, blow dart equipment
6.	Birds	Nets, gloves, towels, pole syringe
7.	Reptiles	Nets, gloves, snares, plastic shield, bags, plastic tubes, snake tong, snake hook

Storage of Equipment

The above equipments are stored in the respective range office of the zoo who solely deals the animal section of the entire zoo. Apart from this all the field staffs like zoo Keepers, Malis, Security Guards, Rangers and Deputy Director shall be given adequate training on handling tranquilizing equipment and chemicals for controlling big mammals like Tiger, Leopard, Bears. The tranquilizing kits shall be stored in the Director's office and the location of the equipment and the phone numbers shall be informed to all trained field staffs in order to take immediate action for capturing escaped animals.

Flow of information



Chain of command



the Director's office and the kitchen
field staff in order to
The <math>K</math> should be kept in closed box and properly disposed

7.2. Monkey and dog menace

Monkey menace: -

Monkeys in park pose a great threat not only to the visitors but also to the animal collections of the park. These monkeys may carry various life threatening diseases like T.B.

Availability of abundant food in open areas of the park attracts the monkeys into it. Monkeys in park get their food from the fruiting trees and sometimes they share the food given to the animal collections. The visitors of the park sometimes feed the monkeys also.

For controlling the monkey menace the following actions are taken

- Visitors are not allowed to feed the monkeys
- Animal feeding should be done in the closed kraals.
- The monkeys are captured and vasectomy and tubectomised and then released back to check their increase in population.

Controlling Dogs: -

Even though a boundary wall shall guards the zoo and rescue centre, Gorewada, at times, the dogs can enter the zoo. Dogs that enter the zoo can cause havoc among the free ranging animals of the park and can cause deaths among them. And if they happen to enter the enclosures of deer family it will result in heavy losses of zoo animals.

Dogs can enter the zoo from the breaches in boundary wall, sometimes from the main gate, if it is not guarded well even for a little time. Unscrupulous elements may release dogs in to the zoo.

For controlling the Dog menace within the zoo the following measures are undertaken

- The boundary wall is checked periodically
- The watchmen keep a look out for the stray dogs
- Dogs that enter the zoo are captured and released or handed over to animal welfare organizations for rehabilitation.
- The main gates shall be guarded by staffs of zoo.
- The leftover meat should be kept in closed bins and properly disposed.

7.3. Arrangement of food in case of strike (non-supply of contractor)

The supply of food and feed for the animals may be affected by public strikes, vehicle breakdown, non-supply of the contractor, natural calamities etc. In these circumstances, it is essential to get the required feed items to be fed.

- The store of zoo shall have the capacity to store non-perishable feed for a period of three months. The factor to be considered here is that, if the feed is stored for more than a month, insect pests and rodents may destroy the quality of feed.
- For perishable feed items, zoo shall have a cold storage unit having two tones capacity and can accommodate feed required for a period of one week.

7.4. Snake bite

- Enough anti-snake venom is stocked in the zoo veterinary hospital and will be used in case of any eventuality.
- Vehicles are readily available to transport the victim to the nearest hospital for proper treatment and care.

7.5. Visitor getting injured/ visitor falling inside the enclosure

Visitors getting injured:

- First aid boxes are kept ready in important points of the zoo like entrance complex, Main office and Veterinary Hospital.
- First aid boxes will also be available in the safari vehicles.
- Walkie-talkies are also provided to the drivers of the vehicles and Safari staffs for easy and quick communication.
- Vehicles are readily available to transport the victim to the nearest hospital for proper treatment and care.

Visitor falling inside the enclosure

- Ropes, ladders, nets are kept ready in the respective offices of the Range officers.
- Once the information is passed to the Range officer, he will depute a team of skilled zoo keepers to rescue the victim.
- The animals in the enclosures will be brought back to the night shelter to facilitate the operation.
- Sometimes the animals may have to be chemically immobilized to avoid any injury to the fallen victim or to the animal.

7.6. Fighting among animals: -

Every effort will be made to separate the fighting animals without causing serious injuries. The fighting animals will be driven back to the night shelter and kraals (herbivores) to avoid further fighting. Many a times fight occurs during breeding season and the animals are watched carefully to avoid fight and if any fight happens, they will be separated. In Felids only those animals that are compatible will be released in the public exhibit. If needed, the animals will be chemically immobilized and to bring them back to the night shelter.

7.7. Breakdown of power supply: -

The Zoo and Rescue Centre, Gorewada shall have 521.96 Kw power generators and fuel for the same to run a minimum of 24 hours is kept in stock. The total load the DG can take under emergency / power outage is 625 Kilowatt which is much higher than the requirement. Therefore the DG has adequate capacity for additional loads if deemed fit in future. The generator will be used to supply power for the entrance complex, stores, hospital, office and exhibits that require continuous power supply.

7.8. First-aid

Providing first aid for the needy people is very important, for it the following points are kept in mind

- First-aid equipment is readily accessible on the zoo premises.
- First aid points are adequately signed.
- An adequate number of staff trained in first-aid is available during the park's normal operating hours
- Written instructions are provided for staff in the provision of health care and the procedures to be followed in the event of an incident involving any venomous animal and a visitor or staff member. These instructions include immediate action to be taken and required information on a prepared form for forwarding to the local hospital which would include:
 - The nature of the bite or sting and the species inflicting it (if the species is known);
 - The specification, for cross-reference purposes, of the anti-venom which accompanies the patient;
 - The telephone number of the zoo and of an appropriate senior staff member;
 - Details of the vet or any staff involved in handling venomous species

7.9. For warning people about the emergencies: -

The following equipments shall be made available at the Safari, zoo premises and night safari for such emergencies to warn the public.

S. No.	Minimal requirement
1	Alarm systems
2	Public address system
3	Radio communications (walkie-talkie)

7.10 Breakdown of Safari Vehicles: -

The Zoo and Rescue Centre, Gorewada shall keep and use the high quality vehicles which are noiseless and safe for animal as well as for visitors. In case if there is breakdown of safari vehicle which is carrying the visitors to the safaris, there shall be two numbers of standby vehicle which shall be available 24 hrs to meet such emergencies and for the safety of visitors. This vehicle shall also be designed in such way that at no point of time animals shall be able to harm the visitors as well the staff, which are involved in the vehicle management including vehicle driver, safari guide and attendant.

.....

Chapter 8

Capacity Building

Skilled and knowledgeable personnel are essential to maintain and up-keep Wild Animal Parks. As time changes the new challenges will emerge and the staff is required to upgrade their skills and potential to handle any eventualities. Capacity building of different category of office staff and frontline personnel is very essential for better care of animals, providing better nature education and smooth function of the Park.

8.1 In-house training: - A cursory look at the history and growth of zoo does indicate the efficient functioning of the zoo with available competent and experience staff. Skills acquired are getting transferred to next generation. Documentation and regular demonstration of the skills and knowledge acquired has to be done on regular basis. Therefore, it is proposed to organize training sessions with experienced people for the benefit of youngsters. A group of youngsters would be attached to such senior staff for some time, so that all the fine skills & nuances of animal handling and care could be learnt "on job". Also, working in groups fosters team spirit and brings out the best of the ordinary, which is the modus operandi of modern corporate work.

To Encourage Specializations and Interaction with Retired Staff: - Tapping the experience of skilled and retired personnel is advantageous to maintain the zoo in good conditions. By virtue of spending lifetime in animal handling and care, some would develop finite & highly special knowledge about particular animal with respect to behavior and breeding ability. Zoo must tap this knowledge and encourage willing personnel among the existing staff to acquire and get expertise in particular group of animal species. It is desirable to elicit the preferences of each person, and assign jobs to attain specialization in the field. In this background, it is planned to conduct interactive sessions to select staff with notable retired staff in Animal Keeping, Horticulture, Security, Workshop and Veterinary care.

Rewards to staff members: - Motivation is important to sustain the interest of staff members. Therefore, the zoo shall introduce rewards to staff members recognizing their service for exemplary services. Cash awards may also be given to the animal keepers, gardeners and other staff with appreciation certificate. Further it is also proposed to institute awards in on annual

basis to the best outstanding contributor, best animal keeper, best gardener and special award respectively.

1. Managing Director, Forest Development Corporation Maharashtra Award.
2. Gorewada Zoo and Rescue Centre Memorial Award.
3. Zoo Director Award.

It is needless to state that the success of the zoo management depends upon the quality of staff working in the zoo. The recruitment is not so easy, especially the zoo keepers, as the job of a keeper is quite risky and require guts and courage to work with the wild creatures. The cadre and recruitment rules will be framed for the recruitment of Assistant Zoo Keeper and Zoo Keeper at the entry level. Experience and skills will be given priority in recruitment. The staff handling the animals will be on regular basis for accountability of the upkeep of precious animals.

Further security, horticulture, sanitation, workshop would be outsourced after following transparency act and rules.

8.2 Keepers Training Programme: - The zoo and rescue centre, Gorewada shall organize keepers training programme from time to time to upgrade their knowledge in the scientific management of zoo. The themes of the training may include crisis management and zoo emergencies, enrichment, management of birds.

The keepers shall be trained to entrust them with higher responsibility and incentives.

8.3 Administrative Training: - The personnel working in administration section in the zoo shall be sent for training to improve their skills. Normally after initial recruitment, they will be working continuously without any opportunity to enhance their skills. Their talents need to be recognized and encouraged for exposure training for the benefit of the zoo.

8.4 Top level, middle level training on zoo management: - The Wildlife Institute of India and the Central Zoo Authority regularly conduct special and focused training and workshops on different aspects of wild life management and policy. Participation of top level management of zoo is must and essential to upgrade their knowledge and bring changes and adopt newer

techniques as enunciated in national park policies and rules. Regular interaction and opportunity to visit other parks would help to acquire suitable animals, enrichment of enclosure and other aspects of zoo management such as crowd management and initiation of better visitor facilities etc. It also provides an opportunity to interact with many experts in the field, who shall participate as faculty in the training programme. The zoo shall take the benefit of the training to have trained officers in the management for better results.

8.5 Training to the Director: - Government should post an officer to work as the Director for at least 5 years and he should be exposed for all the training at least in 2 foreign countries viz. Durrell Wildlife Preservation Trust and in Smithsonian Institute. He should also be sent to all the zoos to gain experience and to run the zoo on scientific lines.

8.6 Zoo Vets Training: The works of the zoo vets are very important from the point of view of the healthcare management of animals. As the zoo shall house valuable animals and failure to diagnose and able to provide treatment in time may lose the valuable animals.

8.7 Zoo Educators training: As conservation education is one of the fundamental objectives of zoo, the education officer shall be trained properly to organize training programme for the students, NGO's.

8.8 Zoo volunteers training: The volunteers should be given orientation training regularly, so that they can assist the zoo management in due necessities.

8.9 Regional committee of experts: A regional committee of experts constituting leading veterinarians should be nominated to train zoo vets and to assist in handling the case as and when required.

As the staff gets older, they may not be in a position to carry out their assigned function. They are to be assessed and evaluated regularly and jobs based on their mental and physical capacity may be assigned to them for optimum efficiency in work. The staff has to be protected from exposure to risks in the course of their duty.

The up gradation of the knowledge and skill of the staff is a continuous process. They must get opportunity to know and understand the new methods, technologies and findings regarding the management of animals.

During the course of time the training needs of the different category of staff shall be assessed. Education and skill development module for each category shall be designed and agency/organization shall be identified for up gradation of their skill and knowledge.

The exchange programme between parks shall be encouraged to give them exposure about the new techniques and management skills in vogue in various parks of the country.

.....

Chapter 9

E-Governance

The concept of e-governance is now a reality. Present is the age of information and efficiency of organization depends upon its information system. It not only helps managers at various levels in organization but also helps in dissemination of information to the needful. In this, the core strategy is to move ahead in a systematic manner, and the approach should be to achieve the success step by step ensuring convenience, efficiency, transparency and reliability.

At zoo and rescue centre, Gorewada, the following will be the areas which will generate the need for establishment of E-governance:

- i) Retrieval of Information with respect to following: -
 - a. Repetitive processing of information manually
 - b. Delays in transfer of information
 - c. Erratic reporting of information
 - d. Lack of standard formats
 - e. Non compliance of the schedules.

While devising the programme at zoo and rescue centre, Gorewada, following thrust areas will be given special attention:

- i) Management aspects related to protection including monitoring of health of the animals kept at zoo and rescue centre, Gorewada.
- ii) Information related to establishment matters including deployment of staff.
- iii) Resource inventory including animals housed at zoo and rescue centre, Gorewada and development works.
- iv) Management planning and perspective planning.
- v) General periodic returns.
- vi) Annual Plan, Budgeting, Monitoring & Evaluation.
- vii) Resource inventory of assets and other equipment.
- viii) Tourism activities.
- ix) Documentation of resources.
- x) Environment awareness and Education Programmes.

- xi) Inventory and information related to inhabitants around the zoo.
- xii) Information relating to feed and fodder, history cards and animal transfers.

To establish and implement the programme smooth functioning, the action plan will include:

- i) Identification of Information needs at different levels.
- ii) The data source will be identified.
- iii) Standardized format for collecting and recording data will be finalized.
- iv) Communication network for information transfer and feedback will be established.
- v) Periodicity of data input and transmission of information will be standardized.
- vi) Formats for reporting will be finalized as per the needs of different levels.
- vii) Zoo notebooks at Gorewada zoo are to be maintained regularly. It is expected that happenings in the zoo should be recorded in these books by care takers, Veterinary Doctor & senior management personals respectively.
- viii) Record of vandalism cases or any other act not commensurate with provisions of Recognition of Zoo Rules, 1992 and Wildlife (Protection) Act, 1972 should be maintained at management level.
- ix) Computer based framework will be used for inventory and management purposes including monitoring and evaluation.
- x) Efficacy of system will be periodically reviewed and the necessary alterations in the system will be made as per the requirement.

While designing the MIS following steps should be taken into consideration by the management:

- i) Basic character of data collected at field level should remain the same.
- ii) Repetition of items of input information should be avoided.
- iii) Format of output data should be kept similar as far as possible.
- iv) Data should be easily accessible.
- v) The programme is to be improved according to needs.

Besides, a website is to be created and should be updated frequently and important events will be publicized among the people to generate awareness. Visitors will be provided with the facility to book their tickets using website (e-ticketing).

Master Plan of Zoological Park and Rescue Centre, Gorewada

Staff involved in management of zoo should be provided with smart I-cards in which their personal details will be stored. The profile of the staff should be kept and database should be used for future management.

Closed circuit television sets will be installed in strategic locations like entrance, parking, stores, hospital and few animal enclosures to monitor the visiting public and the activity of animals and to avoid vandalism. The activities will be monitored at management level.

All the computers in the park will be networked to form LAN and internet connection will be given so that the documents can be accessed from any computer.

Chapter – 10

Budget Analysis

The budget has been prepared by taking into consideration of CSR and market rates. The costs are including pre-opening cost, contingencies & consultancy fees of the consultant. The budget is envisaged for 10 years which will be reviewed thereafter.

