

MASTER PLAN

2012-2022

MANIPUR ZOOLOGICAL GARDEN



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FOREWORD

Every Zoo in the country is to be recognized by Central Zoo Authority, Ministry of Environment & Forests under the condition 'Recognition of Zoo Rules 1992'. It has to have a Master Plan for ten years. The Master Plan for Manipur Zoological Garden for the year 2012-13 to 2021-22 (ten years) was initially prepared by Shri S. Dhananjay Singh, IFS, Chief Conservator of Forests (A&P) and Shri. Shantikumar Singh, MFS and their team of dedicated officers namely Dr. L. Sharatchandra Singh, Veterinary Officer, Shri Kh. Kuber Singh, Shri L. Biramangol Singh, and Shri. Hemochandra Singh(Range Officers). Later, the same was modified and finalised by Shri Arun R S, IFS, Director, Manipur Zoological Garden, under the able guidance of Shri Th. M P Singh, IFS, Conservator of Forests (Wildlife). The services and guidance rendered by the Expert Group on Zoo consisting of Shri R.S. Bhaduria, Ex-PCCF, UP and Prof.(Dr) Surinder Suneja along with Shri A. Kharshi-ing, Ex-PCCF(Manipur) has provided a great deal of input in bringing out this document in this form. All the conditions laid down by CZA have been fulfilled.

Personally, I am thankful to Shri Th. Debendra Singh, Hon'ble Minister (Forests & Environment), Manipur and Shri L. Lawmkunga, IAS, Chief Secretary, Manipur, for their encouragement in preparation of this document. I am thankful to Shri A.K. Rana, IFS, PCCF for his valuable suggestions. I am also thankful to Dr. Anilkumar, IFS, for his efforts and guidance for preparing this document during the initial period of preparation of this document. I thank Shri R.K. Srivastava, IFS, Additional Principal Chief Conservator of Forests (FDA) and Shri K. Angami, IFS, Additional Principal Chief Conservator of Forests (A & P) for their suggestions.

CERTIFICATE

Imphal, the 8th August 2013

This is to certify that this Master Plan (2012-13 to 2021-22) for scientific management of Manipur Zoological Garden, Imphal, Manipur has been prepared by the following officers of the Forest Department, Manipur in consultation with the Expert Group on Zoo Designing of the Central Zoo Authority (CZA).



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Chief Wildlife Warden
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2. (Th. M. P. Singh)
Conservator of Forests (Wildlife)
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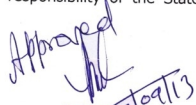
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B.S. BONAL
Member Secretary
Central Zoo Authority
(Ministry of Environment & Forests)
Govt. of India, New Delhi



Countersigned:

Master Plan of the Manipur Zoological Garden, Imphal 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 the State Government of Manipur.



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

It is hoped that Manipur Zoological Garden (a medium sized Zoo) in coming years will be a shining example of ex-situ conservation of many important species such as Sangai, Nongyin pheasant etc. Manipur Zoological Garden will create awareness among the politicians, planners, paramilitary forces, civil forces, State Government Officers and employees and above all common man and the children about the conservation of important fauna of the State. It will create a sense of joy and ethics to the future generations to come.

Imphal, the 3rd September 2013.




(Th. Ibobi Singh)
Chief Wildlife Warden.

PREFACE

Since its inception in 1976, Manipur Zoological Garden was managed under annual work programme with less vision and mission for conservation of wildlife. There was no long term planning. The zoo was managed under small funding by state Government and the CZA assisted on developing the Captive Breeding enclosures at Second Home of Sangai. The systematic display of animals improved but need more planning. The design of the enclosures, visitor circulation path and other visitor amenities, veterinary unit and the sewerage and drainage needed much improvement. The Expert Group of CZA has properly guided the Manipur Zoological Garden Authority in the process of preparation of the 10 year Master Plan with mission, vision and strategy for management of the zoo in consonance with the fixed standards and norms for zoo management under the Recognition of Zoo Rules.

This Master Plan for management of Manipur Zoological Garden is the 7th version which has been finally prepared as suggested by the expert group on zoo designing of the CZA. The master Plan covering 10 years period for scientific and systematic management of the zoo has taken care for development of standard enclosures with shelters and enrichment of enclosures; rescue centre; drainage, sewerage and waste disposal; visitor amenities; gardens and lawns; infrastructures for zoo, Director office, Veterinary Hospital, Staff quarter, ticket counter, interpretation centre, museum, water storage and distribution system, electrification; day to day maintenance, protection, crisis management, recapture of escaped animals, health and hygiene and feed of animals and general administration of the zoo with required staff. It is hoped that with the implementation of the Master Plan, the objective of management of the Manipur Zoological Garden will be achieved and the zoo will become a wildlife conservation centre, a centre for education, a centre for recreation, a centre for research and a centre for rescue of animals.

Imphal, the 3rd September 2013.



(Th. M P Singh)
Conservator of Forests (Wildlife)
Government of Manipur

ACKNOWLEDGEMENT

This Master Plan for scientific management of the Manipur Zoological Garden for 10 years (2012-13 to 2021-22) is an outcome of a series of discussion, interaction and guidance and is based on information, expertise, and advice contributed by the members of the CZA Specialist Group and other senior officers of the Forest Department, who are experienced in the conservation of wildlife and zoo management. I am extremely grateful to Shri A.K Rana, IFS, Principal Chief Conservator of Forests, Manipur who is the pioneer of this Master Plan and the first draft Master Plan was prepared in 2007-08 when he was the Chief Wildlife Warden of Manipur. I thank the CZA Expert Group in Zoo Designing for providing information/suggestion through an extensive review for correcting the shortcoming of the draft Master Plan. we have benefited greatly from CZA. I thank Shri B.S.Bonal, IFS Member Secretary CZA, leader of the CZA Expert Group for his support and guidance and special interest for Manipur Zoo. I also thank Shri R.S.Bhadauria, IFS, EX-PCCF (U. P.)and Prof (Dr) Surinder Suneja who visited Manipur Zoological Garden on 19th February 2011 and also the panel of Expert Group on Zoo Designing of CZA who examined the Master Plan at CZA and suggested criteria for improvements.

I place on record deep sense of gratitude to Shri Th. Ibohi Singh IFS, Chief Wildlife Warden, for his constant inspiration rendered during the preparation of Master Plan. My heartfelt thanks to Shri A.Kharshi-ing, IFS, Ex-Pr. Chief Conservator of Forests while he was the Chief Wildlife Warden, Shri Anilkumar, IFS, earlier Chief wildlife warden, Shri K. Angami, APCCF (A&P) and Shri R K Srivastava, IFS, APCCF (FDA) for their leadership role taken for completing this Master Plan. I express deep sense of gratitude to Shri L Dhananjay Singh, IFS, CCF (A & P), who took immense efforts for making this document, while he was the Director of Manipur Zoological Garden.

The Final Version of the Master Plan is prepared under the guidance of Shri Th. M P Singh, IFS, Conservator of Forests (Wildlife). I express my gratitude to him for his constant support and suggestions rendered by him for completing the Master Plan of Manipur Zoological Garden. I appreciate and acknowledge the services rendered by the earlier Director of Manipur Zoological Garden, Shri H. Shantikumar Singh for bringing out the amended final version of the Master Plan. I also thank Shri L Joykumar Singh, IFS, Ceputy Conservator of Forests (Park and Sanctuary) for his constant support and help during the preparation of this document. The support given by Dr.L. Sharatchandra Singh, Veterinary Officer, Shri Kh. Kuber Singh, Range Officer, Shri L.Birmangol Singh, Range Officer, Shri Hemchandra Singh, Range Officer and Shri Ch.Krishnamani Singh, Technical Associate, GIS, Forest Department, Manipur are appreciated and acknowledged.

Lastly, I thank all the supporting staffs of Manipur Zoological Garden who contributed information and opinions while preparing the Master Plan.

Imphal, the 3rd September 2013



(ARUN R S)

Director, Manipur Zoological Garden
Government of Manipur

MASTER PLAN
2012-13 to 2021-22
MANIPUR ZOOLOGICAL GARDEN

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MASTER PLAN (2012-13 to 2021-22) MANIPUR ZOOLOGICAL GARDEN

Part – I

Chapter - I INTRODUCTION

The Master Plan of Manipur Zoological Garden is a comprehensive document to guide systematic and planned development of the zoo which has been prepared for a period of 10 years considering its land, financial position, zoo personnel, physical and aesthetic resources and constraints in management. The Master Plan is prepared to provide holistic nature conservation and education including research with wholesome recreation. CZA Expert Group has been consulted and discussed on the spot at Manipur Zoological Garden and Sangai Captive Breeding Centre, Imphal and the zoo personnel also visited the CZA office for arriving at a comprehensive master plan document for the management of Manipur Zoological Garden to modernise the zoo, keeping in view the natural habitat need of the animals and the prescriptions of the CZA. The Master Plan has been improved as per instruction of CZA letter F.No.19-58/93-CZA(190)(Vol.III)(M) dated 18.3.2011 and lastly under letter F.No.19-58/93-CZA(190)(Vol.III)(M) dated 11.11.2011 providing with 5 m interval contour lines on the layout maps and others and the General Circular vide F.No.27-1/2005-CZA(Vol.II)(M)//1030 dated 21.11.2011(28.11.2011) providing Checklist for Master Plan Submission and as per the comments of Expert Committee dated 18.5.2012.

a. History of the Zoo

Prior to 1976 there was no zoo in the state of Manipur. Considering the need for creation of a zoo in the state, the matter was discussed under agenda item No.4 of first Meeting of the Manipur State Wildlife Advisory Board on 30.3.1976. As decided in the meeting, the Board directed the State Government to establish an aviary and if possible a Deer Park at the site of

Forest Experimental Station, Iroisemba having an area of 8.17 ha as a nucleus for a Zoological cum Botanical Garden to start with. The purpose was that, in due course of time the Zoological Garden will fulfil the long felt need of the State to serve as educational and scientific study purposes of animals besides ex-situ conservation and protection of wildlife. The Board also directed the State Government that the Mini Zoo cum Botanical Park should be inaugurated in the Wild Life Week of the same year in October 1976. The recommendation of the Manipur State Wildlife Advisory Board was implemented by the State Government and as a result the Manipur Zoological Garden was established on 2nd October 1976 on the Forest Experimental Plot at Iroisemba covering an area of 8.17 ha. Over the last few decades, Manipur Zoological Garden expanded its activities in respect of captive breeding of endangered species belonging to this region apart from keeping several animals and birds including big cats. Presently, the zoo has been conserving wild animals namely, (1) Leopard, (2) Leopard cat, (3) Brow-Antlered Deer, (4) Hoolock Gibbon, (5) Slow Loris, (6) Water Monitor Lizard, (7) Indian Rock Python, (8) Indian Pied hornbill, (9) Green Peafowl, (10) Himalayan Griffon Vulture, (11) Kalij Pheasant and (12) Hume's Bar-backed Pheasant under the Scheduled I animals of Wildlife (Protection) Act, 1972 and others including (13) Himalayan Black Bear, (14) Small Indian Civet, (15) Jackal, (16) Flying Squirrel, (17) Rhesus Monkey, (18) Toddy cat, (19) Porcupine, (20) Sambar deer, (21) Spotted deer, (22) Hog deer, (23) Barking deer, (24) Goral, (25) Wild boar, (26) Asian Forest Tortoise, (27) Keeled Box Turtle, (28) Brown stream terrapin (Asian leaf turtle), (29) Malayan Box turtle, (30) Himalayan Yellow Throated marten, (31) Rosy pelican, (32) Adjutant Stork, (33) Cattle egret, (34) Pond heron, (35) Night heron, (36) Moor hen, (37) Purple moor hen, (38) Common teal, (39) White eyed poachard, (40) Purple heron, (41) Common coot, (42) Water cock, (43) Spot billed duck, (44) Crested Serpent Eagle, (45) Lesser Whistling Teal, (46) Grey Headed Parakeet, (47) White Breasted Water-hen, (48) Brahmani Duck, (49) Owl, (50) purple Heron, (51) Ferret Badger and (52) Emu (exotic bird) with a total of 52 species with a population of 371 animals and birds.

On 1st October 1988, a Biological Museum was established in the Zoo campus. The said Museum has been playing a crucial role in preserving specimens of many rare and endangered species of this region thereby serving the purpose of providing study material for students, scholars and enthusiasts in the field of wildlife conservation, education, research etc. The preserved biological parts of wild animals and birds are displayed with biological information

which is quite informative to the students and the nature lovers. Few Aquariums with imported small fishes are also kept inside the Museum for entertaining the visitors. A small children park with play items like Arch swing, Wave slide, Multi seater sea-saw, Combination 3 in 1, Merry Go Round and Rocking Boat. Manipur Zoological Garden has been taken up Captive Breeding activities for (i) Brow-antlered deer (Sangai), (ii) Hume's bar-backed pheasant and (iii) Kalij pheasant. CZA has recognised Manipur Zoological garden as the Co-ordinating Zoo for captive breeding programme of the Brow-antlered deer. Captive breeding activities taken up by Manipur Zoological Garden for Hume's bar-backed pheasant and Kalij pheasant are not yet to the record of CZA. There is scope for future expansion of the zoo. There is also the vision for conversion of the zoo to the status of Manipur State Zoo.

During the last 35 years of its existence, Manipur Zoological Garden has developed in many spheres with addition of many animal and birds enclosures and collection of varieties of animals and birds thereby upgrading the Zoo's status from a miniature zoo to the status of a Medium Zoo. Some of the important developmental works carried out during the last 35 years of its existence are highlighted as under:

1. Consolidated the zoo boundary with construction of pucca boundary wall as property mark of the Zoo.
2. Constructed pucca boundary wall at the Captive Breeding Centre, the 2nd home of Sangai inside Langol Reserved Forests.
3. Constructed Serow enclosure with enrichment including providing animal rest shed, Feeding place, Water point and natural settings.
4. Constructed Python enclosures animal rest shed, Feeding place, Water point.
5. Constructed deer enclosures for Cheetal, Sambhar. Barking deer, Hog deer and Brow antlered Deer with enrichment like providing animal rest shed, Feeding place, Water point and natural settings.
6. Constructed Monkey enclosures with enrichment of the enclosures with providing for Shelter, Feeding place, water points, furniture.

7. Constructed Leopard enclosure with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
8. Constructed small carnivore enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
9. Constructed Monitor Lizard enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
10. Constructed Tortoise and Turtle enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
11. Constructed Porcupine enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
12. Constructed Water Birds enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
13. Constructed Land Birds enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
14. Constructed enclosures for rare bird species like Hornbill, Kalij Pheasant, Vultures, Burmese Peafowl with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
15. Constructed Himalayan Black Bear enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
16. Constructed three enclosures at Second Home of Sangai for captive breeding of Sangai and Hume's bar-backed pheasant at Langol Reserved Forests with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
17. Constructed visitor amenities like Foot path, Rest sheds, Seats, Toilets.
18. Constructed Zoo Biological Museum.
19. Zoo electrification and Water connection done

20. Constructed Veterinary Unit
21. Constructed staff amenities
22. Drainage improvement done
23. Signage and publications were made
24. Installed Children Play items
25. Constructed Emu enclosure
26. Extended Pelican and Adjutant Stork aviary

There was free entry to the zoo for all categories of visitors till September 1996. The ticket system was introduced in October, 1996 as a policy of the State Government to instil the importance of zoos in the minds of the people and also as a policy matter for collection revenue. The Rates of entry tickets to Manipur Zoological Garden has been revised and implemented with effect from 12.11.2011. The revised rates are Rs.10 per adult, Rs.6 per student /child, group of 30 and above Rs 300, Museum Rs.5 per person, and camera Rs.25 per person and video Rs.1200 per person.