10.1 Construction and Development: -

Sr. No.	Description	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total Amount in crore
1	Gorewada Reserve	4.87	---	---	---	---	---	---	---	---	---	---	4.87
2	Water Reservoir	2.00	3.53	2.44	---	---	---	---	---	---	---	---	7.97
3	Day Safari (Indian & African)												
	Indian Safari (145 Ha)	---	9.41	15.67	---	---	---	---	---	---	---	---	25.08
	African Safari (90 Ha)	---	4.48	12.27	---	---	---	---	---	---	---	---	16.75
4	Night Safari (65 Ha)												
	Safari	---	8.89	14.40	11.23	5.81	---	---	---	---	---	---	40.33
	Entrance Plaza & Area Development	---	5.84	9.55	8.21	---	---	---	---	---	---	---	23.60
5	Bio-Park (30 Ha)	---	6.31	9.63	8.43	---	---	---	---	---	---	---	24.37
7	Bird Park (5 Ha)	---	0.48	10.63	4.53	---	---	---	---	---	---	---	15.64
8	Trail of Sense (10 Ha)	---	---	0.60	0.66	4.65	---	---	---	---	---	---	5.91
9	Tribal Village Trail (7.5 Ha)	---	---	0.075	0.12	4.32	---	---	---	---	---	---	4.515
10	Deep Time Trail(5 Ha)	---	---	0.10	0.13	10.37	---	---	---	---	---	---	10.60
11	Entrance Plaza	---	6.27	28.36	29.31	7.57	---	---	---	---	---	---	71.51

Master Plan of Zoological Park and Rescue Centre, Gorewada

12	Buffer Zone & Land Development	3.03	3.64	0.73	0.73	---	---	---	---	---	---	---	8.13
13	Animal Care Centre	---	2.55	3.82	---	---	---	---	---	---	---	---	6.37
14	Water Supply Scheme & Distribution	---	5.35	2.91	---	---	---	---	---	---	---	---	8.26
15	Electricity & IT	---	8.14	4.45	4.65	---	---	---	---	---	---	---	17.24
16	Sewerage System line	---	8.20	2.55	---	---	---	---	---	---	---	---	10.75
17	Vehicles	---	7.00	8.20	7.40	---	---	---	---	---	---	---	22.60
18	Housing Area for Staff & Administrative blds.	---	8.70	5.72	---	---	---	---	---	---	---	---	14.42
19	Furnishing, Interiors, AC, etc.	---	0.87	5.23	7.84	3.48	---	---	---	---	---	---	17.42
20	Service Block (Elevated Service Reservoir, sump well & related development, pump house, office block)	---	2.18	1.24	---	---	---	---	---	---	---	---	3.42
21	Animals	0.49	4.60	6.92	4.16	1.81	---	---	---	---	---	---	17.98
21	Pre-Opening Cost	0.20	1.92	2.86	1.66	0.64	---	---	---	---	---	---	7.28
22	PMC charges	0.59	5.50	8.32	4.99	2.17	---	---	---	---	---	---	21.58
23	Contingency	0.30	2.75	4.16	2.50	1.09	---	---	---	---	---	---	10.80
	TOTAL	11.48	106.60	160.85	96.56	41.90	---	---	---	---	---	---	417.41
	Inflation @ 4% per annum	---	---	6.43	7.88	5.23	---	---	---	---	---	---	19.54
	TOTAL	11.48	106.60	167.28	104.44	47.13	---	---	---	---	---	---	436.95
	Interest During Construction	---	---	2.21	10.21	1.97	---	---	---	---	---	---	14.40
	GRAND TOTAL(A)	11.48	106.60	169.49	114.65	49.11	---	---	---	---	---	---	451.35

Master Plan of Zoological Park and Rescue Centre, Gorewada

10.2 Day to day maintenance: -

Sr. no.	Description	Estimated Budget (Rs. in lacs)										
		2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total
1	Salary	237.84	505.48	1056.53	1248.24	1323.13	1402.52	1486.67	1575.87	1670.43	1770.65	12277.37
2	Office Expenses	16.65	35.38	73.96	87.38	92.62	98.18	104.07	110.31	116.93	123.95	859.42
3	Water	7.40	15.91	21.29	25.16	26.67	28.27	29.96	31.76	33.67	35.69	255.77
4	Electricity	29.43	63.27	84.66	100.05	106.05	112.42	119.16	126.31	133.89	141.92	1017.16
5	Animal Feed	17.25	81.50	175.00	214.38	227.24	240.88	255.33	270.65	286.89	304.10	2073.22
6	Veterinary Care	0.50	21.00	40.00	51.26	54.33	57.59	61.05	64.71	68.60	72.71	491.75
7	Consumables	12.50	32.50	65.00	97.67	103.53	109.74	116.32	123.30	130.70	138.54	929.80
8	Vehicle maintenance & running	45.00	109.00	185.00	203.07	215.25	228.17	241.86	256.37	271.75	288.06	2043.53
9	Building Repair & General Maintenance	5.00	32.50	189.50	359.00	692.26	839.79	890.18	943.59	1000.21	1060.22	6012.25
10	Road Repairs	0	0	26.00	49.00	52.36	55.50	58.83	62.36	66.10	70.07	440.22
11	Miscellaneous	5.00	10.00	20.00	30.00	31.75	33.45	35.46	37.59	39.84	42.23	285.32
12	Unforeseen Expenses	25.75	60.51	96.85	123.26	146.26	160.33	169.94	180.14	190.95	202.41	1334.29
13	(B) Total	395.40	951.87	2033.78	2588.47	3071.45	3366.83	3568.84	3782.97	4009.95	4250.54	28020.10

Grand Total (A + B): - 451.35 + 280.20 = Rs. 731.55 Crores

Master Plan of Zoological Park and Rescue Centre, Gorewada

ANNEXURE

Ashfaqe Ahmed Consultancy Services Pvt. Ltd.

ANNEXURE - 1



११ अक्षर
११ अक्षर

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS

Central Zoo Authority



221

F. No. 23-11/99-CZA(403)(Vol. I)(M)/2835

DATE: 17.05.2013

To

The Principal Secretary (Forests)
Revenue and Forest Department,
Government of Maharashtra,
Mantralay,
Mumbai - 400 032 (Maharashtra).

Sub:- Establishment of Zoo and Rescue Centre at Gorewada, Nagpur,
Maharashtra - Regarding.

- Ref:- (i) Your office letter No. WLP-10.09/C.R.119/F-1 dated 23rd
November, 2009.
(ii) PCCF (WL), Maharashtra letter No. D-22 (6)/ Plan/ C.R/ 19/ 3359/
2012-13 dated 03.12.2012.

Sir,

Reference is invited to the above cited correspondence.

The DPR (Detailed Project Report) along with Master (layout) Plan, as proposed has been examined by the Expert Group on Zoo Designing of the Central Zoo Authority. The proposal was placed before the Technical Committee of the Central Zoo Authority in its Meeting held on 22nd March, 2013, the Committee recommended for approval.

After detailed scrutiny of the DPR, the approval of Chairperson, Central Zoo Authority/ Minister of State (IC), MoEF, Government of India, New Delhi under Section 38H (1A) is conveyed to the Government of Maharashtra to establish a Zoo and Rescue Centre at Gorewada, Nagpur subject to following conditions:

1. The Forest Department of Maharashtra should obtain mandatory order from the Hon'ble Supreme Court of India for opening of new Zoo and Rescue Centre fulfilling the requisite guidelines for opening of new Zoo.
2. The Forest Department of Maharashtra should submit an undertaking that requisite number of experts of various disciplines including a competent Officer-in-charge, Animal Curator, Biologist, Veterinary Officer would be posted for the execution of the said project.
3. The Forest Department of Maharashtra shall submit a Master Plan for the long term development of the Zoo & Rescue Centre at Gorewada for its approval.
4. The Forest Department of Maharashtra shall ensure that the animal enclosure design and the display area shall be as per the pre-arranged Rules and guidelines of the Central Zoo Authority.

Additional Member (Consultancy Services) P.O. 504

2/-

219

5. The Forest Department of Maharashtra shall make provision on their own for necessary funds for creation of the proposed zoo & rescue centre as well as for the future maintenance of its establishment on professional grounds.
6. On receipt of the necessary clearance from the Hon'ble Supreme Court, the Forest Department of Maharashtra should submit the detailed master plan for the long term development of the zoo for the approval of the Central Zoo Authority.
7. Once the Zoo & Rescue Centres, become ready for operation, it shall be opened formally after getting prior recognition from the Central Zoo Authority under Section 38H of the Wild Life (Protection) Act, 1972.

Recognition to Zoo and Rescue Centre at Gorewada, Nagpur under Section 38H of the Wild Life (Protection) Act, 1972 shall be considered only after compliance of the above said conditions and evaluation of the Zoo and Rescue Centre at Gorewada, Nagpur that point of time.

This has the approval of Minister of State (Independent Charge) Ministry of Environment and Forests/Chairperson, CZA dated 06.05.2013.

Yours faithfully,



(B. S. Bonal)

Member Secretary

Copy for favour of information & necessary action to:-

1. The Principal Chief Conservator of Forests (WL), Government of Maharashtra.
2. The Chairman, Forest Department Corporation of Maharashtra Limited, Nagpur.
3. The Managing Director, Forest Department Corporation of Maharashtra Limited, Nagpur.



(B. S. Bonal)

Member Secretary

ANNEXURE - 2

921346

ITEM NO. 310

COURT NO. 7

SECTION PIL

S U P R E M E C O U R T O F I N D I A
R E C O R D O F P R O C E E D I N G S

I. A. No(s) 22-23 & 24 in WRIT PETITION (CIVIL) NO(s) 47 OF 1998

NAVIN M. RABEJA

Petitioner(s)

VERSUS

U. O. I. & ORS

Respondent(s)

(With appln(s) for permission and permission to file additional documents)

Date: 05/08/2013 This matter was called on for hearing today.

CORAM :

HON'BLE MR. JUSTICE T.S. THAKUR
HON'BLE MR. JUSTICE SURINDER SINGH NIJJAR
HON'BLE MR. JUSTICE RANJAN GOGOI

For C. E. C.

Mr. A. D. N. Rao, Adv. (A. C.)

For Party(s)

Mr. Sanjay Kharde, Adv.
Ms. Asha Gopalan Nair, Adv.
Mr. Mohd. Saheb Alam, Adv.
Mr. Rauf Rahim, Adv.

Certified to be true copy

Assistant Registrar (Jud.)

8/8/13 2013

Supreme Court of India

UPON hearing counsel the Court made the following
O R D E R

Heard.

These applications have been filed by the Government of Maharashtra seeking permission of this Court to establish a zoo and rescue centre at Gorewada, Tahsil and District Nagpur, Maharashtra. By our order dated 20th November, 2000 we had directed that no new zoo shall be established without the prior permission of the Central Zoo Authority of the Government of India and the orders from this Court. The Government of Maharashtra it appears has pursuant to the said direction approached the Central Zoo Authority for permission

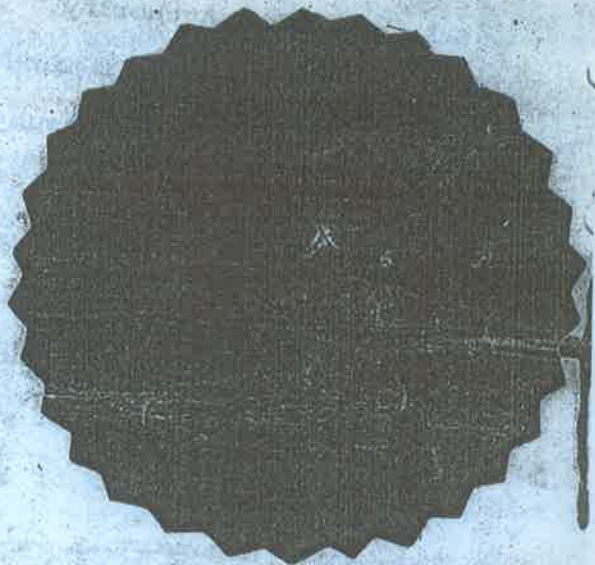
to establish the rescue centre and the zoo, at the location indicated above. The Central Zoo Authority has allowed that prayer by its order dated 17th May, 2013 subject to fulfilment of conditions stipulated in the said order.

Mr. Sanjay Kharde, learned counsel appearing for the Government of Maharashtra submits that the State Government is ready and willing to comply with all the conditions stipulated by the Central Zoo Authority. He submits that this Court could also permit the establishment of the rescue centre and the zoo, subject to those conditions.

In view of the order passed by the Central Zoo Authority by which the Authority has taken care to stipulate suitable conditions subject to which such rescue centre and zoo shall be established, we see no reason why the permission prayed for by the Government of Maharashtra should be declined. We accordingly allow these applications and permit the Government of Maharashtra to establish the proposed rescue centre and zoo subject to the fulfilment of conditions stipulated by the Central Zoo Authority in its order dated 17th May, 2013.

(Mahabir Singh)
Court Master

(Veena Khara)
Court Master



AI—No. 25013
Urgent Fee : Rs 5/-
Certification Fee Rs 10/-
No. of Folio 2 Rs 2
Total Cost Rs 17
Date of Application 2/8/10
Copy Ready On 1/10/10
Date of Delivery

SEALED IN MY PRESENCE

[Handwritten signature]

[Handwritten signature]

Branch Officer
Supreme Court of India

[Handwritten mark]

Supreme Court of India
New Delhi

Supreme Court of India
New Delhi

ANNEXURE - 3

648 AG50

जि.मृ.स.मृ.चा.प्र.नागपूर

जमीन आरोग्य पत्रिका (सुपि.पातळी)

नमूना प्रकार सूक्ष्म मूलदट्टे OutWard No. 615 28-March-2014

प्रयोगशाळा नमूना क्रमांक: 277M201300082001

जमीन आरोग्य पत्रिका क्रमांक

27090910926001

शेतक-याचे नाव: अशफाक अहमद अंड असोसिअतेस

शेतक-याचे राज्य

महाराष्ट्र

शेतक-याचा जिल्हा नागपूर

शेतक-याचा तालुका

नागपूर (ग्रामीण)

शेतक-याचे गाव कवथा

सर्के \ गट क्रमांक

1

अ.क्र.	गुणधर्म	याचन	शेरा	विशेष सल्ला
1	तांबे	0.80 (पीपीएम)	पुरेसे	
2	लोह	1.35 (पीपीएम)	कमी	लागवडीच्या वेळी सेंद्रीय खतासोबत फेरस सल्फेट(हिराकस) 25 ते 30 किलो प्रति हेक्टरी जमिनीतून घावे
3	जस्त	0.27 (पीपीएम)	कमी	लागवडीच्या वेळी सेंद्रीय खतासोबत झिंक सल्फेट 25 ते 30 किलो प्रति हेक्टरी जमिनीतून घावे
4	मंगल	0.89 (पीपीएम)	कमी	लागवडीच्या वेळी सेंद्रीय खतासोबत मॅंगनीज सल्फेट 10 ते 25 किलो प्रति हेक्टरी जमिनीतून घावे

विशेष शिफारस

प्रयोगशाळा नाव

जि.मृ.स.मृ.चा.प्र.नागपूर

जमीन आरोग्य व्यवस्थापन यंत्रणा

नोट: हा अहवाल कोर्टाच्या कामासाठी चालणार नाही.

जिल्हा मृद सर्वेक्षण व मृद चाचणी अधिकारी नागपूर
कृषि महाविद्यालय परिसर, महाराज बाग, नागपूर - ०१
कृषि महाविद्यालय परिसर, महाराज बाग, नागपूर - ०१

घटकनिहाय सर्वसाधारण प्रमाण

अ.क्र. (१)	घटकांचे प्रमाण (२)	संश्लिष्ट कार्बन (Organic Carbon) टक्के (३)	उप. नत्र, (N) कि / हे (४)	उप. स्फुरद, (P) कि / हे (५)	उप. पालाश, (K) कि / हे (६)	शिफारस केलेल्या मात्राच्या किती टक्के (%) कमी-जास्त मात्रा द्यावी (७)
१	अत्यंत कमी	०.२० पर्यंत	१४१ पेक्षा कमी	७ पेक्षा कमी	१०० पेक्षा कमी	५०% जास्त
२	कमी	०.२१ ते ०.४०	१४१ ते २८०	८ ते १४	१०१ ते १५०	२५% जास्त
३	मध्यम	०.४१ ते ०.६०	२८१ ते ४२०	१५ ते २१	१५१ ते २००	शिफारस केलेली मात्रा
४	साधारण भरपूर	०.६१ ते ०.८०	४२१ ते ५६०	२२ ते २८	२०१ ते २५०	१०% कमी
५	भरपूर	०.८१ ते १.००	५६१ ते ७००	२९ ते ३५	२५१ ते ३००	२५% कमी
६	अत्यंत भरपूर	१ पेक्षा जास्त	७०१ पेक्षा जास्त	३६ पेक्षा जास्त	३०१ पेक्षा जास्त	५०% कमी

सामू (पी एच)

क्षारता (इ.सी.) डेसी सायमन / मी

१	आत्यंतिक आम्ल	४.५ पेक्षा कमी	१	सर्वसाधारण	१.०० पेक्षा कमी
२	तीव्र आम्ल	४.६ ते ५.२	२	पिक उगवणीस हानीकारक	१.०१ ते २.००
३	मध्यम आम्ल	५.३ ते ६.०	३	क्षार संवेदनाक्षम पिक वाढीस नुकसान कारण	२.०१ ते ३.००
४	किंवीत आम्ल	६.१ ते ६.५	४	पिकास नुकसानकारक	३.०० च्या पुढे
५	उदासीन	६.६ ते ७.०		मुक्त चुना (टक्के)	
६	किंवीत अल्कली	७.१ ते ७.५	१	चुनखडीविरहित	०.५० पेक्षा कमी
७	मध्यम अल्कली	७.६ ते ८.३	२	अल्प चुनखडीयुक्त	०.५१ ते २.५०
८	तीव्र अल्कली	८.४ ते ९.०	३	मध्यम चुनखडीयुक्त	२.५१ ते ५.००
९	आत्यंतिक अल्कली	९.० पेक्षा जास्त	४	चुनखडीयुक्त	५.०१ ते १०.००
			५	अति चुनखडीयुक्त	१०.०० चे पुढे

(अ) खतासंबंधी सर्वसाधारण सूचना :-

- १०० किलो युरियात ४६ किलो नत्र असते, तेव्हा १ किलो नत्रासाठी अंदाजे २ किलो १७० ग्रॅम युरिया द्यावा.
- १०० किलो सिंगल सुपर फॉस्फेट (सिंसुफा) मध्ये १६ किलो स्फुरद ऑक्साईड असते किंवा स्फुरद ऑक्साईड देण्यासाठी अंदाजे ६ किलो २५० ग्रॅम सिंसुफा द्यावे.
- १०० किलो म्युरेट ऑफ पोटॅश (म्युऑपो) मध्ये ६० किलो पालाश ऑक्साईड असते किंवा १ किलो पालाश ऑक्साईड देण्यासाठी अंदाजे १ किलो ६७० ग्रॅम म्युऑपो वापरावे.
- पालाश ऑक्साईडची शिफारस नसल्यास पालाश ऑक्साईड असलेले खत देऊ नये.
- खते दोन चाड्यांच्या पामरीने पेरून द्यावीत म्हणजे ती पिकांच्या मुळांच्या खालच्या थरात उपलब्ध होवून त्याचा उपयोग होईल. पिकांसाठी निंबोळी पेंडीची बारीक भुकटी १ किलो व युरिया ६ किलो याप्रमाणे द्या.