Manipur Zoological Garden is a medium category zoo under Section 38H of the Wildlife (Protection) Act, 1972 as recognised by the Central Zoo Authority (CZA) vides Letter F.No. 19-58/93-CZA(190) (Vol.III)(M) dated 02.02.2009 under the recognition of Zoo Rules, 1992.

An expert team of Central Zoo Authority consisting of Shri R.S. Bhadauria, Ex-PCCF, UP and Prof.(Dr) Surinder Suneja carried out the field appraisal of the Manipur Zoological Garden, Imphal on 19 February 2011 with the Wildlife Officials of the Forest Department, Manipur consisting Shri A.Kharshi-ing, Chief Wildlife Warden, Shri S.Dhananjoy Singh, Director Manipur Zoological Garden, the Veterinary Doctor, 2 Range Officers, one engaged architecture and other supporting staff as deputed by the Central Zoo Authority. The team members submitted their report to CZA indicating various amendments to be carried out in the Master Plan of the Zoo. The CZA under letter F.No 19-58/93-CZA(190)(Vol.III)(M) dated 18.03.2011 has furnished the report of the team for amendment of the Master Plan. Thus the Master Plan of Manipur Zoological Garden has been amended as per the recommendation of the team as

reflected in their “Inspection Report of Manipur Zoological Garden, Imphal”. The Report is reproduced as follows:

“The Zoo, located at IROISEMBA, about 8 kms from Imphal city centre, was inspected along with Chief Wildlife Warden and Director of the Zoo on 19.2.2011. Zoo area about 9 ha is almost plain, partly wooded like a forest area and partly planted with good number of trees. Some area is marsh land and very suitable for Marsh birds and Gharial and Crocodiles. All the enclosures are outdated, mostly undersized (except Sambar and Hog deer), bounded by unplanned combination of chain link and masonry walls and iron bars, without moats etc, and also they have no proper feeding/night cells. Therefore all the enclosures need to be modified and some even relocated to follow a systematic exhibit plan. But on thorough planning of all the existing and proposed additional species, it has been found that all the intended species can be easily exhibited in the area available at present location and there is no need to extend the zoo over another 100ha in Langol Reserved Forest which is about 1.5 kms away from the existing zoo and is hilly mixed with gentle to steep slopes. However part of this extended area, having gentle slopes is used as Breeding Centre, where there are already an enclosure for Sangai Captive Breeding and another Enclosure for Hume’s Bar-backed Pheasant Captive Breeding.

The required modifications and relocation of unsuitably located enclosures along with additional species to be added to follow taxonomic display has been fully explained to the Chief Wildlife Warden and Zoo Director on the spot, to which they agreed, and revised Master Plan will be prepared on Contour map accordingly to be resubmitted to CZA in due course”.

b. Vision of the Zoo:

Manipur Zoological Garden strive to become a zoo committed to animal stewardship and conservation leadership inspiring the public to have the passion for nature and saving wildlife for future generations.

The vision are:

- i) To inspire the public to see the zoo as scientific institution engaged in animal welfare and conservation of wildlife.

- ii) To inspire the public to see the zoo as Centres of knowledge on effective techniques for maintaining healthy ambience and pollution free environment.
- iii) To become a State Zoo with expansion to National Standard committed to animal conservation.
- iv) To inspire the Visitors for having passion for Nature and saving wildlife for future generation.
- v) To set exemplary standard for conservation, education and preservation of wildlife.
- vi) To commit to protection of biodiversity over the years and to be a major force in conserving biodiversity.

c. Mission of the Zoo

The mission for Manipur Zoological Garden are:

- 1) To complement and strengthen the national efforts in conservation of wildlife through planned coordinated conservation breeding of endangered wild animal species of the region.
- 2) To develop amongst the visitors an empathy for wild animals and motivate them to support the cause of wildlife conservation.
- 3) To develop amongst the visitors an understanding about the ecological linkages with the life supporting processes of nature and the need for keeping them intact by adopting sustainable life styles and living in harmony with nature.
- 4) To enhance the role of Manipur Zoological Garden in conservation through scientific research for protecting the wild animals and their natural habitats by creating a data base for sharing information between the agencies involved in in-situ and ex-situ conservation.
- 5) To act as a rescue centre by receiving and keeping orphaned, seized, rescued, injured wild animals with all medical and feed care with proper housing.
- 6) To give comfort, health and safety for the animals.

7) To provide entertainment, recreation, scientific studies, education, awareness, amenities to the visitors.

8) To engage visitors in enjoyable & unique experiences, connect the community with nature, and inspire actions which support conservation.

d. Strategy of the Zoo

The strategy and activities of the zoo will aim at achieving the Mission and Vision of the zoo. The Master Plan is a 10 year vision plan for meeting the needs to achieve the vision and mission. The Zoo authority will try its outmost effort to obtain required funding for implementation of the Master Plan from the State and the Central Government and other Donors. The staff position of the zoo will be strengthened.

e. Objectives :

The main objective for management of Manipur Zoological Garden are centred round the priorities namely, conservation, breeding of endangered species, education and research and recreation. The Objectives are:

- 1) To complement and strengthen the national efforts in conservation of wildlife through planned coordinated conservation breeding of endangered wild animal species of the region.
- 2) To develop amongst the visitors an empathy for wild animals and motivate them to support the cause of wildlife conservation.
- 3) To develop amongst the visitors an understanding about the ecological linkages with the life supporting processes of nature and the need for keeping them intact by adopting sustainable life styles and living in harmony with nature.
- 4) To enhance the role of Manipur Zoological Garden in conservation through scientific research for protecting the wild animals and their natural habitats by creating a data base for sharing information between the agencies involved in in-situ and ex-situ conservation.
- 5) To act as a rescue centre by receiving and keeping orphaned, seized, rescued, injured wild animals with all medical and feed care with proper housing.

6) To give comfort, health and safety for the animals

7) To provide entertainment, recreation, scientific studies, education, awareness, amenities to the visitors.

f. Physical features like Topography of the area:

Manipur Zoological Garden lies between 24°48'50" to 24°49'2" North latitude and 93°53'34" to 93°53'42.6" East Longitude covering an area of 8.17 hectare in the valley at Iroisemba in Imphal West district near the foot hill of Langol Reserved Forest. The Zoo is has 246 m long northern boundary bordered with paddy field adjoining to Game village, 240 m long southern boundary surrounded by Central Agriculture University, 357m long eastern boundary bordered with paddy field and 304 m long western boundary bordered with the campus of All Manipur Horse Riding Association with perimeter of 1147m. The area drains towards south. It has an elevation of 780 metres above mean sea level. The 2nd Home of Sangai, an extended part of Manipur Zoological Garden with the objective for captive breeding purpose of Sangai is situated in Langol Reserved Forest on the northern side about one km from the MZG. Sangai captive Breeding Centre having an area of 6 ha in Sangai Second Home is a hill and has elevation ranging from 830 m to 910 m above mean sea level. The Captive Breeding Centre has boundary perimeter of about 1200m of which 445m perimeter has been fenced and the remaining 755 m long perimeter is open which requires fencing.

g. Geology

The region is a component of Trans Himalayan Geological formation, young and unstable. The valley was formed by deposition of sediments brought by rivers. The nearest river is the Nambul River to the south.

h. Rock and Soil

The soil is mainly composed of sand, clay and silt in the valley part and ferruginous red hill soil in the foothill. Dark clayey and Boggy types of soils are found in the swampy areas of the zoo. The soils are fertile and rich in humus and support good vegetation.

i. Flora and Fauna in Zoo premises

Flora:

Tree species found in the zoo premises and captive breeding centre are *Mangifera indica*, *Bischoffia javanica*, *Mallotus philipensis*, *Eucalyptus* spp., *Acacia auriculiformis*, *Callistemon lanceolatus*, *Ficus* spp., *Jacaranda mimosaeifolia*, *Toona ciliata*, *Lagerstroemia speciosa*, *Cinamomum camphora*, *Ficus hispida*, *Cassia fistula*, *Bauhinia purpurea*, *Emblca officinale*, *Celtis timorensis*, *Syzygium cuminii*, *Albizia stipulata*, *Pterospermum acerifolium*, *Cordia dichotoma*, *Callicarpa arborea*, *Xylosma longifolium*, *Castanopsis Hystrix*, *Oroxylum indicum*, *Bombax ceiba*, *Quercus* species, *Pinus kesiya*, *Taxodium* sp., *Pongamia pinnata*, *Tectona grandis*, *Dillenia indica*, *Salix tetrasperma*, *Spathodia companulata*, *Artocarpus lakoocha*, *Azadirachta indica*, *Terminalia bellerica*, *Elaeocarpus floribundus*, *Psidium guava*, *Morus alba*, etc.

Shrubs/Ground flora consists of *Polygonum lapathifolium*, *Polygonum barbatum*, *Hydrocotyl javanica*, *Amaranthus campestris*, *Amaranthus tricolor*, *Xanthium strumarium*, *Mimosa pudica*, *Sonchus asper*, *Cyperus kyllingiaeoides*, *Clerodendron indicum*, *Eupatorium* spp, *Centella asiatica*, *Gerardiana heterophylla*, *Drymaria cordata*, *Rubus ellipticus*, *Artemisia nilagarica*, *Solanum erianthum*, *Portulaca oleracea*, *Lantana camara*, *Gynura cusimba*, *Achryanthes aspera*, *Melastoma malabathricum*, *Hibiscus rosasinensis*, *Duranta plumeri*, *Nerium* sp., etc.

Grasses include *Panicum* spp., *Cynodon dactylon*, *Imperata cylindrica*, *Cymbopogon* sp., *Erianthus* sp., *Bamboos*, Para grass, etc.

Aquatic flora consists of *Eicchornia crassipes*, *Nelumbo nucifera*, *Setaria italica*, *Ipoemea aquatica*, *Zizania* spp., *Marsilea minuta*, *Pistia* sp., *Alisma plantago-aquatica*, *Nymphaea* spp., *Azolla* sp., etc.

Fauna:

The free living bird in the zoo includes the cattle egret, pond heron, Indian Moorhen, sparrows, Bulbuls, Pigeons/Doves, etc. The trees in the zoo is fully nested by the cattle egrets starting from the month of April when the birds start nesting and egg laying and abandoned the zoo in the month of September when the chicks are able to fly independently. The tall eucalyptus and silver oak trees are the perching habitat of fruit bats. Barking deer, Small Indian Civets, Ferret badger, mongoose, rats, squirrel, snakes and other land birds are found in the forested area of captive breeding centre at Langol hill.

j. Climate

Manipur Zoological Garden enjoy sub-tropical climate characterised by wet and hot summer and dry winter. The climate of Manipur is enjoyable throughout the year. There are two seasons separated by two transitions. They are (i) Winter (December to February), (ii) Pre-monsoon (March to April), (iii) Monsoon (May to September) and (iv) Post Monsoon (October and November). The temperature ranges between a maximum of 32°C and a minimum of 0°C . Frost in December and January is common.

k. Rainfall

The rainy season commence normally from April and end in September. There is considerable amount of pre-monsoon rain. The period from June to August accounts for the major rainfall over the period. The annual rainfall varies from 1000 mm to 3500mm and average rainfall is about 2000mm.

l. Season

There are two seasons separated by two transitions. They are (i) Winter (December to February), (ii) Pre-monsoon (March to April), (iii) Monsoon (May to September) and (iv) Post Monsoon (October and November). May and June encounter the highest temperature of the year. December and January are the coldest months.

m. Approach

MZG is well connected by road. One can reach MZG by taking a taxi, auto-rikshaw plying along Uripok- Kangchup Road at a distance of nearly seven km from the heart of Imphal.

The best season for visit is from January to June and October to December of the year. A maximum visitor recorded is in the month of April every year because of the New Year of Manipuri, the Meitei community falls during this month.

n. Demography of the surrounding area

Manipur Zoological Garden has, in its surrounding areas and beyond, settlement areas of Iroisemba (part of Imphal Municipal Area W/No.27), Langol Games Village, Uripok, Thangmeiband, Lamphel, Lamdeng, Lainingkhul, Takyel, Tera and Naoremthong. Communities belonging to different religions settle in the villages and the majority of them belong to the Meitei community, a Hindu community.

o. Legal Status of Land

The zoo area is a government revenue land allotted to Forest department, Manipur and the 2nd Home of Sangai consisting the Captive Breeding Centre as a part of the Manipur zoo is a hill area located inside Langol Reserved Forests managed by the Forest Department. The Captive Breeding Centre occupies about 6 ha land out of the total area of Second Home of Sangai.

p. Sources of Pollution, if any (include the present ground situation, layout, description of different facilities, difficulties faced in the management in the past)

There is no threat for pollution at present but there is likely cause of pollution in due course from the following probable sources: (i) The Pony Breeding Centre owned by the Manipur House Riding Association adjacent to the western boundary of the zoo if starts its activities on breeding of pony may cause soil and water pollution at the nearby places. (ii) The paddy fields at the north western side of the zoo may pose soil and water pollution by pouring Chemical pesticides and chemical fertilizer used in Paddy field and thus may be a threat to the well being of the zoo animals/birds. (iii) Another source of pollution may be the animal husbandry activities carried out by undertaking pig farming in Central Agricultural University. The pig farming could become source of pollution unless proper measures regarding husbandry practices are not carried out. The CAU authorities will be requested for taking precaution and act accordingly. The zoo being at the foothill there is rare chance of draining of water to the zoo

campus from outside the zoo, except during the flood. Inadequate drainage system in the zoo has been one of the difficulties faced in the management in the past. The system is being improved. The drainage inside the zoo is cleaned regularly. Care has been taken for proper disposal of the animal waste, left over feed items, garbage and the sewerage and also the disposal of the carcass in the zoo to avoid contamination and pollution.

Present ground situation of the existing Zoo:

The present site of Manipur Zoological Garden (MZG) is in Imphal valley with some portions becoming marshy during the rainy season. There is good forested area at the south western area of the zoo consisting of the species like *Salix tetrasperma*, *Gravelia robusta*, *Lagerstroemia speciosa*, *Taxodium species*, *Ficus glomerata*, etc. There is also good forest of *Taxodium* at the eastern moat. The southern half of the entire zoo area is mainly swampy with few dry land area made with earth work and the site is not at present used fully except utilising as a habitat of Hog deer. There are still scope for its development into a modern Zoo in the present area with limited number of local, regional and exotic animals and birds. This unused marshy / low lying area adjoining the Central Agriculture University and the Pony Centre can be fully developed and can provide enclosures for Gharial, Crocodile, Green Belt, Rhinos etc. There is a space between the bear enclosure and the snake house which is sufficient for construction of moated bear enclosure and another chain linked leopard enclosure. The extension part of the zoo at second home in Langol Reserved Forest occupying about 6 ha from Second Home of Sangai in the hill has been the Captive Breeding Centre of endangered species, the Sangai and Birds like Hume's Bar-backed pheasant, Tragopan etc. The burial ground of dead animals is at Second Home of Sangai at langol hill.

Lay-out of the existing Zoo.

A Lay-out map showing the details of the existing infrastructures, animals enclosures, land mass for Manipur Zoological Garden is enclosed as Annexure I. Lay-out map for Captive Breeding Centre of Sangai is enclosed as Annexure III. The lay-out map of Zoo indicates the locations of Mixed Water Bird Aviary, Observation Centre, Sambar Enclosure, Spotted deer enclosure, Barking Deer enclosure, Hog deer Enclosure, Rosy Pelican Mixed Bird Enclosure, Brow antlered deer enclosure, Goral Enclosure, Museum, Garden/Park, Python enclosure,

Hoolock Gibbon Enclosures, Rhesus monkey enclosures, Kalij Pheasant enclosures, Mrs Hume's bar backed Pheasant enclosure, Hornbill enclosure, Vulture enclosures, Eagle enclosures, Hawk Enclosures, Burmese Peafowl enclosure, Wild boar enclosure, Emu bird enclosure, Leopard enclosure, Himalayan Black Bear enclosures, Jackal enclosures, Porcupine enclosure, bear feed preparation shed, Snake house, Toilet complex, Sentry/Guard post, Small Carnivore enclosures, Tortoise enclosures, Turtle enclosures, ticket counter, Director office, food preparation house, nursing centre for rescued animals, veterinary office, store, go-down, Water reservoir, Drinking Water point, feed go-down, veterinary care unit, incinerator, Toilet, Staff Quarter, trees, drainage, footpath, approach road, visitor seat, visitor shed, exit and entrance gates, office gate, control gate, animal shed, parking site, boundary fencing, water bodies, high land and the wetlands. The zoo has a 1300 m long visitor foot path of which 590 m footpath need concrete pavement and remaining 710m footpath require maintenance. Existing Structures which are to be retained are coloured in black, existing structures to be dismantled are coloured in red, existing structures to be improved are coloured green and structures coloured with blue will be newly proposed layouts/structures of the zoo.

Description of different facilities

1. The Zoo exhibits 52 species of animals with 371 population including 20 species of mammals consisting of 5 endangered species, 7 species of reptiles including 2 endangered species and 25 species of birds including 5 endangered and are open to the visitors.
2. All the animal enclosures are approachable through the visitor paths.
3. The enclosures are provided with signboards depicted with biological information, distribution, habitat and status of the respective animals for the information of the visitors.
4. There is elaborate visitor road leading to the enclosures.
5. Visitor roads are guided with arrow signboards indicating the facilities along the road.
6. The zoo provides visitors' toilets neat and clean separately for man and woman.
7. Drinking Water facility with filtered water is provided for the visitors.
8. Wheeled chair for visit of the disabled persons are provided for the visitors.
9. First Aid facility is provided at the counter and the veterinary unit for the visitors and staff.
10. Rest sheds are provided for the visitors.
11. Visitor seats are provided at regular intervals at suitable areas.

12. Printed materials are made available from the Museum to the visitors.
13. The zoo has a Museum where different animal parts are preserved and displayed to the visitors. This is a centre of education.
14. A small children park with play items attracts the visitor with their kids.
15. Facility for research scholars are provided at their own cost for study on zoo inmates.
16. The zoo has basic facility for treatment of zoo inmates at the veterinary unit. Complicated cases of sick animals are referred to state veterinary hospital.
17. Ticket Counter is just at the entrance gate.
18. Guide facility is provided on request by the visitors.
19. Zoo Education Officer is ready to explain about zoo inmates and the nature and its conservation.
20. Transport facility for transportation of animals and feed available.
21. Incinerator for burning waste and other animals discarded parts available.
22. Burial place for death animals is located at second home of sangai in Langol hills.
23. Tap water for animal enclosures available.
24. 24 hours service electricity is available in the zoo as the Zoo is at the proximity of the Electric Sub-station.
25. Facility for cattle immunisation of surrounding villages is being provided.
26. Facility for medical check up of the zoo keepers is being provided.
27. Facility for uniform and other kits for the zoo keepers is being provided.

Difficulties faced in the management in the past:

The zoo faced difficulties in the management in the past. There was less manpower in the zoo. The Zoo was under the overall in charge of an Assistant Conservator of Forests and few Foresters and Forest Guards. All the Zoo Keepers are Muster roll workers and has been as such till date. Veterinary Officers and Veterinary Assistant were on deputation to Manipur Zoological Garden from the State Veterinary Hospital. There was no central assistance for development of the zoo. The fund provided by the state Government for management of the zoo was insufficient. Fund for Zoo animal feeding was made available from the Plan Head and was insufficient. Now, fund for zoo animal feeding is made available from non-plan head which is better. In the past, people's awareness was less but now the awareness has been increased tremendously and people

appreciate the existence of the zoo. The zoo boundary was porous in the past and there were cases of lost of materials from the zoo. Now the zoo boundary is fully fenced with brick wall and well secured. Management of Zoo was done with untrained staff. Today, almost all the staff are trained and exposed to zoo management and had gained experiences. Future training in DNA finger printing etc for Veterinarian would be carried out under collaboration with CZA, CMMB, Hyderabad and LaCONES.

Achievements:

During the last 35 years of its existence, Manipur Zoological Garden has developed in many spheres with addition of many enclosures and collection of varieties of animals and birds thereby upgrading the Zoo's status from a mini zoo to the status of a Medium Zoo. Some of the important developmental works carried out during the last 35 years of its existence are highlighted as under:

1. Consolidation of zoo boundary with construction of pucca boundary wall as property mark of the Zoo.
2. Part Construction of pucca boundary wall at the Captive Breeding Centre, the 2nd home of Sangai inside Langol Reserved Forests.
3. Construction of Serow enclosure with enrichment including providing animal rest shed, Feeding place, Water point and natural settings.
4. Construction of Python enclosure, animal shed, Feeding place, Water point.
5. Construction of deer enclosures for Cheetal, Sambar. Barking deer, Hog deer and Brow antlered Deer with enrichment like providing animal rest shed, Feeding place, Water point and natural settings.
6. Construction of Monkey enclosures with Shelter, Feeding place, water points, furniture.
7. Construction of Leopard enclosure with enrichment of enclosures providing with shelter, feeding place, water point and furniture.

8. Construction of small carnivore enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
9. Construction of Monitor Lizard enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
10. Construction of Tortoise and Turtle enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
11. Construction of Porcupine enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
12. Construction of Water Birds enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
13. Construction of Land Birds enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
14. Construction of enclosures for rare bird species like Hornbill, Kalij Pheasant, Vultures, Burmese Peafowl with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
15. Construction of Himalayan Black Bear enclosures with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
16. Construction of 3 adjacent enclosures at Second Home of Sangai for captive breeding of Sangai and Humes bar-backed pheasant at Langol Reserved Forests with enrichment of enclosures providing with shelter, feeding place, water point and furniture.
17. Construction of visitor amenities like Foot path, Rest sheds, Seats, Toilets.
18. Construction of Zoo Biological Museum.
19. Zoo electrification and Tape Water connection
20. Construction of Veterinary Unit
21. Construction of staff amenities

22. Drainage improvement
23. Signages and publications
24. Installation of Children Play items
25. Construction of Emu enclosure and introduction of Emu.
26. Construction of water bird aviary
27. Revenue collection from zoo visitor has been in an increasing trend.
28. The Zoo has been serving as an institution for research scholars on wildlife
29. The Zoo is successful in breeding animals in the enclosures and also under captive breeding programme.
30. Display of exotic species namely Emu bird is another pride of the zoo.
31. The Zoo has rescue centre for animals saved by the public adjoining to the zoo and a captive breeding centre at Second Home sangai at Langol hill near the zoo.
32. Diversion road developed in the Captive breeding centre at Second Home of Sangai to avoid disturbance to Captive breeding enclosure site of sangai.
33. Feeding of animals and health care of the animals well cared.
34. Exchange of animals took place between Manipur Zoological Garden and other zoos like Delhi national Zoo, Madras Zoo, Assam State Zoo etc.

Chapter – II

Appraisal of the present arrangement and constraints

a. **Animal Section , Veterinary section, store and feed supply section, sanitation section, maintenance section, security section, water supply section, disposal of solid waste and liquid waste –sewerage, visitor amenities, lawns and gardens-landscapes section**

Animal Section:

Manipur Zoological Garden houses 20 mammal species with 202 population including 5 endangered species, 7 reptiles with a population of 32 including 2 endangered species and 25 species of birds having 137 population including 5 endangered species with a total population of 371 excluding species in the rescue centre. Most of the animals which are exhibited in the zoo are from the state itself. Emu bird is the only exotic that is exhibited in the zoo. The animal section has been grouped as follows:

- 1) **Monkey Group :** The group consists of animals namely, Rhesus Macaque, Slow Loris, Flying Squirrel, Hoolock Gibbon.
- 2) **Bear Group:** The group consists of animals namely, Himalayan Black Bear and Wild Boar.
- 3) **Carnivore Group:** The group consists of animals namely, Leopard, Leopard Cat, Jackal, Small Indian Civet, Toddy cat, Ferret badger, Yellow Throated Marten, Vulture and other carnivorous birds.
- 4) **Reptile Group:** The group consists of animals namely, Python, Monitor Lizards, Turtle, Tortoise and other snakes.
- 5) **Dear Group:** The group consists of Brow-antlered deer (Sangai), Spotted Deer, Sambar, Hog Deer, Barking Deer and Goral.
- 6) **Avian Group:** The group consists of animals namely all Water Birds, Burmese Green Peafowl, Pied Horn Bill, Kalij Pheasant, Hume's bar-backed pheasant, Adjutant Stork, Pelican, Parrot and Emu.

Animal enclosures:

There are altogether 58 animal enclosures for mammals, reptiles and birds including 3(three) Brow Antlered Deer Captive Breeding enclosures and 1(one) Hume's bar-backed pheasant captive breeding enclosure at Second Home, the extended part of the zoo in the adjoining hill. The enclosures have been designed ensuring the safety of animals, caretakers and the visitors. Attempts made to meet biological requirements of the animals housed therein. The feeding cells provided needed improvement. The facility for supplying drinking water to the animal enclosures need to be improved, at present no overhead tank exists near the enclosure, water distribution pipeline temporary in the form of alkathene pipes and the capacity of the main water storage tank is small. This is very important infrastructure to be developed.

Hygiene, Feeding and Upkeep:

The animals in the zoo are healthy. Wholesome and unadulterated food in sufficient quantity is given to the zoo animals. Diet Chart for each animal is fixed after analysing the diet charts followed at other zoo like Assam State Zoo, Nandan Kanan Zoo. Feed supplements like Mineral Mixture (Minarex, Minamil), Vitamines (Ambiplex, Calcivate etc) are mixed in the daily feed and water. Salt licks are provided in the deer enclosures. Solid wastes are either burnt in the incinerator or dumped to the soak pit and liquid waste wash off to the drain after treating with potash. General cleanliness is maintained. The carcasses of the dead animals are buried at the burial site at the second Home, the extended part of the zoo at the Langol hill. Carcasses of small animals are burnt in the incinerator. Antlers, bones, skulls are also burnt to control illegal wildlife trade.

Animal Care, Health and Treatment:

A full time Veterinary Officer and his section are in charge of the animal care, health and treatment. Animals are attended by experienced zoo keepers. Zoo Keepers maintain the Keepers Diary for each enclosure, copy of which is submitted to the Veterinary Doctor for examination, record and necessary action. Routine examination of animal health is done by the veterinary Doctor. Animals with abnormal behaviours/ having symptoms of sickness are treated and segregated if necessary till recovery. Prophylactic measures used are (1) washing the enclosure floor with solution of Potassium permanganate (2) Lime and Bleaching powder solution around

the enclosure and the drains. The feed preparation area is disinfected with PP lotion daily. Vaccination of the domestic animals around the zoo premises for FMD and Black Quarter Disease done once in a year in the month of January/February and another Booster Dose is given in the month of October for domestic animals numbering about 200 – 300. Health check up of Zoo Keepers who attends the zoo animals is carried out at least once a year. Animal history sheets in the form of Stud Book and treatment cards are maintained for endangered species. There is lack of staff in the veterinary section and at present the Veterinary Doctor is assisted by the animal attendants.

Veterinary facilities:

Manipur Zoological Garden has limited veterinary facilities with minimum basic requirements. The facilities namely, veterinary hospital with basic diagnostic facilities, drugs, isolation and quarantine wards for new arrivals and sick animals, facilities for restraining and handling sick animals including tranquilizing equipments and syringe projector, reference library on animal health care and upkeep, post mortem room and incinerator are not to the standard. The zoo has a full time veterinarian. There is facility of referring sick animal to the State Veterinary Hospital which is only 8 kms away from the Zoo. Tranquilizing gun of the zoo is being deposited and kept in the custody of the Lamphel Police Station in an iron chest but never used till date due to lack of trained staff and drug. Use of Tranquilizing gun will be soon done as and when required after getting training through arrangement made by the CZA/WII with request from the Zoo Authority.

Breeding of animals:

Captive Breeding of Brow-antlered deer (Sangai) is done as approved by the CZA in the captive breeding centre in the extension part of the zoo in the adjoining Langol Reserved Forest at a distance of 1 km from the main zoo towards the north. Captive breeding of Kalij Pheasant and Humes bar-backed pheasant started the same has been intimated to CZA. There has been breeding of cases of breeding of Albino Sambar in the zoo in 2010 and also in 2011. The 2010 albino died on a stormy night due to stampede. The 2011 albino died just after parturition as born very weak. Captive breeding of Kalij Pheasant is successful that in 2010-11 there were 6 chicks hatched but died as affected by storm. This year there has been 2 chicks hatched in the enclosure

and healthy. A slow loris after rescue from a private firm area have given birth to a baby loris in Manipur Zoological Garden there has been many birth of Rhesus monkey, Barking Deer, Cheetal, Sambhar, Hog deer and the famous Brow antlered deer. There was also the case of breeding of Porcupine in the zoo. There was also the record of breeding of Indian Python in the zoo. During 2010-11 Asian Forest Tortoise laid eggs and 7 young ones hatched and 2 survived till date. Many small water birds laid eggs and hatched in the zoo aviary. The tree in the zoo has been the breeding habitat of Cattle Egrets. Thousands of the birds congregate in the zoo trees from late April to September and they return back after the young ones could fly. Himalayan Black Bear once gave birth to young one in the zoo.

Veterinary Section

Veterinary section is headed by a Veterinary Officer assisted by animal attendants. At present the zoo has no lab assistant for assisting the veterinary doctor. The Zoo has minimum veterinary facilities consisting of veterinary office, isolation and quarantine ward and treatment room. There is a miniature Rescue centre with cages and observation enclosure. There are feed store, feed godown and feed preparation shed but these structures are old and not located properly. Basic diagnostic facilities are still not available. Facilities for drugs, medicines, the feed supplements and sanitation are available for the animals. Tranquillizing gun is available but it is not in use due to unavailability of the tranquillizing drugs and also because of law and order situations prevailing in the state. There is no facility for syringe projectors. The hospital library should be developed to have a reference on animal health care and upkeep. Modernised post mortem room is required. The facilities for storing drugs, medicines, equipments and the feed supplements are to be developed. One incinerator is in use at present and this need to be supplemented and modernised. There are facilities for disposal of carcasses at Second Home of Sangai without affecting the hygiene of the zoo. This will be modernised improving the existing site at second home of sangai in Langol hill. Facility for burning the carcass will be provided at the Burial site.