(ब) वाढलेला विमल निर्देशांक कमी करण्यासाठी दोषळ सूचना :-

- जमिनीचा चोपणपणा वाढत / वाढलेला आहे. त्यासाठी उतारस समंतर चर काढून पाण्याचा निचरा चांगला होईल अशी काळजी घ्यावी.
- हेक्टरी ५ ते १० टन जिप्सम व १५ ते २५ गाड्या चांगले कुजलेले शेणखत जमिनीत मिसळून घालावे किंवा साखर कारखान्यातील मळी (प्रेस मळ) १० ते १५ गाड्या घाल्यात.
- हिरवळीच्या खतांसाठी ताग, धेंचा, शेवरी या साखळी पिके घेऊन फुलावर येताच जमिनीत गाडावीत.
- भात, कापूस, गहू, शुगरबीट, बरसीम व ऊस यासारखी पिके घ्यावीत.

(क) वाढलेला क्षार कमी करण्यासाठी दोषळ सूचना :-

- जमिनीतील क्षारचे प्रमाण वाढत / वाढलेले आहे. त्यावर खालील उपाय करावेत.
- जमिनीतील पृष्ठभागावर आलेले क्षार खरबडून शेताबाहेर टाकून घ्यावेत.
- जमिनीचे लहान लहान वाफे तयार करून टाकावे म्हणजे पाण्याबरोबर क्षार बाहेर जातील, चर खणून पाण्याच्या निचऱ्याची चांगली सोय करावी.
- गांखते (संश्लिष्ट खते) भरपूर प्रमाणे वापरावीत
- हिरवळीच्या खतांसाठी धेंचा, शेवरी, ताग या साखळी पिके घेऊन फुलावर येताच जमिनीत गाडून टाकावीत.
- क्षारस दार देणारी पिके-कांदा, भात, कापूस, गहू, सुर्यफुल, ऊस यासारखी पिके घ्यावीत.

(ख) कमी झालेला आम्ल निर्देशांक वाढविण्यासाठी :-

- जमिनीचा सामू व पोत लक्षात घेऊन हेक्टरी ०.५ ते २.५ टन चुन्याची पावडर उतार उतार जमिनीत गाडावी.

(ग) संश्लिष्ट खतांचा व हिरवळीच्या खतांचा वापर करणे :-

- जमिनीचा सामू व पोत लक्षात घेऊन हेक्टरी ०.५ ते २.५ टन चुन्याची पावडर उतार उतार जमिनीत गाडावी.

(घ) मुक्त चुन्याचा वाढ कमी करण्यासाठी दोषळ सूचना :-

- ताग, धेंचा, शेवरी या साखळी पिके घेऊन फुलावर येताच जमिनीत गाडावीत.
- भात, कापूस, गहू, शुगरबीट, बरसीम व ऊस यासारखी पिके घ्यावीत.
- सुपर फॉस्फेट व सिंगल सुपर फॉस्फेट अशा संश्लिष्ट खतांचा वापर करावा
- गांखते (संश्लिष्ट खते) भरपूर प्रमाणे वापरावीत

टिप : भागील पाण्यावर दिलेल्या अहवालाचा उपयोग शेत कामासाठी करता येणार नाही.

जि.मू.स.मू.चा.प्र.नागपूर

जमीन आरोग्य पत्रिका (सुपि घातळी)

नमूना प्रकार सूक्ष्म मूलदव्ये

OutWard No.

616

28-March-2014

प्रयोगशाळा नमूना क्रमांक: 277M201300082002

जमीन आरोग्य पत्रिका क्रमांक

27090910822002

शेतक-याचे नाव:

अशफाक अहमद अंड असोसिअतेस

शेतक-याचे राज्य

महाराष्ट्र

शेतक-याचा जिल्हा

नागपूर

शेतक-याचा तालुका

नागपूर (ग्रामीण)

शेतक-याचे गांव

गोधानी (रेल्वे)

सर्कट \ गट क्रमांक

2

अ.क्र.	गुणधर्म	घाचन	शेरा	विशेष सल्ला
1	तांबे	1.50 (पीपीएम)	पुरेसे	
2	लोह	1.69 (पीपीएम)	कमी	लागवडीच्या वेळी सेंद्रीय खतासोबत फेरस सल्फेट(हिराकस) 25 ते 30 किलो प्रति हेक्टरी जमिनीतून घावे
3	जस्त	0.37 (पीपीएम)	कमी	लागवडीच्या वेळी सेंद्रीय खतासोबत झिंक सल्फेट 25 ते 30 किलो प्रति हेक्टरी जमिनीतून घावे
4	मंगल	1.22 (पीपीएम)	कमी	लागवडीच्या वेळी सेंद्रीय खतासोबत मॅंगनीज सल्फेट 10 ते 25 किलो प्रति हेक्टरी जमिनीतून घावे

विशेष शिफारस

दुष्प्रयोगशाळा नाव

जि.मू.स.मू.चा.प्र.नागपूर

जमीन आरोग्य व्यवस्थापन यंत्रणा

नोट: हा अहवाल कोर्टाच्या कामासाठी चालणार नाही.

जिल्हा मृद सर्वेक्षण व मृद घाचणी अधिकारी नागपूर
कृषि महाविद्यालय परिसर, महाराज बाग, नागपूर - ०१
कृषि महाविद्यालय परिसर, महाराज बाग, नागपूर - ०१

घटकनिहाय सर्वसाधारण प्रमाण

अ.क्र.	घटकांचे प्रमाणे प्रमाण	सॅट्रिय कार्य (Organic Carbon) टक्के	उप. नत्र, (N) कि / हे	उप. स्फुरद, (P) कि / हे	उप. पालाश, (K) कि / हे	शिफारस केलेल्या मात्रांच्या किती टक्के (%) कमी-जास्त मात्रा घावी
(१)	(२)	(३)	(४)	(५)	(६)	(७)
१	अत्यंत कमी	०.२० पर्यंत	१४१ पेक्षा कमी	७ पेक्षा कमी	१०० पेक्षा कमी	५०% जास्त
२	कमी	०.२१ ते ०.४०	१४१ ते २८०	८ ते १४	१०१ ते १५०	२५% जास्त
३	मध्यम	०.४१ ते ०.६०	२८१ ते ४२०	१५ ते २१	१५१ ते २००	शिफारस केलेली मात्रा
४	साधारण भरपूर	०.६१ ते ०.८०	४२१ ते ५६०	२२ ते २८	२०१ ते २५०	१०% कमी
५	भरपूर	०.८१ ते १.००	५६१ ते ७००	२९ ते ३५	२५१ ते ३००	२५% कमी
६	अत्यंत भरपूर	१ पेक्षा जास्त	७०१ पेक्षा जास्त	३६ पेक्षा जास्त	३०१ पेक्षा जास्त	५०% कमी

सामू (पी एच)		क्षारता (इ.सी.) डेसी सायमन / मी	
१	आत्यंतिक आम्ल	४.५ पेक्षा कमी	१ सर्वसाधारण
२	तीव्र आम्ल	४.६ ते ५.२	२ पिक उगवणीस हानीकारक
३	मध्यम आम्ल	५.३ ते ६.०	३ क्षार संवेदनाक्षम पिक वाढीस नुकसान कारण
४	किंचित आम्ल	६.१ ते ६.५	४ पिकस नुकसानकारक
५	उदासीन	६.६ ते ७.०	मुक्त चुना (टक्के)
६	किंचित अल्कली	७.१ ते ७.५	१ चुनखडीविरहित
७	मध्यम अल्कली	७.६ ते ८.३	२ अल्प चुनखडीयुक्त
८	तीव्र अल्कली	८.४ ते ९.०	३ मध्यम चुनखडीयुक्त
९	आत्यंतिक अल्कली	९.० पेक्षा जास्त	४ चुनखडीयुक्त
			५ अति चुनखडीयुक्त

(अ) खतारंबंधी सर्वसाधारण सूचना :-

- १०० किलो युरियात ४६ किलो नत्र असते, तेव्हा १ किलो नत्रासाठी अंदाजे २ किलो १७० ग्रॅम युरिया घावा.
- १०० किलो सिंगल सुपर फॉस्फेट (सिंसुफा) मध्ये १६ किलो स्फुरद ऑक्सائیड असते किंवा स्फुरद ऑक्सائیड देण्यासाठी अंदाजे ६ किलो २५० ग्रॅम सिंसुफा घावे.
- १०० किलो म्युरेट ऑफ पोटॅश (म्युऑपो) मध्ये ६० किलो पालाश ऑक्सائیड असते किंवा १ किलो पालाश ऑक्सائیड देण्यासाठी अंदाजे १ किलो ६७० ग्रॅम म्युऑपो वापरावे.
- पालाश ऑक्सائیडची शिफारस नसल्यास पालाश ऑक्सائیड असलेले खत देऊ नये.
- खते दोन चाड्यांच्या पांढरीने पेरून घावीत म्हणजे ती पिकांच्या मुळांच्या खालच्या थरात उपलब्ध होवून त्याचा उपयोग होईल. पिकांसाठी निंबोळी पंढीची बारीक भुकटी १ किलो व युरिया ६ किलो याप्रमाणात घ्या.

(ब) वाढलेला मिश्र निर्देशांक कमी करण्यासाठी दोबळ सूचना :-

- जमिनीचा चौपणपणा वाढत / वाढलेला आहे. त्यासाठी उतारास समांतर चर काढून पाण्याचा निवस चांगला होईल अशी काळजी घ्यावी.
- हेक्टरी ५ ते १० टन जिप्सम व १५ ते २५ गाड्या चांगले कुजलेले शेणखत जमिनीत मिसळून घालावे किंवा साखर कारखान्यातील मळी (प्रेस मळ) १० ते १५ गाड्या घालाव्यात.
- हिरवळीच्या खतांसाठी ताग, धेंचा, शेवरी या साखरी पिके घेऊन फुलावर येताच जमिनीत गाडवीत.
- भात, कापूस, गहू, गुगुरबीट, बरसीम व ऊस यासाखरी पिके घ्यावीत.

(क) वाढलेला क्षार कमी करण्यासाठी दोबळ सूचना :-

- जमिनीतील वाराचे प्रमाण वाढत / वाढलेले आहे. त्यावर खालील उपाय करावेत.
- जमिनीतील पुष्पगाववर आलेले क्षार खरबळून शेताबाहेर टाकून घ्यावेत.
- जमिनीचे लहान लहान वाफे तयार करून टाकावे म्हणजे पाण्याबरोबर क्षार बाहेर जातील, चर खणून पाण्याच्या निचऱ्याची चांगली सोय करावी.
- गांवखते (सॅट्रिय खते) भरपूर प्रमाणात वापरवीत
- हिरवळीच्या खतांसाठी धेंचा, शेवरी, ताग या साखरी पिके घेऊन फुलावर येताच जमिनीत गाडून टाकावीत.
- क्षारस दाय देणारी पिके-कांदा, भात, कापूस, गहू, सुर्यकुल, ऊस यासाखरी पिके घ्यावीत.

(ख) कमी झालेला आम्ल निर्देशांक वाढविण्यासाठी :-

- जमिनीचा सामू व पीट लक्षात घेऊन हेक्टरी ०.५ ते २.५ टन चुन्याची पावडर अगर चुनखळीची पावडर वापरावी.
- सॅट्रिय खतांचा व हिरवळीच्या खतांचा वापर करावा.

(घ) मुक्त चुन्याचा वाढ कमी करण्यासाठीचे उपाय :-

- ताग, धेंचा, शेवरी यासाखरी हिरवळीची पिके जमिनीत नसल्यास
- उच्च अमोनियम फॉस्फेटचा वापर करावा.
- सुपर फॉस्फेट खत वापरावे अमोनियम कार्बोलेट करवा शेणखत मिसळून ते पळी घेऊन घावे
- साफसाल मिश्रण निवडू नये. उदा. बीरे, आवळा, अंबीर, सुर्यकुल, सोयाबीन, गहू, कापूस

टिप : मागील पांढावर दिलेल्या अहवालाचा उपयोग कोरडे कामगारी करवा घेवता नाही.

जि.मृ.स.मृ.चा.प्र.नागपूर

जमीन आरोग्य पत्रिका (सुपि.पातळी)

नमूना प्रकार सूक्ष्म मूलद्रव्य OutWard No. 617 28-March-2014

प्रयोगशाळा नमूना क्रमांक: 277M201300082003

जमीन आरोग्य पत्रिका क्रमांक

27090910822003

शेतकऱ्याचे नाव: अशाफाक अहमद अंड असोसिएटेस

शेतकऱ्याचे राज्य

महाराष्ट्र

शेतकऱ्याचा जिल्हा नागपूर

शेतकऱ्याचा तालुका

नागपूर (ग्रामीण)

शेतकऱ्याचे गांव गोधानी (रेल्वे)

सर्व्हे १ गट क्रमांक

3

अ.क्र.	गुणधर्म	वाचन	शेरा	विशेष सल्ला
1	तांबे	1.87 (पीपीएम)	पुरेसे	
2	लोह	0.90 (पीपीएम)	कमी	लागवडीच्या वेळी सेंद्रीय खतासोबत फेरस सल्फेट(हिराफस) 25 ते 30 किलो प्रति हेक्टरी जमिनीतून घावे
3	जस्त	0.46 (पीपीएम)	कमी	लागवडीच्या वेळी सेंद्रीय खतासोबत झिंक सल्फेट 25 ते 30 किलो प्रति हेक्टरी जमिनीतून घावे
4	मंगल	1.38 (पीपीएम)	कमी	लागवडीच्या वेळी सेंद्रीय खतासोबत मॅंगेनीज सल्फेट 10 ते 25 किलो प्रति हेक्टरी जमिनीतून घावे

विशेष शिफारस

प्रयोगशाळा नाव

जि.मृ.स.मृ.चा.प्र.नागपूर

जमीन आरोग्य व्यवस्थापन यंत्रणा

नोट: हा अहवाल कोर्टाच्या कामासाठी घालणार नाही.

जिल्हा मृदु सर्वेक्षण व मृदु चाचणी अधिकारी नागपूर
कृषि महाविद्यालय परिसर, महाराज बाग, नागपूर - ०१
कृषि महाविद्यालय परिसर, महाराज बाग, नागपूर - ०१

घटकनिहाय सर्वसाधारण प्रमाण

अ.क्र.	घटकाचे प्रमाण	संश्लिष्ट कार्बन (Organic Carbon) टक्के	उप. नत्र. (N) कि / हे	उप. स्फुरद. (P) कि / हे	उप. पालाश. (K) कि / हे	शिफारस केलेल्या मात्राच्या किती टक्के (%) कमी-जास्त मात्रा द्यावी
(१)	(२)	(३)	(४)	(५)	(६)	(७)
१	अत्यंत कमी	०.२० पर्यंत	१४१ पेक्षा कमी	७ पेक्षा कमी	१०० पेक्षा कमी	५०% जास्त
२	कमी	०.२१ ते ०.४०	१४१ ते २८०	८ ते १४	१०१ ते १५०	२५% जास्त
३	मध्यम	०.४१ ते ०.६०	२८१ ते ४२०	१५ ते २१	१५१ ते २००	शिफारस केलेली मात्रा
४	साधारण भरपूर	०.६१ ते ०.८०	४२१ ते ५६०	२२ ते २८	२०१ ते २५०	१०% कमी
५	भरपूर	०.८१ ते १.००	५६१ ते ७००	२९ ते ३५	२५१ ते ३००	२५% कमी
६	अत्यंत भरपूर	१ पेक्षा जास्त	७०१ पेक्षा जास्त	३६ पेक्षा जास्त	३०१ पेक्षा जास्त	५०% कमी

सामु (पी एच)

धारता (इ.सी.) डेरी सायमन / मी

१	आत्यंतिक आम्ल	४.५ पेक्षा कमी	१	सर्वसाधारण	१.०० पेक्षा कमी
२	तीव्र आम्ल	४.६ ते ५.२	२	पिक उमवणीस हानीकारक	१.०१ ते २.००
३	मध्यम आम्ल	५.३ ते ६.०	३	क्षार संवेदनाक्षम पिक वाढीस नुकसान कारण	२.०१ ते ३.००
४	किंचित आम्ल	६.१ ते ६.५	४	पिकास नुकसानकारक	३.०० च्या पुढे
५	उदासीन	६.६ ते ७.०		मुक्त चुना (टक्के)	
६	किंचित अल्कली	७.१ ते ७.५	१	चुनखडीविरहित	०.५० पेक्षा कमी
७	मध्यम अल्कली	७.६ ते ८.३	२	अल्प चुनखडीयुक्त	०.५१ ते २.५०
८	तीव्र अल्कली	८.४ ते ९.०	३	मध्यम चुनखडीयुक्त	२.५१ ते ५.००
९	आत्यंतिक अल्कली	९.० पेक्षा जास्त	४	चुनखडीयुक्त	५.०१ ते १०.००
			५	अति चुनखडीयुक्त	१०.०० चे पुढे

(अ) शतशेतीची सर्वसाधारण सूचना :-

- १०० किलो युरियात ४६ किलो नत्र असते, तेव्हा १ किलो नत्रासाठी अंदाजे २ किलो १७० ग्रॅम युरिया द्यावा.
- १०० किलो सिंगल सुपर फॉस्फेट (सिंसुफा) मध्ये १६ किलो स्फुरद ऑक्साईड असते किंवा स्फुरद ऑक्साईड देण्यासाठी अंदाजे ६ किलो २५० ग्रॅम सिंसुफा द्यावे.
- १०० किलो म्युरेट ऑफ पोटाश (म्युओपो) मध्ये ६० किलो पालाश ऑक्साईड असते किंवा १ किलो पालाश ऑक्साईड देण्यासाठी अंदाजे १ किलो ६७० ग्रॅम म्युओपो वापरवावे.
- पालाश ऑक्साईडची शिफारस नसल्यास पालाश ऑक्साईड असलेले खत देऊ नये.
- खते दोन चाड्यांच्या पांगरीने पेरून द्यावीत म्हणजे ती पिकांच्या मुळांच्या खालच्या थरात उपलब्ध होवून त्याचा उपयोग होईल. पिकांसाठी निंबोळी पेंडीची बारीक भुकटी १ किलो व युरिया ६ किलो याप्रमाणात द्या.