Store and feed supply section

There are 2 store houses for animal feed items. The Store House are old, outdated and need to be reconstructed. Additional weighing machine is required. There is no deep freeze/

refrigerator, which is highly required. The feed preparation platform and ground of the feed distribution centre need improvement providing tile/marble floor with facilities for washing and cleaning. Distribution of feeds to the animals will be more efficiently done replacing the old thelas by small and light thelas handy to the zoo keepers. Appropriate food supplements are added to the animal feeds to avoid nutritional deficiencies. Ungulates are provided with tree fodder, grass, salt licks in addition to the feed concentrate mixture. Feeding is done after cleaning the feeding kraals. Feeds are placed at as many locations as necessary for the animals living in social groups like Rhesus monkey etc to safeguard against weak and young animals remaining under nourished. All the animals are fed before the opening hour of the zoo. Bears are given food two times a day both in the morning and after closing of the zoo. Python is fed once a week with live chicken. The veterinary Doctor is the over all in charge of the quality, quantity, health and hygiene of the zoo inmates. The quantity and quality of the feed items supplied by the Suppliers are received and checked by a team consisting of Veterinary Officer, Deputy Ranger and Forest Guard. Non perishable items of feeds are stored in well ventilated room in sacks and in containers. Feeds are provided as per requirement after weight measurement. Cleanliness is maintained at the time of feed preparation and feed preparation done by the concerned Zoo Keepers of the particular animals.

Sanitation section

Generally, the sanitation of the MZG campus and the enclosures is looked after by the Range Officers and the Deputy Range Officers with the help of Foresters, Forest Guards and the animal attendants under the instruction of the Curator and the Veterinary doctor. Daily cleaning is done for all the enclosures before feeding by the zoo keepers. Sweeping and cleaning the visitor areas are done by a group of sweepers. Weekly cleaning of the Zoo Campus is done on every Monday which is holiday for the Zoo and closed to the visitor. The veterinary doctor also takes important role in maintaining sanitation of the zoo particularly for the enclosures and the waste disposal sites. He is the custodian of all cleaning chemicals. The team take care of the proper functioning of drainage system of the campus, cleanliness of the animal enclosures/cages and houses, maintain the lawns, the visitor amenities and general cleanliness of the zoo campus. Garbage is dumped into pits properly located and many of them are burnt in the incinerator. Drains are kept connected with drains at the Lamphel pat area which is outside the zoo campus.

Maintenance section

Maintenance of enclosures, visitor amenities, infra-structures including boundary wall, office buildings, veterinary set up, visitor roads, external approach road to zoo, museum, ticket counter, staff quarter, drainage, water supply, electric etc are required as a routine work for upkeep of the zoo. The maintenance of all enclosures, structures, buildings, water supply, electric connections and other facilities are done by a team consisting of 2 Range Officers as assisted by Deputy Rangers Foresters and Forest Guards under the over all supervision of the Director as per the recommendation of the Curator and the veterinary Doctor. Annual maintenance is done for all enclosures on a regular term. Emergency maintenance is also done.

Security section

Two Range Officers, two Deputy Range Officers, Foresters, Head Forest Guards, Forest Guards supported by watchmen and chowkidars engaged on muster roll look after the security of the zoo. At present the zoo has no separate section for security but duty has been well assigned to the existing staff for securing the safeguard of the zoo. There is a guard post at the end of the small carnivore enclosures. One watch tower and one more Guard post is required in the zoo. It is required that the zoo have an organised security section with full facilities. The Captive Breeding Centre has Guard post at the entry gate and one Watch Tower near the upper reach of the Sangai enclosure. Additional 5 Zoo guards are required to strengthen the security of the zoo under the Head Zoo Guard.

Water supply section

The volume of water required for animals, cleaning of animal houses, watering the gardens, supply to public toilet, supply to staff quarters is high. The zoo depends on the Public Health Engineering Department Water Reservoir at Langol Hill which supplies tap water twice a day. The capacity of the existing water reservoir at zoo is small and inadequate and there is need to reconstruct with construction of Ground Sump, Overhead tanks and distribution of water with GI Pipes to reach the enclosures where small overhead tanks could be provided. Water is carried in buckets to many of the small enclosures except few enclosures where water is supplied through laying of pipes. There is one visitor water drinking hydrant in the zoo near the entrance

gate. Separate section for water management is required. More safe water drinking points for visitors required.

Disposal of solid waste & liquid waste- Sewerage

The existing sewage system is the small drains. Sewage after treatment with potash flows down to the drainage system of Lamphelpat area which is drained to the Nambul River nearby. Solid waste are mainly burnt in incinerator or dumped in pits which may form compost afterwards. Vegetable left over are dumped in the pits and the leftover meat and bones are burnt in the incinerator. Since the animals produce considerable amount of excreta every day, it is desirable that bigger pucca sewage system is constructed with facility for treatment of biological wastes in order to avoid contamination of the surrounding areas and out-break of epidemic/vector borne diseases.

Visitors' amenities

There are three old rest sheds out of which two needs to be reconstructed. During the year 2010-11 three new small sized visitor sheds have been constructed. There are open visitor seats. There is a public toilet for the visitors. There is one wheeled Chair for movement of the physically challenged and handicapped persons for visit at the zoo. There is one children garden with play items. A visitor water drinking point is provided near the entrance gate. Visitor signboards with guides and information provided. Animal signboards are provided with information on systematic classification, distribution, biology and conservation status of the animals for the information of the visitors. Visitor stand of barriers are erected near the enclosures for safety of the visitors. Visitor circulation footpath reaching all the animal enclosures is provided. The visitor footpath has been laid with concrete paving to avoid slippery conditions during rainy season. The footpath along the water birds and the monkey enclosures are yet to be concrete paved. Adequate dustbins provided at prominent areas and near sheds for dumping of the waste by the visitors. First Aid Kits are kept for any emergency health care of the visitors. Guides to the organised visitor groups are extended by the Zoo Staff as and when asked by the visitor free of costs. Carrying polybags inside zoo is prohibited. The trees in the zoo are provided with name plates showing common names, scientific names and local name for education of the students and nature lovers. There are vendors along the zoo road outside the zoo

campus. There is adequate parking area at the roadside of the zoo road. The visitor ticket counter is just at the entrance gate. There are one small entrance gate and a wide entrance gate which are used as per quantum of the visitors. Guard Post ensures security of the zoo during visiting hours of the visitors.

Lawns and garden- landscape section

There are two big lawns and one small lawn with ornamental hedges and trees. The edges of animal enclosures have also been lined with ornamental hedge species and some horticultural species of plants and bushes. The present zoo is confined to a small area of 8.17 hectare with animal enclosures, administrative set up and about half the area being swampy at the southern side leaves very little scope for extensive landscaping and gardening. The moat at the south western side is well forested with trees like *Salix tetrasperma*, *Taxodium sp.*, *Eucalyptus*, *Gravelia robusta*, *Lagerstroemia*, *Ficus glomerata* etc and undergrowths where the Hog deer is housed at present. The south eastern side of the zoo is also low lying with swamp, water body and *Taxodium* tree species harbouring many resident water birds. The visitor circulation paths are lined with roadside plantations. There is scope for planting more site suitable trees at the water logged areas with earth work. The gardens and footpath sides need to provide more decorative trees, shrubs, visitor seats, visitor sheds.

b. Animal Collection Plan

Comprehensive animal collection plan has been made considering space available in the zoo for the enclosures, past and present performance of the zoo in upkeep and healthcare of the animals, records of birth and death, management cost, species for conservation breeding and surplus species available in other zoos. Being a medium zoo, Manipur Zoological Garden aims at collection of around 40% of the total wild species displayed to be from the North Eastern Region, another 40% of the wild animals to be the species from Manipur itself, collection of 10% selected species from the Nation and another 10% species as exotics.

Existing Animal Collection:

Sl. No.	Name of Species	Scientific name.	Stock M. F. U. T.	Remarks
	<u>SCHEDULE – I</u>			
	<u>BIRDS</u>			
1	Burmese Peafowl	<i>Pavo muticus</i>	2 - - 2	Local
2	Himalayan Griffon Vulture	<i>Gyps himalayansis</i>	- - 4 4	Local
3	Kalij pheasant	<i>Lophura leucomelamos</i>	3 5 - 8	Local
4	Nongeen (<i>Hume's bar back pheasant</i>)	<i>Syrmaticus humiae</i>	2 - - 2	Local
	<u>MAMMALS</u>			
5	Cat leopard	<i>Felis bengalensis</i>	4 4 - 8	Local
6	Deer brow antlered	<i>Recurvus eldi eldi</i>	7 8 2 17	Local
7	Slow loris	<i>Nycticebus bengalensis</i>	3 4 - 7	Local
8	Hoolock Gibbon	<i>Hylobates hoolock</i>	1 - - 1	Local
9	Leopard	<i>Panthera pardus</i>	- 1 - 1	Local
	<u>REPTILES</u>			
10	Python	<i>Python molurus</i>	1 1 - 2	Local
11	Monitor Lizard	<i>Voranus salvator</i>	- - 5 5	Local
	<u>SCHEDULE – II</u>			
	<u>MAMMALS</u>			
12	Himalayan black bear	<i>Ursus thibetanus</i>	7 4 - 11	Local
14	Jackal	<i>Canis aureus</i>	1 1 - 2	Local
15	Rhesus monkey	<i>Macaca mulatta</i>	25 15 - 40	Local
16	Toddy cat	<i>Paradoxurus hermophroditus</i>	1 - - 1	Local
17	Himalayan yellow throated marten	<i>Martes flevigula</i>	1 - - 1	Local

18	Jungle Gat	<i>Felis chaus</i>	1 - - 1	Local
	SCHEDULE – III			
	<u>MAMMALS</u>			
19	Barking deer	<i>Muntiacus muntiak</i>	8 10 - 18	Local
20	Spotted deer	<i>Axis axis</i>	13 20 - 33	Regional
21	Hog deer	<i>Asix porcinus</i>	12 18 - 30	Local
22	Sambar	<i>Cervus unicolor</i>	8 10 3 21	Local
23	Goral	<i>Nemorhaedus goral</i>	1 - - 1	Local
24	Wild boar	<i>Sus scrofa</i>	1 1 - 2	Local
25	Ferret Badger	<i>Melogale moschata</i>	1 1 - 2	Local
	SCHEDULE – IV			
	<u>MAMMALS</u>			
26	Porcupine	<i>Hystrix indica</i>	7 2 - 9	Local
	UNSCHEDULE			
	<u>REPTILES</u>			
27	Asian Forest Tortoise	<i>Manauria emys</i>	4 1 - 5	Local
28	Keeled box turtle	<i>Pyxidea mouhatii</i>	- - 1 1	Local
29	Amboina box turtle	<i>Curora amboinesis</i>	- - 14 14	Local
30	Asian leaf turtle	<i>Kachuega sythetensis</i>	4 1 - 5	Local
	<u>BIRDS</u>			
31	Rosy pelican	<i>Pelicanus onocrotalus</i>	- - 1 1	Local
32	Adjutant stork	<i>Leptoptilos dubius</i>	- - 2 2	Local
33	Cattle Egret	<i>Bubulcus ibis</i>	- - 10 10	Local
34	Pond Heron	<i>Ardeola grayii</i>	- - 15 15	Local
35	Night Heron	<i>Nycticorex nycticorex</i>	- - 8 8	Local
36	Purple Moorhen	<i>Porphyrio porphyrio</i>	- - 3 3	Local
37	Moorhen	<i>Gallinula chloropus</i>	- - 20 20	Local

38	Common teal	<i>Anas crecca</i>	- - 6 6	Local
39	White eye pochards	<i>Aythya ryroca</i>	- - 11 11	Local
40	Coot common	<i>Fulica alra</i>	- - 6 6	Local
41	Water cock	<i>Gallicrex cinerea</i>	- - 1 1	Local
42	Spot bill duck	<i>Anas p0ecilarhyncha</i>	- - 2 2	Local
43	Parrot	<i>Psitacula cyanocaphalla</i>	4 4 - 8	Local
44	Lesser caucal	<i>Centropus bengalensis</i>	- - 1 1	Local
45	Whistling teal	<i>Dendrocygna Javavica.</i>	- - 17 17	Local
46	Crested Sarpent eagle	<i>Spilornis cheela</i>	- - 2 2	Local
47	Orangle bill blue magpie	<i>Vuocissa crythrorhyncha</i>	- - 1 1	Local
48	Purple Heron	<i>Ardea purpurea</i>	- - 2 2	Local
49	Brahmini duck	<i>Toderna ferruginea</i>	- - 2 2	Local
50	Falcon Lagger	<i>Falco jugger</i>	- - 3 3	Local
51	Emu	<i>Dromnius nonahollandine.</i>	4 1 - 5	Exotic

c. General Zoo Administration Section

Director, Manipur Zoological Garden is the overall administrative in charge of the zoo. The Director is responsible for smooth functioning of the zoo, proper housing upkeep and health care of the animals, proper visitor management and ensuring their safety. For discharging these functions, the Director assigns responsibilities and duties to all the zoo personnel. Duties are allotted to the posts which are mandatory under the Zoo Rules.

(i) Curator:

The duty of the Curator is to upkeep and maintenance of animal collection and animal housing, including timely cleaning and disinfection of animals' enclosure, timely feeding of animals in the prescribed manner, keeping a close watch on the general health conditions of the animals and taking steps for getting sick animals treated on priority basis including crating, shifting and transportation of animals within the zoo in consultation with the veterinary doctor. He will coordinate Veterinarian, Education Officer and Biologist and will be reporting to the Director.

(ii) **Veterinarian:**

The duty of the Veterinarian includes frequent visits to animal enclosures and assessing general health condition of animals, assessment of the adequacy of the feed being supplied to the animals, conducting regular check on the quality of feed and water being supplied to the animals and timely screening of animals for parasitic loads. Preparation of disinfection schedules, prophylactic treatment schedules and ensuring implementation of the same. He is supposed to take steps for timely restraining and treatment of sick animals, maintenance of record of the treatment in the prescribed formats, conducting post-mortem of animals that die in the zoo for arriving at local conclusions regarding reasons of death and developing a strategy for keeping the mortality of zoo animals at minimum level. He also supervises the crating, shifting and transportation of zoo animals, coordinating with the Curator. He will coordinate Curator, Zoo Education Officer and Biologist and will be reporting to the Director.

(iii) **Biologist:**

The zoo Biologist who has the background of zoology is to perform the following duties:

- (a) He is to observe the behaviour and biology of animals and maintaining the records of the observation ensuring the upkeep and welfare including the special diet for pregnant females, nursing mother, new arrivals, infirm and sick animals in coordination with veterinary doctor.
- (b) As a part of genetic management of the endangered species he will put identification marks on the newly acquired and new born animals and facilitating timely exchange of animals with other zoos in the country.
- (c) He shall prescribe the enrichment of animal enclosures to the Curator.
- (d) He shall recommend regulation of movement of visitors so that the impact on animals can be minimised.
- (e) He is to maintain the animal history card and studbooks as per the Recognition of Zoo Rules.
- (f) He is responsible for gathering information on behavioural biology and reproductive aspect of zoo animals and can use the information for upkeep and conservation breeding programme.
- (g) He will coordinate Curator, Veterinarian and Education Officer and will be reporting to the Director.