(ब) वाढलेला विम्ल निर्देशांक कमी करण्यासाठी दोबळ सूचना :-

- जमिनीचा चोपणपाणा वाढत / वाढलेला आहे. त्यासाठी उताऱ्यास समांतर चर काढून पाण्याचा निचरा चांगला होईल अशी काळजी घ्यावी.
- हेक्टरी ५ ते १० टन जिप्सम व १५ ते २५ गाड्या चांगले कुजलेले शेणखत जमिनीत मिसळून घालावे किंवा साखर कारखान्यातील मळी (प्रेस मड) १० ते १५ गाड्या घालाव्यात.
- हिरवळीच्या खतासाठी ताग, शेवरी, ताग या सारखी पिके घेऊन फुलावर येताच जमिनीत गाड्यावीत.
- भात, कापूस, गहू, सुगरबीट, बरसीम व ऊस यासारखी पिके घ्यावीत.

(क) वाढलेला क्षार कमी करण्यासाठी दोबळ सूचना :-

- जमिनीतील क्षाराचे प्रमाण वाढत / वाढलेले आहे. त्यावर खालील उपाय करावेत.
- जमिनीतील पृष्ठभागावर आलेले क्षार खरबळून शेताबाहेर टाकून घावेत.
- जमिनीचे लहान लहान वाफे तयार करून टाकवे म्हणजे पाण्याबरोबर क्षार बाहेर जातील. चर खणून पाण्याच्या निचऱ्याची चांगली सोय करावी.
- गांवखते (संश्लिष्ट खते) भरपूर प्रमाणात वापरवावीत
- हिरवळीच्या खतासाठी धैचा, शेवरी, ताग या सारखी पिके घेऊन फुलावर येताच जमिनीत गाड्या टाकावीत.
- क्षारस दाद देणारी पिके-कांदा, भात, कापूस, गहू, सुर्यफुल, ऊस यासारखी पिके घ्यावीत.

(ख) कमी झालेला आम्ल निर्देशांक वाढविण्यासाठी :-

- जमिनीचा सामू व पोत लक्षात घेऊन हेक्टरी ०.५ ते २.५ टन चुन्याची पावडर अगर चुनखडीची पावडर वापरवावी.
- संश्लिष्ट खतांचा व हिरवळीच्या खतांचा वापर करावा.

(ग) मुक्त चुन्याचा दाद कमी करण्यासाठीचे उपाय :-

- ताग, धैचा, शेवरी यासारखी पिके घेऊन जमिनीत गाड्यावीत.
- उच्च अम्लियतायुक्त पॉस्फेटचा वापर करावा.
- स्फुर फॉस्फेट खत उताऱ्याचे उरल्यास कोरटे उरल्या शेणखतात मिसळून ते बळी घेवून घ्यावे.
- वाढलेले निंबोळी निवड करावी. ज्या: बोर, आयका, अजोब, सुर्यफुल, सॅयामीन, गहू, कापूस

टिप : मागील पत्रावर दिलेल्या अडथळाचा उपयोग कोर्ट कामासाठी करता येणार नाही.

ANNEXURE - 4

Floral Bio-diversity: -

The site proposed for the International standard zoo at Gorewada boasts of a variety of plant communities along different elevation gradient. A study has been carried out to elucidate the vegetation structure, composition, species diversity and distribution pattern of the vegetation existing within the park area and a database consisting of a total of 449 species, belonging to 286 genera & 80 families has been prepared. Out of the 449, 294 species are herbs, 30 species are shrubs, 46 species are climbers and 79 species are trees. An exhaustive list of these 449 species is enclosed.

A comprehensive list of herbs found in proposed area of Gorewada bio-park:

Sr.	Habit	Family	Botanical Name	Common Name
1	Herb	Acanthaceae	<i>Andrographis eichoides</i>	False Waterwillow
2	Herb	Acanthaceae	<i>Andrographis paniculata</i>	Kariyat
3	Herb	Acanthaceae	<i>Asystesia sp</i>	Asystasia
4	Herb	Acanthaceae	<i>Barleria cristata</i>	Philippine Violet
5	Herb	Acanthaceae	<i>Barleria priontes</i>	Porcupine flower
6	Herb	Acanthaceae	<i>Blepharis maderaspatensis</i>	Creeping
7	Herb	Acanthaceae	<i>Blepharis repens</i>	Red Barleria
8	Herb	Acanthaceae	<i>Gentlebuga urens</i>	
9	Herb	Acanthaceae	<i>Hemigraphis latibrosa</i>	Shade Loving Hemigraphis
10	Herb	Acanthaceae	<i>Hygrophylla sculli</i>	Marsh Barbel
11	Herb	Acanthaceae	<i>Justicia diffusa</i>	Shrimp plant
12	Herb	Acanthaceae	<i>Justicia procumbens</i>	Water Willow
13	Herb	Acanthaceae	<i>Justicia quanquingularis</i>	
14	Herb	Acanthaceae	<i>Justicia simples</i>	
15	Herb	Acanthaceae	<i>Lepidagathis cristata</i>	Crested Lepidagathis
16	Herb	Acanthaceae	<i>Lepidogathis mitis</i>	
17	Herb	Acanthaceae	<i>Peristrophe bicalyculata</i>	Showy Foldwing
18	Herb	Acanthaceae	<i>Ruellia tuberosa</i>	Minnie Root
19	Herb	Acanthaceae	<i>Rungia eligens</i>	
20	Herb	Acanthaceae	<i>Rungia pactinata</i>	Comb Rungia
21	Herb	Acanthaceae	<i>Rungia repens</i>	Creeping Rungia
22	Herb	Amaranthaceae	<i>Achyranthus aspera</i>	Prickly Chaff
23	Herb	Amaranthaceae	<i>Alternanthera sessalis</i>	Sessile Joyweed
24	Herb	Amaranthaceae	<i>Amaranthus viridis</i>	Green Amaranth
25	Herb	Amaranthaceae	<i>Areva lanata</i>	Mountain Knot
26	Herb	Amaranthaceae	<i>Celosia argentia</i>	Silver
27	Herb	Amaranthaceae	<i>Gomphrena celosioides</i>	Prostrate Gomphrena

Master Plan of Zoological Park and Rescue Centre, Gorewada

28	Herb	Amaranthaceae	<i>Gomphrena indica</i>	Globe Amaranth
29	Herb	Amaranthaceae	<i>Pupalia lappacea</i>	Forest Burr, Creeping Cock's
30	Herb	Aponogetonaceae	<i>Aponogeton natans</i>	Floating Lace
31	Herb	Araceae	<i>Colocasia esculenta</i>	Green Taro
32	Herb	Asteraceae	<i>Acanthospermum hispidum</i>	Bristly starbur, Goat's head,
33	Herb	Asteraceae	<i>Ageratum conyzoides</i>	Goat Weed
34	Herb	Asteraceae	<i>Balanvilla acmella</i>	Para Cress, Para Cress Flower
35	Herb	Asteraceae	<i>Bidens biternata</i>	Yellow Flowered Blackjack
36	Herb	Asteraceae	<i>Blumea eriantha</i>	Kapurio, Kalhar
37	Herb	Asteraceae	<i>Blumea lacera</i>	Kakronda
38	Herb	Asteraceae	<i>Blumea membranacea</i>	Mharbir
39	Herb	Asteraceae	<i>Blumea obliqua</i>	Kapurio
40	Herb	Asteraceae	<i>Caesulia axillaris</i>	Pink Node
41	Herb	Asteraceae	<i>Cythocline purpurium</i>	Gangotra
42	Herb	Asteraceae	<i>Echinops echinata</i>	Indian Globe Thistle
43	Herb	Asteraceae	<i>Eclipta alba</i>	False Daisy
44	Herb	Asteraceae	<i>Emilia sonchifolia</i>	Purple Sow Thistle
45	Herb	Asteraceae	<i>Galinsoga parviflora</i>	Quick Weed
46	Herb	Asteraceae	<i>Glossocordia bosvallea</i>	Patthar Suva
47	Herb	Asteraceae	<i>Gnephaliium indicum (moist)</i>	Well drained soil, Moist Soil
48	Herb	Asteraceae	<i>Grangea medraspatana</i>	Madras Carpet
49	Herb	Asteraceae	<i>Lagascea mollisque</i>	Silk Leaf
50	Herb	Asteraceae	<i>Parthenium hysterophorus</i>	Carrot Grass
51	Herb	Asteraceae	<i>Pulicaria angustifolia</i>	Small Fleabane
52	Herb	Asteraceae	<i>Sonchus arvensis</i>	Perennial sow-thistle
53	Herb	Asteraceae	<i>Spheranthus indicus</i>	East Indian Globe Thistle
54	Herb	Asteraceae	<i>Spilanthus acmella</i>	Toothache Plant
55	Herb	Asteraceae	<i>Synedrella nodiflora</i>	Cinderella Weed
56	Herb	Asteraceae	<i>Tagates erecta</i>	Marigold orange / yellow
57	Herb	Asteraceae	<i>Tridax procumbens</i>	Tridax Daisy
58	Herb	Asteraceae	<i>Vernonia cinerea</i>	Agas-moro
59	Herb	Asteraceae	<i>Vicoa indica</i>	Banjauri Extract
60	Herb	Asteraceae	<i>Xanthium strumarium</i>	Common Cocklebur
61	Herb	Asteraceae	<i>Zinnia elegans</i>	Zinnia
62	Herb	Balsimaceae	<i>Impatient balsamina</i>	Garden Balsam
63	Herb	Boraginaceae	<i>Heliotripium sophinum</i>	Indian Heliotrope
64	Herb	Boraginaceae	<i>Tricodesma sedwicina</i>	Renealmia usneoides
65	Herb	Cactaceae	<i>Opuntia dillenii</i>	Eltham Indian Fig, Sweet
66	Herb	Caesalpiniaceae	<i>Cassia absus</i>	Tropical Sensitive Pea
67	Herb	Caesalpiniaceae	<i>Cassia alata</i>	Candle Bush
68	Herb	Caesalpiniaceae	<i>Cassia mimosoides</i>	Feather-leaved Cassia
69	Herb	Caesalpiniaceae	<i>Cassia obtusifolia</i>	Sicklepod
70	Herb	Caesalpiniaceae	<i>Cassia oxidentallis</i>	Coffee Senna

Master Plan of Zoological Park and Rescue Centre, Gorewada

71	Herb	Caesalpiniaceae	<i>Cassia tora</i>	Stinking Cassia
72	Herb	Caesalpiniaceae	<i>Cassia uniflora</i>	Oneleaf Senna
73	Herb	Cassythaceae	<i>Chlorophytum tuberosum</i>	Musli
74	Herb	Ceratophyllaceae	<i>Ceratophyllum demersum</i>	Rigid Hornwort , Coontail,
75	Herb	Chenopodiaceae	<i>Chenopodium album</i>	Bathua
76	Herb	Cleomaceae	<i>Cleome cheledonii</i>	Celandine Spider
77	Herb	Cleomaceae	<i>Cleome gynandra</i>	Wild Spider
78	Herb	Cleomaceae	<i>Cleome simplicifolia</i>	Simple Leaved Clammy weed
79	Herb	Cleomaceae	<i>Cleome viscosa</i>	Asian Spider Flower
80	Herb	Commelinaceae	<i>Commelina bengalensis</i>	Whiskered
81	Herb	Commelinaceae	<i>Murdannia nudiflora</i>	Naked-Stem Dewflower
82	Herb	Commelinaceae	<i>Murdannia spirata</i>	Asiatic Dewflower
83	Herb	Convolvulaceae	<i>Evolvulus numularis</i>	Roundleaf Bindweed
84	Herb	Convolvulaceae	<i>Evolvulus alsinoides</i>	Dwarf Morning
85	Herb	Convolvulaceae	<i>Ipomoea fistula</i>	bush morning glory
86	Herb	Convolvulaceae	<i>Meremia emarginatus</i>	Kidney Leaf Morning Glory
87	Herb	Cyperaceae	<i>Carex filicina</i>	Ria-Ria, Ombu
88	Herb	Cyperaceae	<i>Cyperus compressus</i>	Poorland Flat
89	Herb	Cyperaceae	<i>Cyperus iria</i>	Rice flat sedge
90	Herb	Cyperaceae	<i>Cyperus niveus</i>	Snow White Sedge
91	Herb	Cyperaceae	<i>Cyprus alopecuroides</i>	Foxtail flat sedge
92	Herb	Cyperaceae	<i>Cyprus alulatus</i>	
93	Herb	Cyperaceae	<i>Cyprus clarkei</i>	
94	Herb	Cyperaceae	<i>Cyprus corymbosa</i>	
95	Herb	Cyperaceae	<i>Cyprus iria</i>	Rice flat sedge
96	Herb	Cyperaceae	<i>Cyprus rotundus</i>	coco-rass, Java rass
97	Herb	Cyperaceae	<i>Cyprus sp</i>	Papyrus Sedges
98	Herb	Cyperaceae	<i>Fimbristylis aphylla</i>	Bogin ngair
99	Herb	Cyperaceae	<i>Fimbristylis dichotoma</i>	Common Fringe-sedge
100	Herb	Cyperaceae	<i>Fimbristylis falcate</i>	Bid chhaj ni jat
101	Herb	Cyperaceae	<i>Fimbristylis ferruginea</i>	Rusty sedge
102	Herb	Cyperaceae	<i>Fimbristylis podocarpa</i>	
103	Herb	Cyperaceae	<i>Fimbristylis spathacea</i>	Hurricanegrass
104	Herb	Cyperaceae	<i>Fimbristylis tetragona</i>	
105	Herb	Cyperaceae	<i>Fuirena glomerata</i>	Mali, manding-Bambara
106	Herb	Cyperaceae	<i>Kyllinga brevifolia</i>	
107	Herb	Cyperaceae	<i>Kyttinga nemoralis</i>	White Water Sedge
108	Herb	Cyperaceae	<i>Kyllinga tenuifolia</i>	Annual Greenhead Sedge
109	Herb	Cyperaceae	<i>Pycnus pumila</i>	
110	Herb	Cyperaceae	<i>Schoenoplectus articulatus</i>	Gauai-gauai
111	Herb	Cyperaceae	<i>Schoenoplectus senegalensis</i>	
112	Herb	Cyperaceae	<i>Scleria annularis</i>	
113	Herb	Cyperaceae	<i>Scleria tessellate</i>	