(iv) Education Officer:

Zoo Education Officer is assigned the following duties and responsibility:

- (a) Timely preparation and distribution of brochures, booklets, CDs and other information materials on behavioural biology and ecology of zoo inmates.
- (b) Designing of signage of enclosures, visitor guides, zoo rules etc.
- (c) Providing guidance and orientation to the visitors for imparting nature education.
- (d) Training the zoo personnel to deal with the visitors in courteous and polite manner without compromising the zoo ethics.
- (e) He will coordinate Curator, Veterinarian and Biologist and will be reporting to the Director.

d. Research

Research plays a vital role for conservation of wildlife both for in-situ and ex-situ conservation. Many observations regarding the behaviour, nutrition, biology, etc. of the wild animals in the zoo have been done by Research Scholars coming from different Institutes at Manipur Zoological Garden. The zoo as its cost has not conducted any structured research on the animals at the zoo. However, with the sponsorship of the Wildlife Institute of India, Research Fellows are conducting research on Sangai and its various aspects at Keibul-Lamjao National Park. In this connection, the zoo is able to provide them valuable scientific data on the biology and behaviour of captive Sangai which is under captive breeding programme. There are scopes for gathering information on the biology of the rare and endangered animals and birds kept in captive at zoo like Sangai, Hoolock gibbon, slow lorries, Leopard, Leopard Cat, Python, Hornbills, Vultures, Green Peafowl, Hume's bar backed pheasant, Kalij Pheasant, Tragopan etc.

The zoo has been an institute for imparting in-house training and research on wild animals and birds for the students from various Veterinary Institutes of other states. Students from College of veterinary Science and Animal Husbandry, Selesih Aizal Mizoram and College of veterinary Science and Animal Husbandry, Khanapara, Assam studied about the Manipur Zoo and biology of its inmates as a part of their research project every year. The zoo education officer and the Veterinary Officer impart the information to the students. The studbook, animal history card and the keepers' diary are useful documents for furnishing information for the research works.

e. Conservation Breeding

Conservation breeding of identified endangered species shall be taken up in the Captive Breeding Centre of the Zoo in coordination with the Central Zoo Authority of India with the following objectives:

- (i) Developing physically, genetically and behaviourally viable population of healthy identified animals for the purpose of display in zoos.
- (ii) Developing physically, genetically and behaviourally viable population of healthy identified animals to act as insurance and raise stock for rehabilitating them in wild as and when it is appropriate and desirable.

The founders for the conservation breeding programme shall preferably be wild origin or of known lineage which have high heterozygosis. Animals born under the programme shall be appropriately marked and segregated or sent to other identified zoo for breeding with the progeny of the other founders to avoid interbreeding.

The National Referral Centre and Laboratory for Conservation of Endangered Species (LaCONES) under coordination with the CZA shall be consulted for physical health safeguard of the founder animal for the Captive Breeding Programme (CBP). Animals for CBP shall be marked properly as per guidelines of marking of animals and birds.

- i) Ringing of Birds: Birds for CAP shall be ringed in the left leg in females and right leg in the males. Chicks shall be ringed only after establishing parental care bond between mother and chick.
- ii) Ear Tagging: The Brow antlered Deer (Sangai) for CAP shall be tagged in the left ear in females and right ear in males

Species Identified for Captive Breeding:

The following is the list of animals identified for conservation breeding at the Captive Breeding Centre of Manipur Zoological Garden.

Sl. No	Common Name	Scientific Name	Local Name	Remarks
1	Brow Antlered Deer/ Manipur Thamin Deer	<i>Cervus eldi eldi</i> Mc Cleland 1842 / <i>Rucervus eldii eldii</i> Thomas 1918	Sangai	Coordinating Zoo
2	Mrs Hume's Bar-backed Pheasant	<i>Syrmaticus humiae humiae</i>	Nongyin	Proposed as participating Zoo
3	Tragopan pheasant	<i>Tragopan blythii</i>	Lamyen	Proposed as participating Zoo
4	Kalij pheasant	<i>Lophura leucomelana Lathami</i>	Waba	Proposed as coordinating Zoo
5	Slow loris	<i>Nicticebus caucang</i>	Laudraubi/ Yong Ekaithibi	Proposed as coordinating Zoo
6	Burmese Green Peafowl	<i>Pavo muticus spicifer</i>	Wahong Asangba	Proposed as coordinating Zoo

1. The Sangai or Brow antlered deer :

Considering the importance of Sangai conservation, captive breeding of Sangai has been taken up with the permission of the Central Zoo Authority at a captive breeding centre located at about 1 (one) km. from the present zoo campus. The enclosure area covering about 2.13 ha. is situated at Langol Reserved Forest.

The objective of captive Breeding of sangai has been for

- i) Maintenance of Stock for display in a Zoo
- ii) Raising of Stock for re-introduction in the wild

This programme has been designed to provide opportunities for scientific studies useful for conservation in general and creation of database for sharing between the agencies involved in conservation. The programme serves the twin purposes of education and research. The programme has been successful as one or two fawns are born every year. With the increase in population of the captive bred Sangai at Manipur Zoological Garden, these animals can be used for ex-situ conservation at other suitable areas. At present there are 12 sangai population. The Captive Breeding Centre at Langol hill require boundary consolidation and maintenance of existing enclosures and buildings. In order to avoid inbreeding, it is proposed to do DNA finger printing in collaboration with CZA and LaCONES.

2. Hume's Bar Backed Pheasant (Nongyin):

Hume's Bar Backed Pheasant, locally known as "Nongyin" is one of the most beautiful and rare birds and it is a State Bird of Manipur. It is a schedule I bird under Wildlife (Protection) Act, 1972. Recently, in September 2010 two pairs of the birds collected locally from Ukhrul District of Manipur for the purpose of Captive Breeding and the programme is on at Second Home with maximum care for successful breeding.

3. Kalij Pheasant (Waba):

The Kalij Pheasant has been successfully bred in Manipur Zoological Garden Enclosure in the display enclosure. Initially, there was one pair of the bird in the zoo. There has been successful breeding and the present population with two cheeks has become to 6. There was causality of 6 chicks during 2010 hatched in the same season.

f. **Education and Awareness**

A modern zoo should effectively serve the purpose of education apart from its recreational utility. It should educate people about the diversity and beauty of wild animals and the need to understand the linkage between the survival of various species and protection of their natural habitat. Zoo Education Officer will be fully responsible for the education and awareness of the

visitors. Being the only zoo in the state, Manipur Zoological Garden plays a great role in giving education and creating awareness to the people about the importance of wildlife, its habitat, nature, relationship with human and the need for conservation of the wildlife. Every year, during the months of January to June and October to December various institutions like colleges, schools, local clubs and other NGO's visit the Zoo to get education about wildlife as a part of their educational curriculum and personal interest. The love and sympathy for the wild animals has been increased to the minds of the visitors after a visit to the zoo. The signboards provided at the zoo are with the information on biology, systematic position, distribution and the conservation status of the animals and this has been the source of information for the visitors when they see the animal in their front. Many students of Veterinary Institutes from outside the State come to Manipur Zoological Garden for short term study of the captive animals.

The Education Officer give guidance and information to the students / visitors who come in groups. Brochures and leaflets regarding wildlife are made available to the visiting public. The Manipur Forest Training School use to visit Manipur Zoological Garden to provide knowledge about wildlife conservation to the trainees as a part of training curricula. he Biological Museum of the zoo plays an important role in preserving many rare and endangered animal species of this region and is providing study material and information for the students, scholars, nature lovers and enthusiasts in the field of wildlife and nature conservation.

g. Other activity unique to the zoo:

Manipur Zoological Garden has been a seasonal breeding place of the Cattle egret. Thousands of cattle egret birds arrive at zoo starting from the late April of every year and started making nest on the branches of the trees and lay eggs in the nests. Hatching started in June and the trend continue till September of the year when the birds abandoned the zoo trees and returned back to their natural habitat along with the grown up young ones. The zoo has been maintaining the trees/habitat of such visiting birds for increasing the population of visit and encouraging their successful breeding at zoo. So far, no threat has been detected on spread of any bird born disease in the zoo because of the breeding of the cattle egret in the nest on zoo trees. The tall trees of eucalyptus at the south western portion of the zoo are the asylum for the fruit bats.

Part – II

Chapter - III

FUTURE OBJECTIVES (including vision mission statement/theme and strategy):

The earlier concept of Zoological Gardens as places of entertainment has undergone a drastic change in tune with the awareness about the need for conservation of wildlife as a whole. Now-a-days, more emphasis is laid on Conservation, Education and Research rather than entertainment, which of course is an unavoidable and a good by-product of the larger conservation aims. The modern concepts of maintaining zoos have been clearly made in the National Zoo Policy, 1998. The Manipur Zoological Garden broadly aims to conserve, educate and promote research on fauna of the region by -

- a) Conservation breeding of different species particularly those endangered species to the region for preservation of bio-diversity, exchange with other zoological parks and of suitable endangered species in the wild with strict adherence to the guidelines framed for the purpose.
- b) Research and scientific study on animal behaviour, diseases and their control, feed and nutrition and reproductive biology. The knowledge so gained can be used in management of wildlife in the wild.
- c) Promote nature education and interpretation for communicating the same to the visiting public in general and younger generation in particular for appreciating the need of wildlife conservation.
- d) To develop it as a training centre for management of wild animals, and their upkeep, besides imparting training on zoo design and planning to the staff of the zoo, veterinarians and others of the region by taking advantage of the knowledge and experience gathered in captive management of wildlife here.

- e) Providing healthy, wholesome recreation through wildlife education to the visiting public, utilizing ambient setting of the zoological park, keeping in view the safety and upkeep of the zoo animals. Recreation shall only be incidental and shall not be the main objective at any time.

Chapter – IV

FUTURE ACTION PLAN:

i) Proposed animal collection plan including population size showing the existing no. of animals and justification of keeping the endangered species:

Manipur Zoological garden has already the following animals in the zoo namely, Brow antlered deer, Hog deer, Barking deer, Sambar, Cheetal, Goral, Hoolock gibbon, Rhesus monkey, slow lorries, Himalayan black bear, Leopard, Leopard cat, Yellow Throated marten, Toddy cat, Small Indian Civet, Wild boar, Porcupine, Vulture, Crested Serpent Eagle, Hawk, Owl, Hornbill, Kalij Pheasant, Burmese Green Peafowl, Hume's Bar backed pheasant, Adjutant Stork, Rosy Pelican, Small Egrets, Large Egrets, Pond Heron, Night Heron, Moor Hen, Purple Moor Hen, Common Teal, white eyed Popchard, Purple heron, Common coot, Water Cock, Spot bill duck, Lesser Whistling Teal, Parrot etc. among birds, Python, Monitor Lizard, Asian Forest Tortoise, Keeled box turtle, South East Asian box turtle, Brown Stream Terrapin among reptiles.

The Zoological Garden needs to collect more animals of local area and about 10 % selected species of nation and exotics. Animal Collection Plan for the zoo in the coming years is produced in the following Table indicating the species to be collected region wise with reason and the population size:

Animal Collection Plan:

Sl. No	Species	Existing				Proposed				Remarks
		3	4	5	6	7	8	9	10	
		M	F	U	Total	M	F	U	Total	
1			1		1	1	1		2	1 male to be acquired from nearby zoos
2	Leopard cat	4	4		8	4	4		8	Will maintain the same number
3	Brow antlered deer	1	1		2	1	1		2	Zoological Garden will have only 2 animals, Others will

										be in CBC.
4	Hoolock gibbon	1			1	1	1		2	1 Female be acquired from nearby zoos
5	Slow loris	3	4		7	3	4		7	Will maintain the same number
6	Himalayan black bear	7	4		11	2	3		5	5 male and 1 female excess
7	Small Indian civet					1	1		2	To be acquired while rescue
8	Toddy cat	1			1	1	1		2	To be acquired while rescue
9	Himalayan yellow throated marten	1			1	1	1		1	1 Female be acquired from other zoos
10	Chinese ferret badger	1	1		2	1	1		2	Will maintain the same number
11	Flying squirrel					1	1		2	To be acquired while rescue
12	Procupine	7	2		9	4	5		9	Will maintain the same number
13	Rhesus macaque	25	15		40	10	15		25	Excess number will be shifted to rescue area
14	Jackal	1	1		2	1	1		2	Will maintain the same number
15	Sambar	8	10	3	21	4	8		12	4 male and 2 female excess for disposal to other zoos
16	Cheetal	13	20		33	5	10		15	8 male and 10 female excess for disposal to other zoos
17	Hog deer	12	18		30	6	12		18	6 male and 6 female excess for disposal to other zoos
18	Barking deer	10	11		21	5	10		15	5 male and 1 female excess for disposal to

										other zoos
19	Goral	1			1	1	1		1	1 female to be acquired from other zoos
20	Wild boar	1	1		2	1	1		2	Will maintain the same number
21	Indian rock python	1	1		2	2	2		4	Will maintain the proposed number while rescue or birth
22	Monitor lizard				5	5	2	3	4	Will maintain the same number
23	Asian forest tortoise	4	1		5	3	3		6	Will maintain the proposed number while rescue or birth
24	Leith's soft shell turtle						1	1	2	Will maintain the proposed number while rescue
25	Keeled box turtle				1	1	1	1	2	Will maintain the proposed number while rescue
26	Amboina box turtle				14	14	5	5	10	Excess number will be disposed off
27	Asian leaf turtle	4	1		5	2	3		5	Will maintain the same number
28	Indian pied horn bill						1	1	2	Will maintain the proposed number while rescue
29	Burmese green peafowl	2			2	2	2		4	2 females to be acquired from wild or other zoos
30	Himalayan griffon				4	4	2	2	4	Will maintain the same number
31	Kalij pheasant	3	5		8	4	6		10	Will maintain the proposed number while rescue or birth
32	Hume's bar-	2			2	2	4		6	4 females to be acquired from wild or

	backed pheasant								other zoos
33	Adjutant stork		2	2	1	1		2	Will maintain the same number
34	Rosy pelican		1	1	2	2		4	Will be quired from other zoos
35	Crested serpent eagle		2	2	1	1		2	Will maintain the same number
36	Cattle egret		10	10	4	6		10	Will maintain the same number
37	Pond heron		15	15	7	8		15	Will maintain the same number
38	Night heron		8	8	4	4		8	Will maintain the same number
39	Purple moor hen		3	3	2	2		4	Will maintain the proposed number while rescue or birth
40	Moor hen		20	20	10	10		20	Will maintain the same number
41	Common teal		6	6	4	4		8	Will maintain the proposed number while rescue or birth
42	White eye porchard		11	11	5	6		11	Will maintain the proposed number while rescue or birth
43	Common coot		6	6	4	4		8	Will maintain the proposed number while rescue or birth
44	Water cock	1		1	1	1		2	Will maintain the proposed number while rescue
45	Spot billed duck		2	2	1	1		2	Will maintain the same number
46	Whistling teal		17	17			17	17	Will maintain the same number
47	Orange bill blue magpie		1	1			1	1	Will maintain the proposed number

										while rescue
48	Purple heron			2	2			4	4	Will maintain the proposed number while rescue
49	Lesser caucal			1	1	1	1		2	Will maintain the proposed number while rescue
50	Parakeet			8	8			8	8	Will maintain the same number
51	Brahmani duck	1	1		2	1	1		2	Will maintain the same number
52	Emu	4	1		5	4	1		5	Will maintain the same number
Animal to be acquired from other Zoos										
53	Crocodile					2	2		4	To be likely collected from Madras crocodile bank, Mahabali puram.
54	Gharial					2	2		4	To be likely collected from Madras crocodile bank, Mahabali puram
55	Spectacled Monkey					1	1		2	Sepahijala Zoological Park, Agartala, Tripura.
56	Stumped tailed monkey					1	1		2	Aizawl Zoological Park, Aizawl.

ii) Description of the Proposed Layout Plan of the Zoo

Proposed Lay out plan showing the detailed landscape of the existing zoo site along with the proposed plan/enclosures in the scale of 1:2000 is provided as annexure II. Contour lines are marked at an interval of 1 – 5 m .Another proposed layout Plan for captive Breeding Centre is also provided as Annexure IV. The lay out plan shows the present locations of existing facilities and infrastructure to be maintained in black colours. Manipur Zoological Garden being an existing zoo the Lay out Map shows the existing animal enclosures in black colour, enclosures to be modified in green colour. The proposed new enclosures are shown in blue colour.