Master Plan of Zoological Park and Rescue Centre, Gorewada

114	Herb	Cyperaceae	<i>Setaria intermedia</i>	
115	Herb	Cyperaceae	<i>Setaria verticillata</i>	Bristly foxtail and hooked
116	Herb	Cyperaceae	<i>Themeda triandra</i>	Red oat grass
117	Herb	Dioscoreaceae	<i>Dioscorea bulbifera</i>	Air Yam
118	Herb	Eriocaulaceae	<i>Eleocharis atropurpurea</i>	purple spikerush
119	Herb	Eriocaulaceae	<i>Eleocharis geniculata</i>	Wild Poinsettia
120	Herb	Eriocaulaceae	<i>Eriocaulon quinquangulare</i>	
121	Herb	Eriocaulaceae	<i>Eriocaulon cinerum</i>	Ashy Pipewort
122	Herb	Eriocaulaceae	<i>Eriocaulon gemphrenoides</i>	
123	Herb	Eriocaulaceae	<i>Eriocaulon indicum</i>	
124	Herb	Eriocaulaceae	<i>Eriocaulon luzulaefolium</i>	Pipewort
125	Herb	Eriocaulaceae	<i>Eriocaulon modertum</i>	
126	Herb	Eriocaulaceae	<i>Eriocaulon truncatum</i>	Short Pipe-Wort
127	Herb	Euphorbiaceae	<i>Crosophora cristata</i>	Crested Philippine violet,
128	Herb	Euphorbiaceae	<i>Euphorbia geniculata</i>	Wild Poinsettia
129	Herb	Euphorbiaceae	<i>Euphorbia hirta</i>	Asthma Weed
130	Herb	Euphorbiaceae	<i>Euphorbia nerifolia</i>	Hedge Euphorbia,
131	Herb	Euphorbiaceae	<i>Euphorbia rosea</i>	Rosy Spurge
132	Herb	Euphorbiaceae	<i>Euphorbia thymifolia</i>	Gulf Sandmat
133	Herb	Euphorbiaceae	<i>Phyllanthus maderaspatensis</i>	Madras Leaf-Flower
134	Herb	Euphorbiaceae	<i>Phyllanthus niruri</i>	Black catnip
135	Herb	Fabaceae	<i>Aeschynomene indica</i>	Indian Joint Vetch
136	Herb	Fabaceae	<i>Alyscarpus tetragonolobous</i>	Red Alyce Clover
137	Herb	Fabaceae	<i>Alyscarpus procumbens</i>	Round-Leaf Alyce Clover
138	Herb	Fabaceae	<i>Alyscarpus vaginalis</i>	Alyce Clover
139	Herb	Fabaceae	<i>Alyscarpus quadrangularis</i>	rough chainpea
140	Herb	Fabaceae	<i>Crotolaria albida</i>	Narrowleaf Rattlepod
141	Herb	Fabaceae	<i>Crotolaria angulata</i>	Rabbit Bells
142	Herb	Fabaceae	<i>Crotolaria hirsuta</i>	Hairy Rattlepod
143	Herb	Fabaceae	<i>Crotolaria juncea</i>	Sunn hemp
144	Herb	Fabaceae	<i>Crotolaria linifolia</i>	Legume
145	Herb	Fabaceae	<i>Crotolaria medicagenia</i>	Medick Rattlepod
146	Herb	Fabaceae	<i>Crotolaria notonii</i>	Rattlepod
147	Herb	Fabaceae	<i>Crotolaria prostrata</i>	Prostrate Rattlepod
148	Herb	Fabaceae	<i>Crotolaria pusilla</i>	Rattlebox
149	Herb	Fabaceae	<i>Crotolaria retusa</i>	Rattleweed
150	Herb	Fabaceae	<i>Desmodium gangeticum</i>	Sal Leaved Desmodium
151	Herb	Fabaceae	<i>Desmodium triflorum</i>	Creeping Tick Trefoil
152	Herb	Fabaceae	<i>Desmodium velutianum</i>	Velvet-Leaf
153	Herb	Fabaceae	<i>Dolichos trilobus</i>	Wild Gram
154	Herb	Fabaceae	<i>Goniogyna hirta</i>	Fuzzy Fruited
155	Herb	Fabaceae	<i>Indigofera cassioides</i>	Cassia Indigo
156	Herb	Fabaceae	<i>Indigofera cordifolia</i>	Heart-Leaf Indigo

Master Plan of Zoological Park and Rescue Centre, Gorewada

157	Herb	Fabaceae	<i>Indigofera glandulosa</i>	Three Leaf Indigo
158	Herb	Fabaceae	<i>Indigofera linifolia</i>	Narrowleaf Indigo
159	Herb	Fabaceae	<i>Indigofera tinctoria</i>	West Indian Indigo
160	Herb	Fabaceae	<i>Indigofera tirta</i>	Asian Indigo
161	Herb	Fabaceae	<i>Indigofera trifolia</i>	Blue Wild Indigo
162	Herb	Fabaceae	<i>Phaseolus trunngo</i>	Urad, black matpe
163	Herb	Fabaceae	<i>Phaseolus sp</i>	Scarlet Runner Bean
164	Herb	Fabaceae	<i>Phaseolus vulgaris</i>	Common Bean
165	Herb	Fabaceae	<i>Psorelia corilifolia</i>	Scurfy Pea
166	Herb	Fabaceae	<i>Sesbenia sesbain</i>	Common sesban
167	Herb	Fabaceae	<i>Smithia conferta</i>	Paired Flower Smithia
168	Herb	Fabaceae	<i>Tephrosia purpuria</i>	Wild Indigo
169	Herb	Fabaceae	<i>Tephrosia strigosa</i>	Bristly Tephrosia
170	Herb	Fabaceae	<i>Tephrosia villosa</i>	Goat-rue
171	Herb	Fabaceae	<i>Zornia diphylla</i>	Trencilla, zornia
172	Herb	Fabaceae	<i>Zornia gibbosa</i>	Grasslike Zornia
173	Herb	Gentianaceae	<i>Canscora decurrens</i>	Bhui Neem
174	Herb	Gentianaceae	<i>Centaurium centauriodes</i>	Rolla Rao & Hemadri
175	Herb	Gentianaceae	<i>Enicostema hyssopifolium</i>	Chhota Chirayata, Indian
176	Herb	Gentianaceae	<i>Exacum pedunculatum</i>	Stalked Persian Violet
177	Herb	Gentianaceae	<i>Hoppea dichotoma</i>	
178	Herb	Gentianaceae	<i>Nymphoides cristata</i>	Crested Floatingheart
179	Herb	Hydrocharitaceae	<i>Hydrilla verticilata</i>	Water Thyme, hydrilla
180	Herb	Hydrocharitaceae	<i>Ottelia alsimoides</i>	Duck Lettuce
181	Herb	Hydrocharitaceae	<i>Vallisneria spiralis</i>	Straight Vallisneria, Tape
182	Herb	Hypoxidaceae	<i>Curculago orchoides</i>	Golden Eye Grass
183	Herb	Lamiaceae	<i>Anisomeles indica</i>	Indian Catmint, Malabar
184	Herb	Lamiaceae	<i>Hyptis suveolens</i>	Marrubium indicum Blanco
185	Herb	Lamiaceae	<i>Leonatis nepetiifolia</i>	Lion's Ear, Annual lion's ear
186	Herb	Lamiaceae	<i>Leucas aspera</i>	Common Leucas
187	Herb	Lamiaceae	<i>Leucas biflora</i>	Two-Flowered Leucas
188	Herb	Lamiaceae	<i>Ocimum americanum</i>	Hoary Basil
189	Herb	Lamiaceae	<i>Ocimum basclicum</i>	Basil sweet large leaf
190	Herb	Lamiaceae	<i>Orthosiphon pallidus</i>	Pale Java Tea
191	Herb	Liliaceae	<i>Iphigenia pallida</i>	Pale Grass Lily
192	Herb	Liliaceae	<i>Scilla indica</i>	Scilla, sea onion, seasquill,
193	Herb	Loganiaceae	<i>Mitreola petiolata</i>	Lax Hornpod
194	Herb	Lythraceae	<i>Ammania nodiflora</i>	Node Flower Allmania
195	Herb	Lythraceae	<i>Rotala indica</i>	Indian toothcup
196	Herb	Malaceae	<i>Hibiscus cannabinus</i>	Deccan Hemp
197	Herb	Malaceae	<i>Hibiscus lobatus</i>	Lobed Leaf Mallow
198	Herb	Malvaceae	<i>Abelmoschus manihot</i>	Sweet Hibiscus
199	Herb	Malvaceae	<i>Abelmoschus esculantus</i>	Ladies Finger

Master Plan of Zoological Park and Rescue Centre, Gorewada

200	Herb	Malvaceae	<i>Abelmoscus Jiculneus</i>	White Wild Musk Mallow
201	Herb	Malvaceae	<i>Abelmoscus moschatus</i>	Musk Mallow
202	Herb	Malvaceae	<i>Malachra capitata</i>	Brazil Jute
203	Herb	Malvaceae	<i>Malvastrum</i>	False Mallow
204	Herb	Malvaceae	<i>Pavonia zeylanica</i>	Ceylon Swamp Mallow
205	Herb	Malvaceae	<i>Sida acuta</i>	Common Wireweed
206	Herb	Malvaceae	<i>Sida cordata</i>	Long-stalk Sida
207	Herb	Malvaceae	<i>Sida glutinosa</i>	Mysore Fanpetals
208	Herb	Malvaceae	<i>Sida rhombifolia</i>	Cuban jute
209	Herb	Malvaceae	<i>Sida spinosa</i>	Prickly Fan-Petals
210	Herb	Malvaceae	<i>Urena lobata</i>	Burr Mallow
211	Herb	Malvaceae	<i>Waltheria indica</i>	Sleepy Morning
212	Herb	Martyniaceae	<i>Martynia annua</i>	Devils Claws
213	Herb	Najadaceae	<i>Najaj minor</i>	European naiad
214	Herb	Nyctaginaceae	<i>Boerhaevia errecta</i>	Erect Spiderling
215	Herb	Nyctaginaceae	<i>Boerhavia chinensis</i>	Diffuse Hogweed
216	Herb	Nyctaginaceae	<i>Boerhavia diffusa</i>	Red Spiderling
217	Herb	Onagraceae	<i>Ludwigia octovalvis</i>	Willow Primrose
218	Herb	Oxalidaceae	<i>Biophytum sensitivum</i>	Little Tree Plant
219	Herb	Oxalidaceae	<i>Oxalis corniculata</i>	Creeping Wood Sorrel
220	Herb	Oxalidaceae	<i>Oxalis martiana</i>	Large Leaf Wood Sorrel
221	Herb	Pedal iaceae	<i>Sesamum indicum</i>	Sesame
222	Herb	Pedal iaceae	<i>Sesamum indicum var</i>	Benne Seed
223	Herb	Periplocaceae	<i>Cryptolepis buchananii</i>	Wax Leaved Climber
224	Herb	Poaceae	<i>Andropogon pumilus</i>	Bushy Bluestem
225	Herb	Poaceae	<i>Aristida adscensionis</i>	Sixweeks threeawn
226	Herb	Poaceae	<i>Aristida funiculate</i>	Aristida
227	Herb	Poaceae	<i>Aristida hystrix</i>	Pottapullu
228	Herb	Poaceae	<i>Aristida setacea</i>	Broom Grass
229	Herb	Poaceae	<i>Arthraxon lancifolius</i>	Creek grass
230	Herb	Poaceae	<i>Arthraxon quartiniamus</i>	Small carpetgrass
231	Herb	Poaceae	<i>Bothriochloa pertusa</i>	Hurricane grass
232	Herb	Poaceae	<i>Brachiaria eruciformis</i>	Sweet signalgrass
233	Herb	Poaceae	<i>Brachiaria reptans</i>	Running grass, para grass
234	Herb	Poaceae	<i>Coix lacryma-jobi</i>	Job's Tears
235	Herb	Poaceae	<i>Cyanotis cristata</i>	Nabhali
236	Herb	Poaceae	<i>Cynodon dactylon</i>	Bermuda Grass
237	Herb	Poaceae	<i>Dactyloctenium aegyptium</i>	Crowfoot Grass
238	Herb	Poaceae	<i>Dichanthium annulatum</i>	Sheda Grass
239	Herb	Poaceae	<i>Dichanthium aristatum</i>	Angleton grass
240	Herb	Poaceae	<i>Digitaris ciliaris</i>	Wild Crabgrass
241	Herb	Poaceae	<i>Eleusine indica</i>	Indian Crowfoot Grass
242	Herb	Poaceae	<i>Eragrostiella bifaria</i>	Teff Grass

Master Plan of Zoological Park and Rescue Centre, Gorewada

243	Herb	Poaceae	<i>Eragrostiella brachyphylla</i>	Angola
244	Herb	Poaceae	<i>Eragrostis aspera</i>	grootpluimeragrostis
245	Herb	Poaceae	<i>Eremopogon foveolatus</i>	okras
246	Herb	Poaceae	<i>Eriograstis cilianensis</i>	stinkgrass, candy grass
247	Herb	Poaceae	<i>Eriograstis pilosa</i>	hairy love grass
248	Herb	Poaceae	<i>Eriograstis tenella</i>	Lovegrass, feather lovegrass
249	Herb	Poaceae	<i>Heteropogon contortus</i>	black spear grass
250	Herb	Poaceae	<i>Panicum miliare</i>	Blue Panicgrass
251	Herb	Poaceae	<i>Paspalidium flavidum</i>	Yellow Watercrown Grass
252	Herb	Poaceae	<i>Paspalidium geminatum</i>	Egyptian Panicgrass
253	Herb	Poaceae	<i>Pennisetum pedicellatum</i>	deenanath grass
254	Herb	Poaceae	<i>Pennnisetum geminatum</i>	Elephant grass
255	Herb	Poaceae	<i>Saccharum spontaneum</i>	Kans Grass
256	Herb	Polygalaceae	<i>Polygala arvensis</i>	Field Milkwort
257	Herb	Polygonaceae	<i>Rumex dentatus</i>	Toothed Dock
258	Herb	Potamogetonaceae	<i>Potamogeton crispus</i>	Curly-leaved pondweed
259	Herb	Rosaceae	<i>Potentilla supine</i>	Spreading Cinquefoil
260	Herb	Rubiaceae	<i>Anotis montholoni</i>	
261	Herb	Rubiaceae	<i>Borreria hispisa</i>	Shaggy Button Weed
262	Herb	Rubiaceae	<i>Oldenlandia corymbosa</i>	Diamond Flower
263	Herb	Rubiaceae	<i>Oldenlandia affinis</i>	Kalata-kalata
264	Herb	Rubiaceae	<i>Oldenlandia herbacea</i>	Slender Oldenlandia
265	Herb	Rubiaceae	<i>Spermacoce hispida</i>	Booka
266	Herb	Schrophulariaceae	<i>Bacopa monnieri</i>	Brahmi
267	Herb	Schrophulariaceae	<i>Buchnera hispida</i>	Karanji
268	Herb	Schrophulariaceae	<i>Celsia coremandiliana</i>	Chinese Mullein
269	Herb	Scrophulariaceae	<i>Kicksia ramosissima</i>	Branched Cancerwort
270	Herb	Scrophulariaceae	<i>Limnophila heterophylla</i>	beremi
271	Herb	Scrophulariaceae	<i>Lindernia crustecia</i>	Brittle False Pimpernel
272	Herb	Scrophulariaceae	<i>Sophibia delphinifolia</i>	Common Sopubia
273	Herb	Scrophulariaceae	<i>Stemodia viscoa</i>	Sticky Blue Rod
274	Herb	Scrophulariaceae	<i>Striga densiflora</i>	Denseflower Witchweed
275	Herb	Solanaceae	<i>Datura alba</i>	devil's trumpet
276	Herb	Solanaceae	<i>Datura inoxia</i>	thorn-apple
277	Herb	Solanaceae	<i>Nechamandra alternifolia</i>	Nechamandra
278	Herb	Solanaceae	<i>Nicotiana plumbaginifolia</i>	Tex-Mex Tobacco
279	Herb	Solanaceae	<i>Physails minima</i>	Ground Cherry
280	Herb	Solanaceae	<i>Solanum xathocarpum</i>	Thorny Nightshade
281	Herb	Spigeliaceae	<i>Spigelia anthelmia</i>	Pinkroot, wormbush
282	Herb	Sterculiaceae	<i>Pentapetes phoenicea</i>	Midday Flower
283	Herb	Sterculiaceae	<i>Trimfetta rotundifolia</i>	Palikur
284	Herb	Sterculiaceae	<i>Triumfetta rhomboidea</i>	Burr Bush
285	Herb	Steruliaceae	<i>Melochia corchorifolia</i>	Chocolate Weed

Master Plan of Zoological Park and Rescue Centre, Gorewada

286	Herb	Steruliaceae	<i>Triumfetta rountidifolia</i>	Palikur
287	Herb	Tiliaceae	<i>Corchorus aestuans</i>	East Indian Mallow
288	Herb	Tiliaceae	<i>Corchorus capsularis</i>	White Jute
289	Herb	Tiliaceae	<i>Corchorus olitorius</i>	Nalta Jute
290	Herb	Tiliaceae	<i>Corchorus trilocularis</i>	Wild Jute
291	Herb	Typhaceae	<i>Typha indica</i>	Lesser Indian Reed Mace
292	Herb	Verbenaceae	<i>Phyla nodiflora</i>	Frog Fruit
293	Herb	Violaceae	<i>Hybanthus enneaspermus</i>	Spade Flower
294	Herb	Zygophyllaceae	<i>Tribulus terrestris</i>	Puncture Vine

A comprehensive list of Shrubs found in Proposed Gorewada bio-park

Sr. No	Habit	Family	Botanical Name	Common Name
1	Shrub	Asclepediaceae	<i>Calotropis procera</i>	Sodom apple, mudar or osher
2	Shrub	Balanitaceae	<i>Balanites aegyptica</i>	desert date, soap berry bush
3	Shrub	Caesalpiniaceae	<i>Caesalpinia pulcherima</i>	Poinciana, Peacock Flower
4	Shrub	Caesalpiniaceae	<i>Caesalpinia bonduc</i>	Gray Nicker
5	Shrub	Caparidaceae	<i>Capparis horida</i>	Ceylon caper, Indian caper
6	Shrub	Celestraceae	<i>Maytenus emarginata</i>	Baikal, Kankera
7	Shrub	Combrataceae	<i>Calycoptoris floribunda</i>	Paper flower climber
8	Shrub	Euphorbiaceae	<i>Jatropha corcus</i>	Barbados Nut, Purging Nut
9	Shrub	Euphorbiaceae	<i>Jatropha gossypifolia</i>	Kammatti
10	Shrub	Euphorbiaceae	<i>Kirginallia reticulata</i>	Black-Honey Shrub
11	Shrub	Euphorbiaceae	<i>Ricinus communis</i>	Castor bean, Castor oil plant
12	Shrub	Euphorbiaceae	<i>Securinega virosa</i>	Common Bushweed
13	Shrub	Fabaceae	<i>Flemengia bracteata</i>	Madipata
14	Shrub	Fabaceae	<i>Flemingia strobilifera</i>	Wild Hops, Luck plant
15	Shrub	Lythraceae	<i>Woodfordia fruticosa</i>	Fire-flame Bush, Shiranjitea
16	Shrub	Malvaceae	<i>Abutilon indicum</i>	Indian Mallow
17	Shrub	Mimosaceae	<i>Dichrostachys cinera</i>	Sickle Bush
18	Shrub	Mimosaceae	<i>Mimosa hamata</i>	Hooked Mimosa
19	Shrub	Mimosaceae	<i>Parkinsonia aculeata</i>	Jerusalem thorn
20	Shrub	Mimosaceae	<i>Prosopis cineraria</i>	Jhand
21	Shrub	Mimosaceae	<i>Prosopis julifera</i>	Algaroba, Mesquite
22	Shrub	Nyctaginaceae	<i>Bougainvillea glabra</i>	Bougainvillea
23	Shrub	Poaceae	<i>Bambusa arundinacea</i>	Indian Thorny Bamboo
24	Shrub	Rubiaceae	<i>Canthium parviflorum</i>	Coromandel Canthium
25	Shrub	Solanaceae	<i>Datura metal</i>	Datura, Thorn-apple
26	Shrub	Sterculiaceae	<i>Helicteres ixora</i>	Nut-leaved screw tree
27	Shrub	Tiliaceae	<i>Grewia sp</i>	Dhaman, Grewia
28	Shrub	Verbenaceae	<i>Clerodendrum inerme</i>	Glory Bower
29	Shrub	Verbenaceae	<i>Clerodendrum serratum</i>	Blue Fountain Bush
30	Shrub	Verbenaceae	<i>Lantana camara</i>	Lantana

A comprehensive list of Trees found in Proposed Gorewada bio-park

Sr.	Habit	Family	Botanical Name	Common Name
1	Tree	Anacardiaceae	<i>Buchanania lanzan</i>	Chironji Tree
2	Tree	Anacardiaceae	<i>Lannea coromandelica</i>	Indian Ash Tree, Moya,
3	Tree	Anacardiaceae	<i>Semicarpus anacardium</i>	Marking Nut
4	Tree	Anacardiaceae	<i>Soymida febrifusa</i>	Bastard cedar
5	Tree	Annonaceae	<i>Annona squamosa</i>	Sugar Apple, Custard apple
6	Tree	Apocynaceae	<i>Holorhina antidysentrica</i>	Indrajao
7	Tree	Apocynaceae	<i>Plumaria rubra</i>	Frangipani
8	Tree	Araceae	<i>Phoenix sylvestris</i>	Wild Date Palm
9	Tree	Bignoniaceae	<i>Dolichandrone falcata</i>	Medhshingi
10	Tree	Bignoniaceae	<i>Kigellia pinnata</i>	Sausage Tree
11	Tree	Bignoniaceae	<i>Spathodia campanulata</i>	African tulip tree,
12	Tree	Bombaceae	<i>Bombax ceiba</i>	Silk Cotton Tree, Kapok Tree
13	Tree	Caesalpiniaceae	<i>Bauhinia purpuria</i>	Purple orchid tree
14	Tree	Caesalpiniaceae	<i>Bauhinia racemosa</i>	Bidi Leaf Tree
15	Tree	Caesalpiniaceae	<i>Bauhinia variegata</i>	White Orchid Tree
16	Tree	Caesalpiniaceae	<i>Cassia fistula</i>	Amaltas, Golden shower tree
17	Tree	Caesalpiniaceae	<i>Cassia renigera</i>	Burmese Pink Cassia
18	Tree	Caesalpiniaceae	<i>Cassia siamea</i>	Siamese Senna,
19	Tree	Caesalpiniaceae	<i>Delonix regia</i>	Gulmohar
20	Tree	Combrataceae	<i>Termanalia arjuna</i>	Arjun Tree
21	Tree	Combrataceae	<i>Terminalia alata</i>	Asan
22	Tree	Ebanaceae	<i>Diospyros melenoxylon</i>	Coromandel Ebony
23	Tree	Euphorbiaceae	<i>Cleistanthus collinus</i>	Garari
24	Tree	Fabaceae	<i>Albizia procera</i>	White Siris
25	Tree	Fabaceae	<i>Albizia odoratissima</i>	Black Siris
26	Tree	Fabaceae	<i>Anogeissus latifolia</i>	Axle Wood Tree
27	Tree	Fabaceae	<i>Butea monosperma</i>	Flame of the Forest
28	Tree	Fabaceae	<i>Dalbergia latifolia</i>	Black Rosewood
29	Tree	Fabaceae	<i>Dalbergia paniculata</i>	Pachari
30	Tree	Fabaceae	<i>Dalbergia sisoo</i>	Shisham
31	Tree	Fabaceae	<i>Erythrina varigata</i>	Indian Coral Tree
32	Tree	Fabaceae	<i>Gliricidia sepium</i>	Mexican Lilac
33	Tree	Fabaceae	<i>Pongamia pinnata</i>	Pongam Tree
34	Tree	Fabaceae	<i>Pterocarpus marsupium</i>	Malabar Kino
35	Tree	Flacourtiaceae	<i>Flacourtia ramonchii</i>	batoko plum
36	Tree	Lythadaceae	<i>Careya arborea</i>	Wild Guava
37	Tree	Lythraceae	<i>Lagerstroemia parviflora</i>	Small Flowered Crape Myrtle
38	Tree	Malaceae	<i>Kydia cordifolia</i>	Country mallow
39	Tree	Meliaceae	<i>Azadirachta indica</i>	Neem
40	Tree	Meliaceae	<i>Chloroxylon sweitiana</i>	Ceylon Satinwood

Master Plan of Zoological Park and Rescue Centre, Gorewada

41	Tree	Meliaceae	<i>Melia azadiracta</i>	Barbados Lilac, Bead Tree,
42	Tree	Mimosaceae	<i>Acacia auriculoformis</i>	Earleaf Acacia
43	Tree	Mimosaceae	<i>Acacia catechu</i>	Cutch Tree
44	Tree	Mimosaceae	<i>Acacia farnesiana</i>	Mimosa Bush
45	Tree	Mimosaceae	<i>Acacia latifolia</i>	Golden Wattle
46	Tree	Mimosaceae	<i>Acacia leucophloea</i>	White Bark Acacia
47	Tree	Mimosaceae	<i>Acacia nilotica</i>	Babool
48	Tree	Mimosaceae	<i>Hardwickia bipinata</i>	Anjan
49	Tree	Mimosaceae	<i>Lucena lucocephala</i>	Wild Tamarind
50	Tree	Mimosaceae	<i>Peltophorum ferruginum</i>	Yellow poinciana
51	Tree	Mimosaceae	<i>Pithocoelobium dulce</i>	Madras Thorn
52	Tree	Mimosaceae	<i>Tamarindus indica</i>	Tamarind
53	Tree	Moraceae	<i>Ficus benghalensis</i>	Krishna Fig
54	Tree	Moraceae	<i>Ficus religiosa</i>	Peepal
55	Tree	Moraceae	<i>Ficus sp</i>	Hilteetaa
56	Tree	Myrtaceae	<i>Eucalyptus sp</i>	Eucalyptus
57	Tree	Myrtaceae	<i>Syzygium cumuni</i>	Jambolan plum, Jamun
58	Tree	Rhamnaceae	<i>Ziziphus glaberrima</i>	Kath Ber
59	Tree	Rhamnaceae	<i>Ziziphus jujuba</i>	Jujube, red date
60	Tree	Rhamnaceae	<i>Ziziphus mauritiana</i>	Ber
61	Tree	Rhamnaceae	<i>Ziziphus oenopilia</i>	Jackal Jujube
62	Tree	Rubiaceae	<i>Adina cordifolia</i>	Gao, Haldu
63	Tree	Rubiaceae	<i>Anthocephalus chinensis</i>	Kadam
64	Tree	Rubiaceae	<i>Gardenia resinifera</i>	Brilliant Gardenia
65	Tree	Rubiaceae	<i>Gardenia turgida</i>	Shumeo
66	Tree	Rubiaceae	<i>Ixora arborea</i>	Small Flowered Ixora
67	Tree	Rubiaceae	<i>Mitragyna parviflora</i>	Kaim
68	Tree	Rubiaceae	<i>Morinda citrussifolia</i>	Great Morinda
69	Tree	Rubiaceae	<i>Randia dumeratum</i>	Mountain Pomegranate
70	Tree	Rubiaceae	<i>Xeromphis dumeratum</i>	Emetic nut
71	Tree	Rutaceae	<i>Aegle marmalos</i>	Bel
72	Tree	Santalaceae	<i>Santalum album</i>	Sandalwood
73	Tree	Sapindaceae	<i>Schleichera oleosa</i>	Kusum Tree
74	Tree	Simarubiaceae	<i>Ailanthus excelsa</i>	Indian Tr
75	Tree	Tiliaceae	<i>Grewia hrisuta</i>	Kukurbicha
76	Tree	Tiliaceae	<i>Grewia tilifolia</i>	Dhaman
77	Tree	Verbenaceae	<i>Gmelina arborea</i>	Gamhar
78	Tree	Verbenaceae	<i>Tectona grandis</i>	Teak
79	Tree	Verbenaceae	<i>Vitex negundo</i>	Chaste Tree

A comprehensive list of Climbers found in Proposed Gorewada bio-park

Sr.	Habit	Family	Botanical Name	Common Name
1	Climber	Fabaceae	<i>Abrus precatorius</i>	Gunj
2	Climber	Convolvulaceae	<i>Argeria spinosa</i>	Caper
3	Climber	Liliaceae	<i>Asparagus racemosus</i>	Satawari
4	Climber	Malpighiaceae	<i>Aspidopteris cordata</i>	Bokadvel
5	Climber	Malpighiaceae	<i>Aspidopterys vallichii</i>	Kanara Climber
6	Climber	Fabaceae	<i>Atylosia platycarpa</i>	Sukli Sengha
7	Climber	Fabaceae	<i>Atylosia scaraboides</i>	Showy Pigeonpea
8	Climber	Caesalpiniaceae	<i>Bauhinia vahlii</i>	Maloo Creeper
9	Climber	Caesalpiniaceae	<i>Bauhinia frondosa</i>	Pore-Leaved Bauhinia
10	Climber	Fabaceae	<i>Canavalia gladiata</i>	Sword Bean
11	Climber	Sapindaceae	<i>Cardiospermum halicacabum</i>	Balloon Vine
12	Climber	Lauraceae	<i>Cassytha sp.</i>	Love Vine
13	Climber	Minispermaceae	<i>Cissumpetalous parera</i>	Velvet Leaf
14	Climber	Vitaceae	<i>Cissus quadrangularis</i>	Veldt Grape
15	Climber	Vitaceae	<i>Cissus repanda</i>	Pani Bel
16	Climber	Fabaceae	<i>Clitoria ternatea</i>	Butterfly Pea
17	Climber	Minispermaceae	<i>Cocculus hirsutus</i>	Broom Creeper
18	Climber	Combretaceae	<i>Combretum ovalifolium</i>	Piluki
19	Climber	Cucurbitaceae	<i>Corallocarpus epigaeus</i>	Indian Bryonia
20	Climber	Periplocaceae	<i>Creptolepis grandilora</i>	Wax Leaved Climber
21	Climber	Cuscutaceae	<i>Cuscuta reflexa</i>	Amar Bel
22	Climber	Liliaceae	<i>Gloriosa superba</i>	Glory Lily
23	Climber	Fabaceae	<i>Dolichus lablab</i>	Lablab Bean
24	Climber	Apocynaceae	<i>Ichnocarpus fructiscens</i>	Black Creeper
25	Climber	Periplocaceae	<i>Hemidesmus indicus</i>	Indian Sarsaparilla
26	Climber	Convolvulaceae	<i>Ipomoea aquatica</i>	Water Morning Glory
27	Climber	Convolvulaceae	<i>Ipomoea digitata</i>	Palm-Leaf Morning Glory
28	Climber	Convolvulaceae	<i>Ipomoea eriocarpa</i>	Tiny Morning Glory
29	Climber	Convolvulaceae	<i>Ipomoea nil</i>	Blue Morning Glory
30	Climber	Convolvulaceae	<i>Ipomoea obscura</i>	Obscure M
31	Climber	Convolvulaceae	<i>Ipomoea pestigridis</i>	Beach Morning Glory
32	Climber	Convolvulaceae	<i>Ipomoea quimoclit</i>	Cypressvine morning glory
33	Climber	Convolvulaceae	<i>Ipomoea sinensis</i>	Chinese Morning Glory
34	Climber	Leeaceae	<i>Leea crispa</i>	Banchalita
35	Climber	Cucurbitaceae	<i>Mimordica chirayita</i>	Bitter Gourd
36	Climber	Fabaceae	<i>Mucuna puriens</i>	Velvet Bean
37	Climber	Asclepediaceae	<i>Oxystelma esculentum</i>	Rosy Milkweed Vine

Master Plan of Zoological Park and Rescue Centre, Gorewada

38	Climber	Passifloraceae	<i>Passiflora encinata</i>	Passion flowers
39	Climber	Asclepediaceae	<i>Pergularia demia</i>	Pergularia
40	Climber	Fabaceae	<i>Rhynchosia bracteata</i>	Junglee Sem
41	Climber	Fabaceae	<i>Rhynchosia capitata</i>	Soybean
42	Climber	Smilacaceae	<i>Smilax perfoliata</i>	Common Smilax
43	Climber	Minispermaceae	<i>Tinospora cordifolia</i>	Gulbel
44	Climber	Periplocaceae	<i>Tylophora indica</i>	Indian Ipecac
45	Climber	Rhmnaceae	<i>Ventilago denticulata</i>	Raidhani
46	Climber	Vitaceae	<i>Vitis vetigenia</i>	Grapevine

Although tall tree species are absent, yet the moderate trees and shrubs constitute the chief woody components of the forest. Among these the most dominant species are *Anogeissus latifolia*, *Tectonagrandis*, *Buteamonosperma*, *Lagerostromiaparviflora* and *Mitragynaparviflora*.

The tree elements are mixed with shrubs and climbers. Chief shrubby components are *Acacia nelotica*, *Acacia leucocepholea*, *Balanitiesaegyptica*, *Canthiumparviflorum*, *Clorodendronserratum*, *Flacourtiaindica*, *Helectrisisora*, *Kirginalia reticulate*, *Lantana camara*, and *Mimosa hamata*. Woody twiners and climbers include *Abrusprecatorius*, *Ampelocissuslatifolia*, *Aspidopteriscordata*, *Cocculushirsuus*, *Celastruspaniculata*, *Ziziphusoenoplia* and *Ventilago denticulate*.

Ground vegetation is dominated by numerous herbaceous species during August to December but are particularly absent during February to May. Some perennials belonging to family *Liliaceae*, *Hypoxidaceae* and *Araceae* start, making their appearance soon after first rains. These include *Amorphophaluscampanulatus*, *Asperagusracemosus*, *Curculigoorchioides*, *Iphigenia indica*, *Scilla hyacinthine* along with a few grasses.

Post monsoon period shows change in herbal vegetation. During September-October most common plants include *Alysicarpus*, *Borreria*, *Cassia*, *Crotalaria*, *Desmodium*, *Diptracanthus*, *Euphorbia*, *Fimbriaria*, *Leucas*, *Oldanlandia*, *Parthium*, *Phyllanthus*, *Rungia*, *Tridex*, *Triumphetta* and *Vernoniaspecies*.

Open area within the forest is mainly covered by dwarf grasses in addition to herbaceous species.