A) New constructions of enclosures:

Mixed water bird aviary, Hog deer enclosure, Goral enclosure, Crocodile enclosure, Gharial enclosure, Wild boar enclosure, Barking deer enclosure, Sangai enclosure, Indian peafowl enclosure, Humes pheasant enclosure, Kalij pheasant enclosure, Hornbill enclosure, Primate enclosures, nocturnal animal enclosure, small carnivore enclosure, reptile house, porcupine enclosure, bear enclosure, leopard enclosure, leopard cat enclosure, jackal enclosure, land bird enclosure and vulture enclosure

B) Modification of present enclosures:

Cheetal enclosure, Sambar enclosure, Aviary, Burmese Green peafowl enclosure and emu enclosure.

C) Construction of new infrastructure

Intpretation centre cum museum, Toilet complex, Soak pits (6 nos.), Ticket counter, in-patient house, Veterinary hospital, Store cum guard house, Food distribution centre, directors office, Septic tank (4 nos.) Control gates (3 nos.), Over head tank (one 35000 ltr capacity and none 2000 ltr. Capacity), Transformer, Drinking water point (3 nos.), kiosks (2 nos.), Watch tower (1 no.), and Visitor sheds (6 nos.).

- D) Retaining the present infrastructures viz. Incinerator, Garden, staff quarter, feed godown, toilet and visitor sheds.
- E) Development of Iris Bakerii conservation plot and open water bird habitat.
- F) Others:

Foot path concrete paving for 590m, maintenance of footpath for 710m and development of service path for 942 m required. Control gates to be retained with construction of new ones. Boundary drainage 1147m and internal drainage 1200m are to be developed. Boundary wall 1147 m will be maintained. Tree Plantation at the boundary to create green belt will be done. Adequate earth filling up to appropriate level will be done to make enclosures free from water logging even during rains before constructing proposed animal enclosures. Sufficient green cover between enclosures and also along the boundary fencing will be provided to camouflage the structures.

iii) Proposal to address the inadequacies and shortcomings identified in the appraisal report

Animal Section

Animal enclosures:

Enclosures, cages and animal houses, shelters, kraals will be constructed as per the prescribed sizes for the animals to be kept keeping in view of the expected increase in population to the selected location to serve the purpose of modern zoo management. The area of the enclosure will set considering the availability of adequate land space for facilitating the animals to have free movement and exercise, adequate area to rest in shade and bask in the sun and express their natural, social and reproductive behaviour. The animal exhibit enclosures will be designed to avoid corners for unrestricted movement of the animals. Shelters and feeding place will be kept at a safe distance from the visitors. The indicative sizes for the enclosures given in the Annexure IIA and IIB of the CZA Guidelines for Establishment & Scientific Management of Zoos in India will be strictly followed for construction of new enclosures. Old enclosures which do not meet the required sizes will be reconstructed. Landscape around every animal exhibit/enclosure will be provided with plantation of appropriate tree and shrub species. Planting of bamboo and dwarf tree species and shrubs will be carried out to effectively camouflage the

feeding cells. Environmental enrichment of animal enclosures will be provided. Animals will be kept in compatible social groups providing adequate space for walking, flying and climbing and proper substrate for digging, burrowing and exploratory instincts. Suitable trees, shrubs and bushes will be provided to provide opportunities for climbing, swinging, feeding, clawing and rubbing the antlers. Bamboo baskets will be provided to meet nesting and egg-laying by birds. Chain-link stand-off barriers of 75 cm height at a distance of 150 cm from the barrier are to be provided.

1. The Hog deer enclosure at the southern half of the zoo will be divided to accommodate Hog deer, Sangai, Crocodile, Gharial, and the Barking deer leaving open areas for green belt with additional plantation
2. Existing Barking deer enclosure will be added to Cheetal enclosure to increase area of Cheetal Enclosure to 2450 sq.m. Barking deer will be shifted to the new enclosure having 4400 sq.m. area. Sambar enclosure to remain with appropriate modification in fencing and provision of animal house with an area of 2400 sq.m. Hog deer enclosure covering an area of 4000 sq.m, Sangai enclosure covering 3200 sq.m. area to be constructed. The enclosures for Crocodile and Gharial over an area of 1600 sq.m.each will be. Vulture enclosure having 325 sq.m. area with 8m height will be constructed near the present small vulture enclosure.
3. Open moat Bear enclosure of size 1010sqm with moat 5m wide will be constructed at the north eastern corner of the zoo adjacent to the new Leopard enclosure.
4. Construction of the new Leopard enclosure of size of about 625 sq.m.at the north after dismantling 3 out of the 5 old bear enclosures. Leopard Cat and Jackal enclosures will be constructed adjacent to leopard enclosure.
5. Porcupine enclosure will be dismantled and new one will be constructed.
6. The space between the snake house and the Toilet complex will be for enclosures for small reptiles like Turtle, Tortoise, Veranus, Python.
7. The existing Python enclosure being in bad shape will be dismantled and the area will be constructed with the enclosures for keeping nocturnal animals like slow lorries, Flying squirrel, Pangolin, Owl and others.
8. The existing small carnivore enclosures will be reconstructed and maintained for housing of the small animals like otter and small carnivores like leopard cats, yellow throated marten, Small Indian Civet and others. Partition walls will be provided between the enclosures.

9. Four primate enclosures will be constructed to have four species.
10. Kalij Pheasant, Horn Bill, Hume Pheasant, Birds of prey, and peafowl enclosures will be constructed in the existing area and adding area after shifting sangai to new enclosure. One more peafowl enclosure will be constructed modifying one carnivore bird enclosure. Burmese peafowl enclosure will be modifies.
11. Emu and Wild Boar enclosure will be modified.
12. Chain link angle iron fencing will be replaced/re-constructed for Cheetal 220m, Sambar Deer 210m, Hog deer 255m, Swamp deer 220m, Barking deer 278m, with a total length of 1773m.
13. New Goral enclosure will be constructed.
14. Water Birds Enclosures along the entrance foot path will be constructed further extended to another 78 m leaving the over-bridge visitor shed in the middle.
15. Island near the Emu enclosure and opposite to the existing Leopard enclosure and vulture enclosure will be maintained.
16. The water supply system to the enclosures will be modernised increasing ground Sump capacity to 130 cum with one main distribution overhead tank of 35000 litre capacity and providing 9 overhead water tanks of 2000 litre capacity near the enclosures and required pipe lines
17. Winter care for reptiles by warming the retiring cubicles will be done providing heat convector, straw and logs.
18. Winter care for other animals by providing straw and other beddings will be done.
19. Captive Breeding enclosures for Sangai and Hume's bar backed Pheasant will be reinforced and boundary wall of 750 m will be completed around second home of Sangai.
20. 6 more Water holes will be provided in the Sangai enclosure of captive breeding centre.
21. Additional night shelters in the sangai enclosure to be provided.
22. Fodder plantation plots will be developed in the captive Breeding centre.
23. Sangai Feed preparation shed with store to be constructed.
24. Replacement and erection of new signboards will be done.
25. Rescue Centre at zoo campus at non display area near the Administrative Block with 16 caged enclosures which will include 2 enclosures of size 5mx10mx3m each for deer and 14

enclosures of size 3mx4mx3m for small animals and birds with squeeze cage facility will be constructed.

26. Adequate earth filling works will be done before construction of enclosures so that during the rainy season the enclosures are not water logged.

Hygiene, Feeding and Upkeep:

The main important thing for maintenance of hygiene and upkeep of the zoo is the proper disposal of wastes. For burning of Solid wastes of the feed items like bones, leftover meat in the incinerator, one more incinerator will be constructed. For disposal of the liquid waste from the enclosures, pucca drainage system will be constructed at the periphery of the enclosures joining with the main drain and the liquid waste is to be wash off to the drain after treating with potash and lime. Solid vegetable waste and the droppings of the animals to be properly dumped in the soak pit located at safe place. Enclosures and feeding places need to be cleaned with application of potash solution and lime. Burial of carcass of the dead animals at the burial site at the extended part of the zoo at the Langol hill will be hygienically done and the burial site will be fenced and guarded against the theft of buried animal parts. Antlers, bones, skulls will be burnt.

The feed supplied should be hygienic and of high quality. Appropriate feed supplement should be added to avoid nutritional deficiency. Larger cats should be provided with meat with bones. Pieces of liver to be added to the meat supplied to the carnivores. Ungulates should be provided with tree fodders in addition to other fodder and salt licks at appropriate places in their enclosures. Placement and timing of feeding should be arranged that providing feeds completed before opening of the zoo after cleaning of the enclosures and the feeding places. For social animals like monkeys and deer the feeds are provided at many locations to safeguard the feeding of young animals. All animals are fed once a day in the morning with exception for Bear and the Python. Bears are fed twice a day – morning and evening whereas Pythons are fed with live chicken once a week. Animal enclosures should be provided with feeding cells and kraals at the farthest point from the animal viewing area. Feeding the animals shall be to meet the nutritional requirements and the functional needs of the animals. Wholesome and unadulterated food in sufficient quantity will be given to the zoo animals. Diet Chart of zoo inmates will be examined comparing with the diet charts of the other Zoos and if required will be revised for development

of the animal health. The number of animal housed will be within the carrying capacity of the enclosure. Aggressive animals will be separated and keep in enclosure at the off display area. Animals already breeding will not be removed while shifting the excess number of animals.

Animal Care, Health and Treatment:

Treatment to animals with less possible stress require squeeze cage facilities in th enclosure itself. Recording of observations on animal behaviour and health, treatment provided, birth, death etc are to be recorded in (1) Keeper's Diary in Form Annexure IV-A by Zoo Keepers, (2) Daily Report by Curator in Form annexure IV B (3) Animal History Cards by the Zoo Biologist/ Education Officer in Form Annexure IV-C. (4) Studbook of endangered animal species in the zoo shall be maintained in Form Annexure IV -D by the Zoo Biologist and (5) Treatment Cards for identifiable animal shall be maintained by the Veterinary Doctor in Form Annexure IV- E. Efforts will be made to acquire and become members of National/International Record Keeping System.

Tranquillisation of animals in the zoo become necessary at the time of dangerous animal escaping from the enclosure, capturing of aggressive animal inside the enclosure and treatment of animals. Tranquillisation shall be done by experience trained person under direct supervision of the veterinary doctor.

Animals are attended by experienced zoo keepers who know the animal behaviours because of their long association with the animals. Prompt reporting of animal behaviour change, sick or injured animals by the animal attendants to the veterinary Doctor and immediate action by Doctor to be followed. The Veterinary Doctor will also do the Routine examination of animal health. Periodic de-worming of animals and testing of stools will be followed. Winter care of animals from cold climate will be ensured. Animal Keepers' health check to be done at least once a year. Animal history sheets and treatment cards shall be maintained for endangered species. Cattle immunisation of the adjoining village is to be done twice a year.

Veterinary facilities:

A new Veterinary hospital building with basic diagnostic facilities, Lab, drugs, isolation and quarantine wards for new arrivals and sick animals, facilities for restraining and handling

sick animals including tranquilizing equipments and syringe projector, reference library on animal health care and upkeep, post mortem room, will be reconstructed. The zoo veterinarian will be strengthened by employing one veterinary field assistant. Animals with complicated problems will be taken to the State Veterinary Hospital.

Breeding of animals:

A) Captive Breeding Programme:

- 1) Captive Breeding of Brow antlered deer (Sangai), the state animal of Manipur, at its Captive Breeding Centre at Second Home of Sangai with a population of 7 females and 4 males as on 31.3.2011 and another 1 male at zoo will continue. The portion of the boundary of the Captive Breeding Centre which is not yet fenced will be fenced and consolidated. From this year on the expected birth of sangai will be 4 to 5. The infrastructures will be maintained.
- 2) Captive Breeding of the Hume's Bar backed Pheasant (Nongyin), Schedule I bird, and also the State bird of Manipur with 2 males and 2 females will continue. The birds were collected in September 2010 and expect egg-laying in June/July 2012.
- 3) Captive Breeding of Kalij Pheasant will be started in the Second Home. In the zoo enclosure, the bird had successfully bred.

B) Breeding in the normal conservation and display enclosures:

- 1) Captive Breeding of Kalij Pheasant, a Schedule I bird is successful in its normal conservation and display enclosure at Zoo will continue and Captive Breeding in off display enclosure at second home will be started.
- 2) Breeding of Asian Forest Tortoise will be encouraged
- 3) Breeding of Leopard is expected.
- 4) Breeding of Porcupine is expected
- 5) The breeding of all deer will be continued
- 6) Breeding of Rhesus monkey will continue
- 7) Breeding of few water birds expected

Veterinary Section

- i) The existing Veterinary Section being very basic will be strengthened and improved to a well equipped veterinary Hospital with basic diagnostic facilities, Lab, comprehensive range of drugs and a reference library on animal healthcare and upkeep.
- ii) New Veterinary Hospital having the infrastructure facilities like isolation and quarantine wards, treatment room, post mortem room, ICU with facility like air condition and oxygen supply system, store and veterinary staff office rooms will be constructed.
- ii) One qualified Lab. Assistant is necessary for assisting the Veterinary Officer.
- iii) Squeeze cages for restraining and handling of wild animals will be constructed.
- iv) Safe disposal of carcasses to be done in the second home burial ground at the foothill and burning in the incinerator for bones and leftover meat will be done.
- v) Veterinary Doctor, zoo biologist and curator will be trained in handling and use of the Tranquilizing gun.

Stores & feed supply section:

1. Existing store house to be demolished and reconstructed.
2. Procurement and supply of animal feed items will be through the reliable approved contractors.
3. Store house will be well equipped with racks, tables, feed containers, refrigerator, weighing machines and other measuring tools.
4. The store will be rodent and fly proof.
5. Maintenance of records of feed arrival/stock and issued quantity for animal feeding under supervision of the veterinary Doctor will be done.
6. Fly proof feed preparation shed will be constructed with tables fitted with tape water and drain pipe for cleaning the feed item before cutting and taking to the animals. Marble laid ground platform will be provided for mixing the feed items of the ungulates.
7. Cycle rickshaws, cart, trolleys are needed to carry prepared feed items to the animal enclosures.

8. Zoo Keepers to be provided with hand gloves and masks and other kits.

Sanitation section

- i) The existing drainage system being small and shallow new bigger size drainage will be constructed running to the proximity of the enclosures for proper liquid waste disposal generated from the animal enclosures after treatment with potash and lime.
- ii) Leftover food items, animal excreta and rubbish to be removed from each enclosure daily and disposed off in soak pits located at the selected places.
- iii) Round the clock supply of potable water for drinking purposes in each cell / cubicle / enclosure will be made providing overhead water tanks and laying water distribution pipe lines.
- iv) A schedule for periodic disinfection of each animal enclosure in the zoo will be prepared and implemented as per directions of the Veterinary Officer.
- v) Bio-degradable wastes like leaf litter, animal dung and vegetable wastes will be subjected to vermin-culture by constructing vermiculture chambers. This will assist in maintaining proper hygiene in the zoo.

Disposal of solid waste & liquid waste- Sewerage

Sewerage System:

The main sources of sewerage in Manipur Zoological Garden are the liquid waste originated from animal enclosures, the solid waste originated from the animal left over feeds and the animal droppings. There is no case of storm water source in the zoo as it is entirely in a plain area. The sewerage in the toilets are biologically treated in the septic tank and as such there is no problem for sewerage from human source. The sewerage originated from the animal enclosures will be treated by physical, biological and chemical methods. Easily indigestible left over feeds like bones will be physically collected from the enclosures and burnt in the incinerators. The heaps of animal dung and droppings will be physically collected with shovel and dump into the 1st settlement chamber of the sewerage treatment tank. The floor of the enclosures wherever possible will be washed down with water and the liquid sewerage will be collected by well laid

sewerage pipes and poured into the settling chamber of the sewerage treatment Tank. The sewerage thus collected will be automatically acted upon by the bacteria in the second chamber of the sewerage treatment tank reducing its volume. After digestion of the waste in the second chamber, the remaining clear water on the top of the second chamber is drained to the third collection chamber. In the third chamber, the water is again treated with potassium permanganate solution for killing the contaminated germs. The treated water from the third chamber will be poured into the drainage system of the Zoo for safe disposal.

The Zoo will be installing with 4 Sewerage Treatment Tanks with elaborate pipe system of not less than 6 inch dia. It will be planned in such a way that the level of exit of water in the third chamber of the settling Tank should be above the general drain water level.

The boundary Drainage system for 1147 m length will be constructed and internal drains of 1200 m in length near the path and the enclosures will be constructed including renovation of existing drains. There are drainage all around outside the zoo campus and as such the water /trerated sewage from the zoo is easily and safely drained to Lamphelpat and finally to the Nambul river.

Maintenance Section

Day to day and emergency maintenance of all enclosures, structures, buildings, water supply, electric connections, fencing, painting and repair of other machineries are required. The maintenance section under the supervision of the Range Officer requires employees consisting of the following staff support for attending emergency and minor maintenance works. They are also required for annual maintenance of enclosures and other infrastructures with other hired experienced workers.

- i) Black smith - cum-welder
- ii) Fitter -cum-mechanic
- iii) Carpenter
- iv) Electrician
- v) Painter

vi) Labour

Security section

The zoo boundary, enclosures, animals and the activities of the visitors are required to be watched so that no unwanted activities occur and the zoo property is guarded properly. The existing staffs are to be strengthened for providing more effective security arrangement for the zoo during visitor hours and non visitor hours. The zoo guards will be provided with full khaki uniform and other accessories for performing duty befittingly. Guard Posts will be constructed at the selected places in the zoo. Watch tower will be constructed at the boundary adjoining to the Central Agricultural University. The Zoo Guards will be under a Head Zoo Guard. Mobile handsets will be provided to the Zoo Guards for prompt communication and action. Accessories kits will be provided to the guards.

Water supply section

Water requirement of the Zoo is obtained from the PHED Water supply Storage Reservoir located near the zoo on Langol Reserved Forests. There is regular supply of water from the PHED reservoir. A 130 cum capacity ground water storage tank (Ground Sump) built with an overhead main distribution Tank of 35000 litre capacity from where water can be supplied to the 9 overhead tanks of 2000 litre capacity near the enclosures and 6 other overhead tanks at 2 Toilets, 3 water drinking hydrants and 1 near staff and administrative building by gravity. 850m length enclosure line and others will be covered with pipe lines. Water will also be supplied to lawns and gardens. Separate staff will be provided for looking after the water distribution system.

Power supply section

The zoo is at the opposite side of the Iroisemba Power Supply Station and thus enjoys a 24 hour power supply. A separate Transformer will be installed for the zoo. Main power lines will be extended to reach the overhead tanks, Guard posts, Museum, Bear Feed preparation kitchen, reptile enclosures and main key points of the zoo for further extension covering a length of 1250m. A Generator Set will support the electric supply system in case of power cut.

Internal Roads/ Visitor Circulation System

The zoo has only one main approach road to take the visitors to the zoo animal display area. Appropriate signage indicating the directions of prominent animal exhibits and visitor facilities are made and erected at prominently sighting point. Due safeguards have been taken so that visitor road does not pass the area adjoining the animal feeding cells, feeding kraals, animal service areas, service road and the off the exhibit areas. All the civic amenities and visitor facilities in the zoo are located by the side of main road. The visitor roads are one way starting from entry gate ending to exit gate. There are 710 m concrete paved road and 590m kutchra road. The concrete laid visitor path from entrance road turn to right along Cheetal enclosure then turn to left in between Cheetal and Sambar enclosures and then straight to the end of Sambar enclosure and then turning left in between barking deer enclosure and hog deer enclosure to pelican enclosure and then turning left along Sangai enclosure. It then turns to right near the Children Park following the small carnivores path with short extension to the right to the museum and children park, otherwise turning right in front of tortoise enclosure towards the Hoolock gibbon and monkey enclosure which is unpaved and then turning to left along the wild boar and Emu enclosures and then following left near the visitor shed towards the vulture and leopard enclosures and then turning further to the left coming along the bank of the pond winding the path leaving the original straight path which has been left for use in construction of Open moat Bear enclosure and then turning towards left along the toilet complex and finally reaching the exit gate to the right.

Visitor's amenities

The following visitor amenities will be added to the existing ones:

1. one toilet near visitor interpretation centre
2. 5 visitor sheds, 3 sheds at the eastern side of pond, 1 over-bridged, 1 near Gharial enclosure.
3. 2 Kiosks and seats
4. 5 Safe drinking water points
5. Interpretation centre and Gift shop
6. Improving Play items for children
7. Providing adequate Dustbins
8. Providing Signboards for animals, conservation slogans, Acts and Rules

9. Providing Guide Map and direction map
10. Visitor Stand off barriers: Water Bird 330m, Cheetal 145m, Barking deer 70m, Sangai Goral 170m, Emu Wild boar 80m, Vulture small carnivore 100m, Leopard 35m, Reptile 45m, Nocturnal enclosure 60m, Small carnivores 75m total : 910m.
11. Providing Wheeled chair for disabled persons
12. Providing guides by education officer
13. Providing First aid in case of emergency
14. Concrete paving of visitor path for 850m & maintenance 710m with raising height.
15. Concrete paving of Zoo Approach Road side at zoo side for 165 m x 1.20m x 0.75m
16. Strengthening the of existing visitor amenities.
17. Printing Leaflets, handout, publications
18. Other new items emerged from time to time.

Lawns and gardens- landscape section

Proposed works for maintaining Lawns and garden for landscaping will be :-

1. Earth works in low lying areas and plantation of imported grass and rose and other flowering plants and shed trees.
2. Regular cutting of grass
3. Plantation of suitable trees all along the boundary wall in multiple rows and between the enclosures to develop green belt.
4. Providing tree name plates with scientific name
5. Providing circular boulder tree guards.
6. Maintenance of growing trees, branch cutting etc.
7. Purchase of tools and machine

Others/ Peculiar problems, Education and Awareness.

For self learning, education and awareness of the visitor, the following facilities will be provided:-

1. Setting up a visitor interpretation centre cum museum.

2. Animal display signboards will be provided with systematic classification of the animals, information on distribution, biology and conservation status.
3. The zoo will publish leaflets, brochures, guide books and annual reports and the same will be made available to the visitors on payment at nominal price.
4. Fixing name plates of trees in the zoo
5. Display signboards on Wildlife Acts and Rules and environment
6. Conservation Slogan Signboards
7. Providing guides for group visitors on request
8. Zoo education officer available for imparting education and awareness.

Research

No research work is set for the coming years. However, the zoo will entertain research scholars from the recognised institutes for their visit and study about the animals and birds kept in the zoo without collecting any animal part. The veterinary officer, the biologist and the education officer are assigned duty as field guide for the purpose.

Fodder cultivation

Fodder cultivation and plantation at second Home of sangai with fodder trees and Napier grass will be carried out for producing good quality fodder to supplement the feeding of zoo ungulates.

Administrative buildings/Infrastructure:

Present existing office buildings are old wooden buildings and these will be dismantled and the administrative building site will be shifted to near the staff entrance gate and the present building site will be in zoo display area where the Visitor Interpretation centre will be constructed along with a gift shop. A visitor water point and visitor toilet will be installed near the Interpretation centre. The following administrative buildings and infrastructure are proposed for construction:

1. Director Office building in 90 sqm area each floor to be constructed

2. Veterinary Hospital Building consisting of Staff rooms, store, treatment room. Operation theatre, Quarantine room, Library, Mini laboratory and ICU room opposite to the Director office with plinth area 280 sqm to be constructed.
3. Store cum Guard House having 56 sqm plinth area to be constructed near the feed distribution centre.
4. One Guard Watch Tower at CAU border.
5. Visitor Centre at the old building site of Director office with 240 sqm
6. Construction of in-patient house.
7. Renovation of Ticket Counter
8. Construction of interpretation centre cum museum cum zoo zhop.
9. Zoo boundary wall 1147m will be reinforced.
10. Porous boundary of Captive Breeding centre for 755m will be fenced and the existing 455 m fencing will be reinforced.
11. To strengthen protection of the Captive breeding centre 2 guard posts at the upper reaches of the Captive Breeding Centre will be constructed
12. 1toilet attached to office building at Captive Breeding Centre
13. One Guard Watch Shed at Captive Breeding Centre.

Staff quarters:

The buildings at staff colony outside the zoo campus will be renovated and reinforced. Remaining boundary fencing is to be provided. The gates are to be reconstructed to ensure safety of the staff. The staff quarter at Captive Breeding Centre are to be renovated with additional construction of attached toilets. One Watch shed commanding the view of Sangai Captive Breeding Enclosure will be constructed between the staff quarter and the office building. Staff quarter for zoo guards and zoo keepers will be provided at the first floor of the General store to be constructed.

Mobility

The mobility and readiness of the zoo personals and zoo keepers will be increased by providing:-

1. Separate Driver for the existing vehicle, Bolero camper.

2. Van ambulance for transportation of sick/injured/rescued animals/staff and visitors in case of emergency.
3. Increasing the number of Rickshaws and Trolleys required for transport of animal feeds from feed distribution centre to animal enclosures
4. Adequate fuel stock required for the vehicles
5. Adequate staff to be stationed at the zoo premises for prompt services.
6. Uniform and kits to the staff and regular health check up of staff.
7. Issue of mobile handsets and cameras.
8. Increasing staff amenities and incentives.
9. Imparting training and developing leadership
10. Proper duty allocation

Chapter – V

Personnel Planning

The proposed Zoo staff strength to manage different works considering the activities in the plan for development of the Zoo is listed below in hierarchical order in various administrative branches indicating the sanctioned posts, proposed staff and present staffing pattern and position (as per Recognition of Zoo Rules, 2009).

Sl. No.	Name of posts	Sanctioned	Proposed	Present staffing	Remarks
1	2	3	4	5	6
Administrative					
1	Director (DCF)	1	1	1	
2	Curator (ACF)		1		Present i/c Range Officer HQ
3	Head Clerk	1	1	1	
4	Range Forest Officer	2	2	2	
5	Dy. Ranger	2	3	2	
6	Forester	2	4	2	
7	Head Forest Guard	1	4		
8	Forest Guard	8	6	6	
9	UDC		1		
10	LDC	2	2	2	

11	Peon	2	2	2	
12	Chowkidar	1	2	1	Engaged on Muster Roll
13	Project operator cum Electrician		1		
14	Mali		1		Gardening
15	Ticket collector				
16	Driver	1	3	1	
17	Welder cum blacksmith		1		
18	Fitter cum Mechanic		1		
19	Plumber		1		
20	Carpenter		1		
21	Painter		1		
22	Sweeper	2	4	1	Sanitation
Animal Section					
23	Zoo Education Officer		1		Present i/c R.O.HQ
24	Zoo Biologist		1		Present i/c VAS
25	Zoo keepers		11		
26	Zoo Guards		6		Security
27	Watchmen		2		

Veterinary					
28	Veterinary Assistant surgeon	1	1	1	
29	Veterinary Field Assistant	1	1		

The Zoo has 25 Muster Roll/Casual employees as shown in column 6.

Chapter VI

DISASTER MANAGEMENT

(Plan to address problems faced during the natural calamities like fire control, flood, cyclone, law and order break down, feed supply etc)

There may be crisis in management arising out of natural disasters like cyclone, flood, drought and earth quake or accidental happenings like fire, animal escapes, outbreak of diseases, etc. The crisis may also arise out of Vandalism by unruly visitors, strike by staff, and stoppage of supply of water, power and animal feed due to circumstances beyond the control of the zoo management. The degree of subjectivity of the zoo to each type of crisis has been assessed and a

list of more frequently encountered crisis in Manipur Zoological Garden has been identified.

List of frequently occurring Crisis in Manipur Zoological Garden are:

1. Seasonal Flood
2. Escape of Animals
3. Stoppage of Water Supply
4. Stoppage of Power Supply
5. Vandalism

List of Crisis which may arise in the zoo are:

1. Strike by staff
2. Stoppage of animal feed supply
3. Storm/Cyclon

Lookout for new potential crisis of the village/District/State like:

1. Bird Flu
2. Cattle born diseases
3. Civil Unrest

Strategy to manage the crisis:

1. Equipments and consumables:

Required stock of equipments to deal with the crisis like Diesel Generators, Portable Saws, Axes, Shovels, Water Tanker, Diesel Pumping Set, Rops, Spot lights, Emergency lamps, Siren, Loud Speaker, Tarpaulin, Chains, Nuts and Bolts are to be acquired and stocked. Consumables like diesel, petrol, LPG, Kerosene, lubricants, Fuel wood, batteries, saw blades etc will be acquired and stocked. Equipments for Handlers like Protective clothing, Safety Helmet, Safety Boot, Goggles, Whistle, Hand Torch and Head Hold Torch are to be provided.

2. Training the Team/all concerned to deal with the situation through periodic mock drills.
3. Maintaining a good network and coordinating with specialised agencies like fire fighting department unit of the district, State Crisis management Department, Police, Para Military, Army, NCC , Medical Dept, Veterinary Department, District Administration, Metrological Department etc.