The proposed Zoo area, particularly the eastern area shows presence of a number of seasonal pools along with a big perennial lake. The lake supports rich vegetation all around the year. However, seasonal pools harbour wetland vegetation only during part of the year. The general vegetation around water bodies shows intergrading stratification of plant communities. The most common

Master Plan of Zoological Park and Rescue Centre, Gorewada

submerged plants are *Ceratophyllum*, *Hydrilla*, *Najas*, *Nechmandra* and *Potamogetonspecies*. The most dominating components of vegetation on the margins of the pools are *Typhaangusta*, *Coix aquatic*, members of *Cyperaceae* family, *Eriocaulaceae*, *Gentianaceae*, *Polygonaceae*, *Scrophulariaceae* and *Nejadaceae*.

ANNEXURE - 5

Faunal Bio-diversity: -

A study of the faunal bio-diversity in the site proposed for International standard Zoo at Gorewada shows a lot of variety. An exhaustive list of the animals sighted in this area is enclosed.

List of animals sighted in different compartments of Gorewada International Biopark, Nagpur (M.S.)

Sr. No.	Common Name	Zoological Name	Occurrence in compartments						
			790	791	792	793	794	795	796
Phylum - Annelida									
1	Eathworm	<i>Pheritima</i>	✓	✓	✓				✓
2	Cattle leech	<i>Hirudinaria</i>	✓		✓			✓	✓
Phylum Arthropoda									
Class - Arachnida , Order - Araneae									
1	Spider	<i>Heteropoda sp.</i>	✓	✓		✓			✓
2	Oxyopes Spider	<i>Oxyopes birmanicus</i>	✓		✓	✓	✓		
3	Agriop Spider	<i>Agriope pulchella</i>			✓		✓		✓
4	Agriop Spider	<i>Argiope anasuja</i>	✓	✓	✓				
5	Yellow Sac Spider	<i>Cheiracanthium sp.</i>		✓	✓	✓			
6	Running Crab Spider	<i>Philodromus sp.</i>		✓		✓			
7	Hippasa Spider	<i>Hippasa sp.</i>		✓		✓			
8	Long Bodied Cellar	<i>Pholcus phalangioides</i>	✓		✓				
Class - Crustacea									
1	Crab	<i>Cancer sp.</i>	✓	✓		✓		✓	✓
2	Water flea	<i>Daphnia sp.</i>	✓	✓			✓	✓	✓
Class- Insecta, Order- Odonata									
1	Ruddy marsh skimmer	<i>Crocothemis servilia</i>	✓		✓	✓	✓	✓	✓
2	Slender skimmer	<i>Orthetrum sabina</i>	✓	✓	✓	✓	✓	✓	✓
3	Blue tailed forest hawk	<i>Orthetrum triangulare</i>			✓	✓	✓		
4	Epaulet Skimmer	<i>Orthetrum chrysostigma</i>			✓	✓		✓	✓
5	Skimmer	<i>Orthetrum pruinosum</i>			✓	✓	✓	✓	✓
6	Globe Skimmer	<i>Pantala flavescens</i>		✓	✓	✓	✓	✓	✓
7	Ditch Jewel	<i>Brachythemis contaminata</i>				✓	✓	✓	✓
8	Common clubtail	<i>Ictinogomphus rapax</i>			✓	✓	✓	✓	✓
9	Ground Skimmer	<i>Diplocodes trivialis</i>	✓	✓	✓	✓	✓	✓	✓
10	Pied Paddy Skimmer	<i>Neurothemis tullia</i>					✓	✓	✓
11	Common Darter	<i>Sympetrum striolatum</i>	✓	✓	✓		✓	✓	✓
12	Western Meadowhawk	<i>Sympetrum occidentale</i>		✓	✓	✓	✓	✓	✓
13	Bandwinged	<i>Sympetrum semicinctum</i>					✓	✓	✓
14	Violet-marked Darter	<i>Trithemis annulate</i>			✓		✓	✓	✓

Master Plan of Zoological Park and Rescue Centre, Gorewada

15	Long legged Marsh	<i>Trithemis pallidinervis</i>			✓		✓	✓	✓
16	Red Darter	<i>Trithemis aurora</i>			✓		✓	✓	✓
17	Blue Dasher	<i>Pachydiplax longipennis</i>					✓	✓	✓
18	Darner	<i>Anax glutattus</i>		✓	✓		✓	✓	✓
19	Spiketail	<i>Cardulogaster sp.</i>					✓	✓	✓
20	Saddlebag	<i>Tramea Virginia</i>					✓	✓	✓
21	Coloured winged	<i>Rhyothemis variegata</i>	✓	✓	✓	✓	✓	✓	✓
22	Damsel fly	<i>Copera marginipes</i>				✓	✓	✓	✓
23	Coromandel Marsh Dart	<i>Ceriagrion</i>		✓		✓	✓	✓	✓
24	Senegal Golden Dartlet	<i>Ischnura senegalensis</i>		✓		✓	✓	✓	✓
25	Golden Dartlet	<i>Ischnura aurora</i>		✓		✓	✓	✓	✓
26	Common Blue Damsel	<i>Enallagma cyathigerum</i>						✓	✓
27	Stream Glory	<i>Neurobasis chinensis</i>					✓	✓	✓
28	Blue Grass Dartlet	<i>Pseudagrion</i>	✓		✓		✓	✓	✓
29	Blue Bush Dart	<i>Coperavittata</i>	✓		✓		✓	✓	✓
Order- Hymenoptera									
1	Indian Honey Bee	<i>Apis cereno indica</i>	✓	✓	✓	✓	✓	✓	✓
2	Rock Honey Bee	<i>Apis dorsata</i>	✓	✓	✓	✓	✓	✓	✓
3	European HoneyBee	<i>Apis florea</i>	✓	✓	✓	✓	✓	✓	✓
4	Bumble Bee	<i>Bombus</i>	✓		✓	✓	✓	✓	✓
5	Wasp	<i>Vespula maculata</i>	✓	✓	✓	✓	✓	✓	✓
6	Common Black Ant	<i>Camponotus comopressus</i>	✓	✓	✓	✓	✓	✓	✓
7	Red Ant	<i>Solenopsis geminata</i>	✓	✓	✓	✓	✓	✓	✓
8	Little Black Ant	<i>Monomorium sp.</i>	✓	✓	✓	✓	✓	✓	✓
9	Big Headed Ant	<i>Pheidole sp.</i>	✓	✓	✓	✓	✓	✓	✓
10	Pavement Ant	<i>Tetramorium mixtum</i>	✓	✓	✓	✓	✓	✓	✓
11	Acrobat Ant	<i>Myrmecina urbanii</i>	✓	✓	✓	✓	✓	✓	✓
12	Jumping Ant	<i>Crematogaster</i>	✓	✓				✓	✓
13	Jumping Ant	<i>Harpegnathos saltator</i>	✓	✓	✓	✓		✓	✓
Order - Hemiptera									
1	Red Cotton Bug	<i>Dysdercus cingulatus</i>	✓	✓		✓	✓		✓
2	Giant water Bug	<i>Belostoma grandis</i>	✓					✓	✓
3	Water Scorpion	<i>Nepa cinerea</i>	✓					✓	✓
4	Pentatomid Bug	<i>Chlorochora sp.</i>	✓					✓	✓
5	Water Stick	<i>Ranatra quadridentata</i>	✓					✓	✓
Order - Lepidoptera									
1	Common Mormon	<i>Papilio polytes</i>	✓	✓	✓	✓	✓	✓	✓
2	Crimson Rose	<i>Pachliopta hector</i>	✓	✓	✓	✓	✓	✓	✓
3	Lime Butterfly	<i>Papilio demolus</i>	✓	✓	✓	✓	✓	✓	✓
4	Tailed Jay	<i>Graphium agamemnon</i>	✓	✓	✓	✓	✓	✓	✓
5	Common Jay	<i>Graphium doson</i>	✓	✓	✓	✓	✓	✓	✓
6	Common Indian Crow	<i>Euploea core</i>	✓	✓	✓	✓	✓	✓	✓

Master Plan of Zoological Park and Rescue Centre, Gorewada

7	Common Evening Brown	<i>Melanitis leda</i>	✓		✓		✓	✓	✓
8	Great Evening Brown	<i>Melanitis zitenius</i>	✓	✓	✓	✓	✓	✓	✓
9	Common Bush Brown	<i>Mycalesis perseus</i>	✓	✓	✓	✓	✓	✓	✓
10	Blue Tiger	<i>Tirumala limniace</i>	✓	✓	✓	✓	✓	✓	✓
11	Danaid eggfly	<i>Hypolimnas misippus</i>	✓	✓	✓	✓	✓	✓	✓
12	Great Eggfly	<i>Hypolimnas bolina</i>	✓	✓	✓	✓	✓	✓	✓
13	Spotless grass yellow	<i>Eurema laeta</i>	✓	✓	✓	✓	✓	✓	✓
14	Common grass yellow	<i>Eurema hecabe</i>	✓	✓	✓	✓	✓	✓	✓
15	Small grass yellow	<i>Eurema brigitta</i>	✓	✓	✓	✓	✓	✓	✓
16	Plain tiger	<i>Danus chrysippus</i>	✓	✓	✓	✓	✓	✓	✓
17	Stripped Tiger	<i>Danaus genutia</i>	✓	✓	✓	✓	✓	✓	✓
18	Common emigrant	<i>Catopsilia pomona</i>	✓	✓	✓	✓	✓	✓	✓
19	Mottled emigrant	<i>Catopsilia pyranthe</i>	✓		✓		✓	✓	✓
20	Blue Pansy	<i>Junonia orytha</i>	✓		✓		✓	✓	✓
21	Gray Pansy	<i>Junonia atlites</i>	✓		✓		✓	✓	✓
22	Lemon Pansy	<i>Junonia lemonias</i>	✓		✓	✓	✓		✓
23	Peacock Pansy	<i>Junonia almanac</i>	✓	✓	✓		✓	✓	✓
24	Chocolate Pansy	<i>Junonia hedonia</i>		✓	✓		✓	✓	✓
25	Yellow Pansy	<i>Junonia hierta</i>							✓
26	Common Sailer	<i>Neptis hylas</i>	✓	✓	✓	✓	✓	✓	✓
27	Baronet	<i>Euthalia nais</i>	✓	✓	✓	✓	✓	✓	✓
28	Angled Castor	<i>Ariadne ariadne</i>	✓	✓			✓	✓	✓
29	Common Castor	<i>Ariadne merione</i>	✓		✓		✓	✓	✓
30	Common Pierrot	<i>Castalius rosimon</i>	✓	✓	✓	✓	✓	✓	✓
31	Rounded Pierrot	<i>Tarucus extricates</i>		✓			✓	✓	✓
32	Dark Cerulean	<i>Jamides bochus</i>		✓		✓	✓	✓	✓
33	Common Cerulean	<i>Jamides celeno</i>	✓	✓	✓	✓	✓	✓	✓
34	Grass Jewel	<i>Freyeria trochylus</i>	✓	✓	✓	✓	✓	✓	✓
35	Gram Blue	<i>Euchrysops cnejus</i>	✓	✓	✓	✓	✓	✓	✓
36	Tiny Grass Blue	<i>Zizula gaika</i>	✓			✓	✓	✓	✓
37	Zebra Blue	<i>Tarucus plinius</i>	✓				✓	✓	
38	Joker	<i>Byblia ilithyia</i>	✓					✓	
39	Common Sailer	<i>Neptis hylas</i>		✓			✓		
40	Common Wanderer	<i>Pareronia Valeria</i>					✓	✓	
41	Common Leopard	<i>Phalanta phalantha</i>	✓		✓		✓	✓	
42	Rice Swift	<i>Borbo cinnara</i>	✓		✓		✓	✓	
43	Armyworm Moth	<i>Mythimna separata</i>	✓		✓		✓	✓	
44	Whiteline Sphinx	<i>Hyles lineata</i>	✓	✓	✓	✓		✓	
45	Tasar Silkworm	<i>Antheraea myllita</i>	✓		✓			✓	
46	Fruit Sucking Moth	<i>Othreis materna</i>	✓		✓		✓		
47	Uranid Moth	<i>Chasmina nigropunctata</i>	✓		✓		✓		✓
48	Paddy Stem Borer	<i>Tryporyza incertulus</i>	✓		✓		✓		

Master Plan of Zoological Park and Rescue Centre, Gorewada

Order - Coleoptera									
1	Water Beetle	<i>Cybister tripunctatus</i>	✓					✓	✓
2	Rhinoceros Beetle	<i>Eupatorus hardwickei</i>	✓		✓		✓	✓	
3	Dung Beetle	<i>Heliocopris</i>	✓	✓	✓	✓	✓	✓	✓
4	Meloid Beetle	<i>Mylabris pustulata</i>	✓	✓	✓	✓	✓	✓	✓
5	Ladybird Beetle	<i>Coccinella sp.</i>	✓		✓		✓		✓
6	Tiger beetle	<i>Cicindela cancellata</i>	✓			✓	✓		✓
7	Mealworm Beetle	<i>Tenebris molitor</i>		✓		✓	✓	✓	✓
8	Rice Weevil	<i>Sitophilus oryzae</i>		✓		✓	✓	✓	✓
9	Carpet Beetle			✓		✓	✓		
Order - Diptera									
1	Housefly	<i>Musca domestica</i>	✓	✓	✓	✓	✓	✓	✓
2	Midge	<i>Chironomous</i>	✓					✓	✓
3	Mosquito	<i>Anopheles sp.</i>	✓	✓	✓	✓	✓	✓	✓
4	Horsefly	<i>Tabanus</i>	✓	✓	✓	✓	✓	✓	✓
5	Robbe fly	<i>Hyperechia sp.</i>	✓	✓	✓	✓	✓	✓	✓
Class - Myriapoda									
1	Milliped	<i>Julus sp.</i>	✓					✓	✓
Phylum - Mollusca									
1	Apple snail	<i>Pilaglobossa</i>	✓	✓				✓	✓
2	Bivalve	<i>Unio</i>	✓	✓				✓	✓
3	Bivolve	<i>Mytilus</i>	✓	✓				✓	✓
4	Snail	<i>Limnea</i>	✓	✓				✓	✓
Phylum - Chordata, Class - Amphibia									
1	Frog	<i>Rana tigrina</i>	✓	✓		✓	✓	✓	✓
2	Tree Frog	<i>Hyla sp.</i>	✓	✓			✓	✓	✓
3	Toad	<i>Bufo bufo</i>	✓	✓		✓		✓	✓
Class - Reptilia									
1	Garden Lizard	<i>Calotes versicolor</i>	✓	✓	✓	✓	✓	✓	✓
2	Skink	<i>Mobowia carcinata</i>	✓	✓	✓	✓	✓	✓	✓
3	Monitor Lizard	<i>Varanus monitor</i>	✓	✓	✓	✓	✓	✓	✓
4	Rat Snake	<i>Ptyas mucosus</i>				✓			✓
5	Python	<i>Python reticulatus</i>						✓	
Class - Mammalia									
1	Black Rat	<i>Rattus rattus</i>	✓	✓	✓	✓	✓	✓	✓
2	House Mouse	<i>Mus musculus</i>	✓	✓	✓	✓	✓	✓	✓
3	Squirrel	<i>Funambulus pennanti</i>	✓	✓	✓	✓	✓	✓	✓
4	Mongoose	<i>Herpestes</i>	✓	✓	✓	✓	✓	✓	✓
5	Hanuman langur	<i>Presbytis entellus</i>	✓	✓	✓	✓	✓	✓	✓
6	Hare	<i>Lepus nirgricollis</i>	✓	✓					
7	Nilgai	<i>Bosephalus tagocamelus</i>						✓	✓
8	Flying Fox	<i>Pterpopus sp.</i>	✓	✓					✓

Master Plan of Zoological Park and Rescue Centre, Gorewada

9	Cheetal	<i>Axis axis</i>	✓	✓	✓	✓	✓	✓	✓
10	Sambhar-Rusa	<i>Rusa unicolorat</i>	✓	✓	✓	✓	✓	✓	✓

Amongst all classes, Insecta consists of the largest number of species. In this, dragonflies, damselflies, moths, bugs beetles and flies are common. There are 29 species of order Odanta, 13 species of Hymenoptera, 5 species of Hemiptera, 5 species of Diptera, 9 species of Coleoptera and 48 species of Lepidoptera. As far as vertebrates are concerned, excluding avifauna, there are 3 species of Amphibia, 5 species of Reptilia and 10 species of Mammalia.

A separate study of avifauna has also been conducted for this area. It shows presence of a total of 202 bird species. Of this, 22 bird species were found to be abundant, 79 species were common, 13 species were occasional, 77 species were uncommon and 11 species were rare. An exhaustive list of bird species found in Gorewada area is enclosed.

In the following list, the categorization of status, abundance and habitat has been done as follows:

Abundance:

- A – Seen very commonly in the habitat
- C – Seen commonly in the habitat
- O – Seen Occasionally in the habitat
- U – Seen many times but not common
- R – Seen quite rarely

Status:

- R – Resident species which are found in the habitat throughout the year
- WM – Winter migrant species, which are found in the habitat only during winter months
- LM – Local migrant species, which are found in the habitat irregularly
- BM – Breeding migrant species, which visit the habitat only during their breeding period
- PM – Passage migrant, which are sighted on the passage from their wintering grounds to their breeding grounds or vice-versa
- V – Vagrant species, which are not winter migrants or breeding migrants but are seen sometimes

Habitat (Location of sighting):

- GR – Grasslands
- SF – Scrub forest
- DF – Dense Forest

RI – Riparian Zone (Along the water course)

Checklist of Birds found in Gorewada Reserve Forest with Status, Abundance and Habitat

Sr.No	Name of Bird	Latin Name	Statu	Abundan	Habita
1	little Grebe	<i>Tachybaptus rutlicollis</i>	R	C	G
2	Great Crested Grebe	<i>Podiceps cristatus</i>	W	Rr	G
3	Darter	<i>Anhinga rufa melanogaster</i>	LM	U	G
4	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	R	U	G
5	Little Cormorant	<i>Phalacrocorax niger</i>	R	C	G
6	Great Egret	<i>Casmerodius albus modestus</i>	R	U	G
7	Intermediate Egret	<i>Mesophoyx intermedia</i>	R	U	G
8	Little Egret	<i>Egretta garzetta garzetta</i>	R	U	G
9	Cattle Egret	<i>Bubulcus ibis coromandus</i>	R	A	G,F
10	Grey Heron	<i>Ardea cinerea rectirostris</i>	LM	U	G
11	Purple Heron	<i>Ardea purpurea manillensis</i>	LM	U	G
12	Little Heron	<i>Butorides striatus</i>	R	U	G
13	Indian Pond Heron	<i>Ardeola grayii</i>	R	C	G
14	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	R	U	G
15	Yellow Bittern	<i>Ixobrychus sinensis</i>	R	U	G
16	Woollynecked Stork	<i>Ciconia episcopus</i>	R	U	G
17	Asian Openbill	<i>Anastomus oscitans</i>	R	U	G
18	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	R	C	G
19	Ruddy Shelduck	<i>Tadorna ferruginea</i>	W	U	G
20	Northern Pintail	<i>Anas acuta</i>	W	C	G
21	Common Teal	<i>Anas crecca crecca</i>	W	C	G
22	Spot-billed Duck	<i>Anas poecilhorhynchus</i>	R	C	G
23	Gadwall	<i>Anas strepera strepera</i>	W	U	G
24	Eurasian Wigeon	<i>Anas penelope</i>	W	U	G
25	Garganey	<i>Anas querquedula</i>	W	O	G
26	Northern Shoveler	<i>Anas clypeata</i>	W	C	G
27	Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	R	C	G
28	Redcrested Pochard	<i>Rhodonessa rufina</i>	W	C	G
29	Common Pochard	<i>Aythya ferina</i>	W	C	G
30	Ferruginous Pochard	<i>Aythya nyrocha</i>	W	Rr	G
31	Tufted Duck	<i>Aythya fuligula</i>	W	U	G
32	Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i>	R	C	F
33	Black-shouldered Kite	<i>Elanus caeruleus</i>	R	C	F
34	Black Kite	<i>Milvus migrans govinda</i>	R	C	F
35	Shikra	<i>Accipiter badius dmsumieri</i>	R	C	F
36	Eurasian Sparrowhawk	<i>Accipiter nisus</i>	W	Rr	F
37	White-eyed Buzzard	<i>Butastur teesa</i>	R	U	F

Master Plan of Zoological Park and Rescue Centre, Gorewada

38	Osprey	<i>Pandion haliaetus</i>	W	O	G
39	Eurasian Marsh Carrier	<i>Circus aeruginosus</i>	W	C	G
40	Short-toed Eagle	<i>Circaetus gallicus gallicus</i>	R	U	F
41	Crested Serpent Eagle	<i>Spilornis cheela melanotis</i>	R	O	F
42	Common Kestrel	<i>Falco tinnunculus</i>	R	O	F
43	Grey Francolin	<i>Francolinus pondicerianus</i>	R	C	F
44	Painted Francolin	<i>Francolinus pictus</i>	R	C	F
45	Common Quail	<i>Coturnix coturnix coturnix</i>	R	C	F
46	Rain Quail	<i>Coturnix coromandelicha</i>	W	C	F
47	Jungle Bush Quail	<i>Perdicula asiatica</i>	R	C	F
48	Rock Bush Quail	<i>Perdicula argoondah</i>	R	C	F
49	Small Button Quail	<i>Turnix sylvatica</i>	R	U	F
50	Yellowlegged Button Quail	<i>Turnix tanki</i>	R	U	F
51	Barred Button Quail	<i>Turnix suscitator</i>	R	U	F
52	Common Peafowl	<i>Pavo cristatus</i>	R	C	F
53	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	R	C	G
54	Common Moorhen	<i>Gallinula chloropus</i>	R	C	G
55	Common Coot	<i>Fulica atra</i>	R	C	G
56	Purple Swamphen	<i>Porphyrio porphyrio</i>	R	C	G
57	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	R	C	G
58	Bronzewinged Jacana	<i>Metopidius indicus</i>	R	C	G
59	Blackwinged Stilt	<i>Himantopus himantopus</i>	R	C	G
60	Eurasian Thick-knee	<i>Burhinus oedicephalus</i>	R	U	F
61	Great Thick-knee	<i>Esacus recurvirostris</i>	R	U	F
62	Indian Courser	<i>Cursorius coromandelicus</i>	R	U	F
63	Small Pratincole	<i>Glareola lactea</i>	R	Rr	G
64	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	R	C	F
65	Red-wattled Lapwing	<i>Vanellus indicus indicus</i>	R	A	F
66	Little Ringed Plover	<i>Charadrius dubius jerdoni</i>	R	C	G
67	Spotted Redshank	<i>Tringa erythropus</i>	PM	Rr	G
68	Common Redshank	<i>Tringa totanus</i>	W	U	G
69	Common Greenshank	<i>Tringa nebularia</i>	W	U	G
70	Green Sandpiper	<i>Tringa ochropus</i>	W	U	G
71	Common Sandpiper	<i>Actitis hypoleucos</i>	W	C	G
72	Wood Sandpiper	<i>Tringa glareola</i>	W	C	G
73	Common Snipe	<i>Gallinago gallinago gallinago</i>	W	U	G
74	Little Stint	<i>Calidris minuta</i>	W	U	G
75	River Tern	<i>Sterna aurantia</i>	R	C	G
76	Little Tern	<i>Sterna albifrons</i>	BM	U	G
77	Chestnutbellied Sandgrouse	<i>Pterocles exustus</i>	R	U	F
78	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	R	C	F
79	Little Brown Dove	<i>Streptopelia semgalensis</i>	R	A	F
80	Spotted Dove	<i>Streptopelia chinensis</i>	R	U	F

Master Plan of Zoological Park and Rescue Centre, Gorewada

81	Yellow-footed Green	<i>Treron phoenicoptera</i>	R	U	F
82	Rock Pigeon	<i>Columba livia</i>	R	A	F
83	Plumheaded Parakeet	<i>Psittacula cyanocephala</i>	R	C	F
84	Rose-ringed Parakeet	<i>Psittacula krameri</i>	R	A	F
85	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	R	C	F
86	Pied Cuckoo	<i>Clamator jacobinns</i>	BM	C	F
87	Asian Koel	<i>Eudynamys scolopacea</i>	R	A	F
88	Greater Coucal	<i>Centropus sinensis</i>	R	C	F
89	Indian Nightjar	<i>Caprimulgus asiaticus</i>	R	C	F
90	Savanna Nightjar	<i>Caprimulgus affinis</i>	R	C	F
91	Grey Nightjar	<i>Caprimulgus indicus</i>	R	C	F
92	Barn Owl	<i>Tyto alba stertens</i>	R	C	F
93	Rock Eagle-Owl	<i>Bubo bubo bengalensis</i>	R	C	F
94	Collared Scops Owl	<i>Otus bakkomoena</i>	R	U	F
95	Jungle Owlet	<i>Glaucidium radiatum radiatum</i>	R	U	F
96	Spotted Owlet	<i>Athene brama brama</i>	R	C	F
97	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	R	C	F
98	House Swift	<i>Apus affinis affinis</i>	R	A	F
99	Crested Treeswift	<i>Hemiprocnne coroncttu</i>	R	U	F
100	Indian Roller	<i>Coracias benghalemis</i>	R	C	F
101	Pied Kingfisher	<i>Ceryle rudis</i>	R	C	G
102	Common kingfisher	<i>Alcedo atthis</i>	R	C	G
103	Whitethroated kingfisher	<i>Halcyon smyrnensis</i>	R	C	G,F
104	Bluetailed Bee-eater	<i>Merops philippinus</i>	BM	U	G
105	Green Bee-eater	<i>Merops orientalis</i>	R	A	F
106	Coppersmith Barbet	<i>Megalaima haemacephala</i>	R	A	F
107	Common Hoopoe	<i>Upupa epops</i>	R	U	F
108	Common Grey Hornbill	<i>Ocyrceros birostris</i>	R	U	F
109	Blackrumped Flameback	<i>Dinopium benghalense</i>	R	C	F
110	Greater Flameback	<i>Chrysocolaptes lucidus</i>	R	U	F
111	Yellow-crowned	<i>Dendrocopus mahrattensis</i>	R	C	F
112	Common lora	<i>Aegithina tiphia</i>	R	C	F
113	Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>	R	U	F
114	Bluewinged Leafbird	<i>Chloropsis cochinchinensis</i>	R	Rr	F
115	Eurasian Golden Oriole	<i>Oriolus oriolus kundoo</i>	R	C	F
116	Black-hooded Oriole	<i>Oriolus xanthornus</i>	R	U	F
117	Indian Pitta	<i>Pitta brachyura</i>	BM	U	F
118	Singing Bushlark	<i>Mirafra cantillans</i>	R	C	F
119	Indian Bushlark	<i>Mirafra erythroplera</i>	R	C	F
120	Ashycrowned Sparrow Lark	<i>Eremopterix grisea</i>	R	C	F
121	Rufoustailed Lark	<i>Ammomanes phoenicrurus</i>	R	C	F
122	Sykes' Lark	<i>Galerida deva</i>	R	C	F
123	Oriental Skylark	<i>Alauda gulgula</i>	R	C	F

Master Plan of Zoological Park and Rescue Centre, Gorewada

124	Dusky Crag Martin	<i>Hirundo concolor</i>	R	C	F
125	Barn Swallow	<i>Hirundo rustica</i>	W	U	F
126	Wiretailed Swallow	<i>Hirundo smithii</i>	R	A	F
127	Red-rumped Swallow	<i>Hirundo daurica</i>	R	A	F
128	Streak-throated Swallow	<i>Hirundo fluvicola</i>	R	C	F
129	Black Drongo	<i>Dicrurus macrocercus</i>	R	A	F
130	Whitebellied Drongo	<i>Dicrurus caerulescens</i>	R	U	F
131	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	R	U	F
132	Southern Grey Shrike	<i>Lanius meridionalis lahtora</i>	R	Rr	F
133	Longtailed Shrike	<i>Lanius schach</i>	R	C	F
134	Baybacked Shrike	<i>Lanius vittatus</i>	R	C	F
135	Brown Shrike	<i>Lanius cristatus</i>	W	O	F
136	Chestnut-tailed Starling	<i>Sturnus malabaricus</i>	R	C	F
137	Brahminy Starling	<i>Sturnus pagodarum</i>	R	A	F
138	Rosy Starling	<i>Sturnus roseus</i>	W	C	F
139	Common Starling	<i>Sturnus vulgaris</i>	W	Rr	F
140	Asian Pied Starling	<i>Sturnus contra contra</i>	R	C	F
141	Bank Myna	<i>Acridotheres gingianus</i>	R	U	F
142	Common Myna	<i>Acridotheres tristis tristis</i>	R	A	F
143	Indian House Crow	<i>Corvus splendens</i>	R	A	F
144	Rufous Treepie	<i>Dendrocitta vagabunda</i>	R	U	F
145	Large Cuckooshrike	<i>Coracina macei</i>	R	O	F
146	Blackheaded Cuckoo-shrike	<i>Coracina melanoptera</i>	R	O	F
147	Whitebellied Minivet	<i>Pericrocotus erythropygus</i>	R	U	F
148	Redvented Bulbul	<i>Pycnonotus cafer</i>	R	A	F
149	Whitebrowed Bulbul	<i>Pycnonotus luteolus</i>	R	U	F
150	Tawnybellied Babbler	<i>Dumetia hyperythra</i>	R	O	F
151	Yellow-eyed Babbler	<i>Chrysomma sineme</i>	R	U	F
152	Jungle Babbler	<i>Turdoides striata</i>	R	A	F
153	Large Grey Babbler	<i>Turdoides malcolmi</i>	R	C	F
154	Common Babbler	<i>Turdoides caudalus</i>	R	U	F
155	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	W	Rr	F
156	Redthroated Flycatcher	<i>Ficedula parva</i>	R	O	F
157	Tickell's Blue Flycatcher	<i>Cyornis tickelliae tickelliae</i>	R	O	F
158	Asian Paradise Flycatcher	<i>Terpsiphone paradisi</i>	R	U	F
159	Blacknaped Monarch	<i>Hypothymis azurea styani</i>	R	O	F
160	Whitebrowed Fantail	<i>Rhipidura aureola</i>	R	U	F
161	Whitethroated Fantail	<i>Rhipidura albicollis albogularis</i>	R	O	F
162	Ashy Prinia	<i>Prinia socialis socialis</i>	R	C	F
163	Plain Prinia	<i>Prinia inornata</i>	R	C	F
164	Jungle Prinia	<i>Prinia sylvatica</i>	R	C	F
165	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	W	U	G,F
166	Booted Warbler	<i>Hippolais caligata rama</i>	W	U	F

Master Plan of Zoological Park and Rescue Centre, Gorewada

167	Common Tailorbird	<i>Orthotomus sutorius</i>	R	A	F
168	Orphean Warbler	<i>Sylvia hortensis</i>	W	U	F
169	Lesser Whitethroat	<i>Sylvia curruca blythii</i>	W	U	F
170	Common Chiffchaff	<i>Phylloscopus collybita</i>	W	U	F
171	Greenish Warbler	<i>Phylloscopus trochiloides</i>	W	U	F
172	Bluethroat	<i>Luscinia svecica</i>	W	U	G,F
173	Black Redstart	<i>Phoenicurus ochrurus</i>	W	C	F
174	Brown Rock Chat	<i>Cercomela fusca</i>	R	C	F
175	Oriental Magpie Robin	<i>Copsychus saularis</i>	R	C	F
176	Indian Robin	<i>Saxicolodes fulicata</i>	R	C	F
177	Pied Bushchat	<i>Saxicola caprata</i>	R	U	F
178	Common Stonechat	<i>Saxicola torquata</i>	R	C	F
179	Blue Rock Thrush	<i>Monticola solitarius</i>	W	Rr	F
180	Whitethroated Ground	<i>Zoothera citrina</i>	R	U	F
181	Great Tit	<i>Parus major stupae</i>	R	U	F
182	Black-lored Tit	<i>Parus xanthogenys</i>	R	U	F
183	Tree Pipit	<i>Anthus trivialis</i>	R	U	F
184	Paddyfield Pipit	<i>Anthus nifulus</i>	R	C	F
185	Whitebrowed Wagtail	<i>Motacilla madraspatemis</i>	R	C	F
186	Citrine Wagtail	<i>Motacilla c. citreola</i>	W	U	G
187	Grey Wagtail	<i>Motacilla cinerea</i>	W	U	G
188	Yellow Wagtail	<i>Motacilla flava</i>	W	U	G
189	White Wagtail	<i>Motacilla alba</i>	W	U	G
190	Purple-rumped Sunbird	<i>Nectarinia zeylonica</i>	R	A	F
191	Purple Sunbird	<i>Nectarinia asiatica</i>	R	A	F
192	Oriental White-eye	<i>Zosterops palpebrosus</i>	R	C	F
193	Palebilled Flowerpecker	<i>Dicaeum erythrorhynchos</i>	R	U	F
194	Red Avadavat	<i>Amandava amandava</i>	R	U	F
195	Indian Silverbill	<i>Lonchurra malabarica</i>	R	A	F
196	Whiterumped Munia	<i>Lonchurra striata</i>	R	Rr	F
197	Scalybreasted Munia	<i>Lonchurra punctulata</i>	R	C	F
198	Blackheaded Munia	<i>Lonchurra malacca</i>	R	U	F
199	House Sparrow	<i>Passer domesticus</i>	R	A	F
200	Chestnut-shouldered	<i>Petronia xanthocollis</i>	R	U	F
201	Baya Weaver	<i>Ploceus philippinus</i>	R	U	F
202	Common Rosefinch	<i>Carpodacus erythrinus</i>	W	O	F