Management of regular crisis:

1. Manipur Zoological Garden experience seasonal floods during monsoons. The height of plinth level of animal enclosure and the visitor path is to be raised. The ground of the enclosures particularly for the deer group will be provided with more earth work and raise the ground level in addition to existing dry lands. Small animal enclosures are free from flood.
2. Sometimes there are cases of escape of animals from its enclosures. Recapture of escaped zoo animals will be done by closing the zoo to visitors and then putting animal feeds to the enclosure opening the service door. Emergency repairing to be done promptly. For escape of dangerous carnivores tranquilising guns will be used and for which staff is to be trained and drugs to be procured. It is planned to avoid escape of animals from the enclosures by taking all precautions at the time of design and construction of the enclosures.
3. Storm damage, fallen trees, branches, damaged enclosures and shelters, emergency repairing on war footing will be done. Branches of tree which pose danger to animal enclosures and visitor are streamer.

4. In case of accidental fire immediate call to the nearest fire station at Imphal will be made and simultaneous action like pumping available water, using fire extinguishers and evacuation action will be taken up.
5. Required equipments to deal the disaster namely, generator, saws, axes, shovels, water tankers, pumping set, emergency lamps, loud speaker, tarpaulin, chains, POL, Kerosene and Batteries will be kept in stock.
6. Two Emergency Preparedness Team led by one Range officer for each team will promptly act on the crisis and disaster.
7. Non-perishable storable items of animal feed will be stored to meet the need for at least days. Local vegetable growers will be contacted for procurement of vegetable feed items in case of Law and order breakdown. Local poultry and fish firm will support the fish and meat supply in case of emergency.
8. The zoo will be closed to the visitors on such days of law and order breakdown and natural calamities and protection measures will be increased.
9. The incentives to the staff will be increased during Disaster management.

Chapter - VII

CONTINGENCY PLAN

(1) Animal rescued from the wild

Animals rescued/brought from the wild will be kept at the zoo after proper screening and quarantine. At least one month (30 days) of quarantine is a must to observe the animal for detection/ treatment of any disease or unnatural behaviour. The rescued animal take time to adapt to the changed food habit as provided in the captive. Care should be taken so that the rescued animal does not starve because of the change in availability of feed items. In case of starvation alternative feed items should be provided considering its natural habitat and food habit. All the rescued animals cannot be housed in the rescue centre. Healthy rescued animals if they are not going to put in the exhibit enclosures will be either released to their natural habitat or transported to other zoo of the country through arrangement made by notification by the zoo and coordination by the CZA. Construction of Rescue centre is proposed to be set up inside the zoo premises near the administrative and veterinary section for easy supervision. While analysing the past history of species of animal rescued, most of them were of small mammals, reptiles and birds which does not need spacious enclosure at the rescue centre.

(2) Escape of animals from the Enclosures

Re-capture of the escaped animals could be carried out coolly and calmly. The fugitive/escaped animals should not be rushed at as they may jump out of the zoo premises and cause harm in the surrounding areas. The following steps may be taken for re-capture:

- i) Feed will be kept inside the enclosure from where the animal escaped so that they might approach the enclosure. Constant watch is to be kept and the animal put in as soon as the opportunity arises.
- ii) All efforts will be taken to ensure that the escaped animals do not get out of the zoo premises. Constant surveillance may be done along the outer boundaries of the zoo while another team tracks the escaped animals.

- iii) Zoo animals have the tendency to get inside their cages and enclosures as they apparently feel safe and secure. If zoo animals are out of the cages/enclosures, they can be herded back with utmost care and caution.
- iv) In case of carnivorous and dangerous animals, rapid rescue team with adequate tools for re-capture must be deployed before any major accident takes place.
- v) Readiness for tranquilising the escaped dangerous animals should be prompt.

(3) Monkey and Dog menace.

There is no monkey menace in zoo and its nearby villages. However, the general public are informed not to feed monkeys as this exposes them to risk of an attack. There is also no dog menace in and around the zoo. The problem of stray dogs is not yet a serious problem in Manipur. However, vaccination of all domestic dogs in the adjoining villages will be done to avoid incidences of rabies and attacks by feral or mad dogs.

(4) Arrangements of food in case of strike (non- supply by contractor)

The zoo will have good storage facilities for food stuff to last at least 15 days since the animals cannot survive without supplied food in captivity. Cold storage facility will be very helpful in case of any bandh or strike by contractors. A fodder plantation plot at second home of sangai will be developed and maintained to meet fodder requirement of the zoo inmates in case of failure of supply. Garden plots for herbivore and birds will be maintained to provide feed to the animals in case of non-supply by contractors. This will reduce dependence of feeds on outside supply.

(5) Snake bite/attack by zoo animals

It is proposed to keep a stock of anti-venom to deal with accidental snake bite to visitors and zoo workers. An ambulance is also proposed to be maintained to rush such accident victims to the hospital urgently. First aid facilities will be given to the affected person and then rush to the hospital immediately for treatment. Nearby Army Camp are also helpful in treatment of snake bite as they have good stock of anti venom injection.

(6) Visitors getting injured /visitors falling inside enclosure

First aid facilities for injured visitors would always be kept at an easily accessible place within the zoo premises. An ambulance would also be available to transport injured people to the hospital. However, there is no chance of visitor falling inside enclosure in case of Manipur Zoo.

(7) Fighting among animals:

Many of the existing animal enclosures are small and this limits the movement of the caged animals to escape themselves from the attack by the counterpart. Fighting among the Rhesus Monkey frequently happen but it is not fatal. The male deer sometimes fight during the mating season. Care has been taken to avoid mortality on this account by segregating most offensive male. Partition between adjacent small carnivore enclosures shall be reinforced with walling so that animals in one enclosure may not see the animal at his neighbour and fight between the unlike species avoided. Sufficient food should be ensured in all the enclosures to avoid fight for food. Sexing of animals and keeping of desired number of animals as per the required sex ration will be adopted. Surplus animals will be released to the natural habitat or donated to other zoos under the guidance of CZA.

(8) Epidemics

In the past history of Manipur Zoological Garden, there was no occurrence of any epidemics in Manipur Zoological Garden. However, readiness to control and fight epidemics will be ensured consulting State Veterinary Hospital, Sate Medical Department and the CZA in case of occurrence of epidemics.

(9) Breakdown of power supply

The zoo is just at the proximity of the Iroisemba Power Sub-station and there is regular supply of electricity in the zoo. During storm and rainy season the power supply sometimes breakdown. Uninterrupted power supply to the zoo will be ensured by installation of Generator Set and this will back up the gap of breakdown of normal power supply.

(10) Free ranging animals/Feral animal menace

There is no feral animal menace in the zoo. However, there is menace of free living birds, the Cattle Egrets which flocks in hundreds on the trees of the zoo in April of every year for breeding and returns in thousands in September of the year. During their stay at zoo, many dropping are dropped, the ground below become white and sometimes the droppings fall on the body of the visitors. This is an unavoidable menace. Adequate signboards are put at distinct places for the visitors to look out for the bird droppings.

Chapter - VIII

CAPACITY BUILDING

(Plan to upgrade skills of zoo staff, interaction with other zoos- regional cooperation with institution)

Plans to upgrade skills of Zoo staff

Manipur Zoo needs to have plans to upgrade skills of zoo staffs of different levels for smooth functioning and effective management of the zoo. The co-operation of recognized universities already working in these fields for imparting training will also be taken. Two animal attendants have attended Zoo Keepers' Training programme conducted by CZA at Assam State Zoo, Gauhati during 2010-11. The veterinary Doctor of Manipur Zoological Garden attended training at Nandan Kanan Zoo for the Zoo Biologist and also at Madras Veterinary University and Aringana Zoological Park on Transportation Protocol as conducted by the CZA during 2010-11. Another 2 zoo keepers attended training at Sepahijala Zoo, Agartala, Tripura during September 2011 on management of carnivores in the zoo.

The training programme organised by the Central Zoo Authority for training of the zoo keepers, Veterinary officer, biologists, the Range Officers and Zoo Directors on the biology, behaviour, nutrition and veterinary aspects of wild animals, design and layout of zoo, enclosure design are expected for participation by the personnel of Manipur Zoo. The personnel of the zoo would also be trained on visitor management. The Officers not below the rank of Range Officers would also have expertise on zoo architecture and landscape designing. Training on tranquilizing the animals for capture for treatment and transport is required and suitable zoo staff including the veterinary officer and the Range officer will be trained when the opportunity is given by the CZA or as required by arrangement by the zoo with the help of CZA.

Interactions with other Zoos

The staffs of the zoo would be given the opportunity to interact with counterparts in other zoo of the country to enhance/ exchange their knowledge and experiences during their service for better management of the zoo. The Central Zoo Authority of India and the state government can provide due support to the Manipur Zoo in the effort. Organised tour will be scheduled to other

zoos for exposing the zoo keepers of Manipur Zoological Garden to upgrade the skills on zoo layouts, animal enclosures, visitor facility, zoo veterinary hospital, feeds and feeding, interpretation etc. There has been interaction with the Surat Municipal Corporation Zoo and Aquarium with Manipur Zoological Garden. Surat Municipal Cooperation Zoo and Aquarium desire to collect one pair of Himalayan Black Bear from Manipur Zoo which has been accepted by the zoo. Assam State Zoo has informed Manipur Zoo about their surplus animals including Tiger for donation. Manipur Zoological Garden is also providing information on its surplus animals to other zoos. The zoo will interact with neighbouring zoos and collect the Feed/Diet Chart of animals for reference. The Manipur Zoo obtained the RR for Zoo Keepers in Assam State Zoo for framing the RR for Zoo Keepers of Manipur.

Regional cooperation with institution

Contact with the regional Institutes will be established to explore areas where the zoo and the staff may be benefited and co-operate between the Institute and the Zoo authority in case of problems, treatment of sick animals and otherwise for any assistance. Research scholars from different institutes will be encouraged in study of the biology of the captive animals. The zoo shall have cooperation with regional veterinary university/college/ state veterinary hospitals which are capable of providing appropriate scientific inputs for diagnosis of the diseases and advice on the proposed line of treatment. Necessary assistance in this regard will be taken from the CZA for the sick animals which could not be effectively handled by the regional referral centre for better treatment by IVRI, Bareilly (National Referral Centre) which has been recognised by the CZA.

Chapter - IX

E-governance

E-Governance is the application of Information and Communication Technology for delivering government services, exchange of information communication transactions, integration various stand-one systems and services between Government-to-Citizens, Government-to-Business, Government-to-Government and interactions within the entire government frame work. Through the e-Governance, the government services will be made available to the citizens in a convenient, efficient and transparent manner. Information and Communication Technologies such as Internet, Local Area Networks, mobiles, telephone, FAX etc. are used to improve the effectiveness, efficiency and quick service delivery. The zoo has facility of internet through Broad Band Service of BSNL and the TATA Photon + service. Informations are shared between Manipur Zoo and other Indian zoos and also the CZA through its e mail: manipurzoo@rediffmail.com. There is FAX service available at Telephone cum FAX No. 0385-2416703 of Manipur Zoological Garden. There is plan for distribution of mobile to the zoo keepers, guards, zoo choukidars and night watchers for prompt communication and reporting. Funds are received from the CZA through electronic transfer of fund direct to its bank account at SBI, Imphal. Staff pays are distributed through electronic transfer of the respective salary amount to the personal accounts of the staff at the respective banks. MZG will install the software ARKS for animal collection record keeping and CMS for collection management system of wild animals in captivity. The Zoo will become an ISIS (International species Information System) member so that data on captive wildlife of Manipur Zoological garden may be submitted to the ISIS which is a global biodiversity database custodian for wild animal species held in captivity. One Range Officer has been trained on the ARKS and CMS Software in 2009 at Nandankanan Biological Park, Bhubaneswar conducted under CZA. The zoo works are fully computerised. New modern technologies, equipment and implements will be procured for updating the E governance.

Chapter – X

BROAD BUDGET ANALYSIS FOR IMPLEMENTING THE PLAN

Broad Budget requirement for implementation of the Master Plan in 10 years from 2012-13 to 2021-22 for management of Manipur Zoological Garden has been estimated to Rs. 4444.55 lakhs. The budget will mainly focus on Construction and development and day to day maintenance of the zoo. The budget is prepared based on the current cost of items with addition of required estimated cost escalation over the years to come. The zoo Director will mobilise the financial resources from different sources like State Schemes to be financed by the State Government, Central Sponsored Schemes to be financed by the Central Government and other donor agencies for the implementation of the Master Plan. The Broad Budget is flexible and subject to revision as per prevailing cost norms at the time of implementation. Considering the past records of funding agencies and other future prospects, the following Agencies/Schemes will finance the budget required for the execution of the works proposed in the Master Plan. The broad budget requirement is meant for (i) Construction and development and (ii) Day to day maintenance of the zoo.

- 1) State Schemes
- 2) TFC Awards
- 3) Central Sponsored Schemes
- 4) Other Sources

Broad Budget: Year: 2012-13 to 2021-22

Rs.in lakh

Sl.No	Particular of works	Financial Requirement										Total
		2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Management of Manipur Zoological Garden for implementation of Master Plan proposal.	245.00	551.50	480.00	466.60	515.00	463.50	448.70	448.5	408.00	417.75	4444.55
	Total:											4444.55

a. CONSTRUCTION AND DEVELOPMENT:

Construction and development under the broad budget of the Master Plan will include the developmental works namely, earth work for improving low lying areas and landscaping, construction of enclosures and its associated structures (like feeding cell, night shelter with squeeze cage facility where ever required and furniture), rescue centre, visitor amenities, infrastructures for Director office, infrastructures for veterinary unit, staff quarter, boundary wall, watch tower, guard post, electrification, water supply, boulder embankment of zoo pond, sewerage treatment tanks, pipes and drainage, ticket counter, museum, visitor interpretation centre, tree plantations etc. Construction of enclosures will include aviaries for land birds, water birds, carnivore birds, enclosures for reptiles, enclosures for deer, enclosures for apes and monkeys, enclosures for leopard, open moat enclosure for Bear, enclosures for nocturnal animals, enclosures for small animals and captive breeding enclosures for Sangai and Schedule I Birds. The visitor amenities will

include construction and development of visitor path, visitor rest sheds, visitor seats, drinking water facilities, toilets, lawns, gardens, signboards, first aid facilities, children park, facility for disabled person, hand outs and publications, kiosks, etc. Tree plantation will include plantation of Taxodium, Terminalia arjuna, Salix tetrasperma, syzygium cuminii, Ficus glomerata and other avenue plants and trees including fodder plantation and Iris bakerii and other ornamental trees, flowering herb and shrubs. Under the head Rs. 2964.55 lakh is earmarked for the 10 year plan period.

Construction and development: Year: 2012-13 to 2021-22

Rs in lakh

Sl.N o	Particular of works	Financial Requirement										Total
		2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Construction and development	175.00	446.50	370.00	341.60	365.00	303.50	278.70	268.50	208.00	207.75	2964.55
	Total:											2964.55

b. DAY TO DAY MAINTENANCE:

Maintenance of the existing assets and also the newly constructed and developed assets are required for maintaining the strength and good look, longevity and hygienic condition of the assets, structures and the enclosures. Day to day maintenance of the zoo

PART – III

Chapter – XI

Management Plan(Budget)

The budget reflects the anticipated expenditure to be incurred in carrying out the activities as indicated in the Master Plan for a period of 10 years starting from 2012-13 to 2021-22. The budget estimate has been prepared with prioritisation of works for each financial year based on realistic estimated amount for the proposed works considering the high price of building materials in the state of Manipur and also the expected cost escalation over the years to come. The estimation of cost has been based on Manipur Schedule Rate (MSR) 2009 adding prevailing cost index, sales tax and agency charge etc. Market rates have been applied for few items of works. Estimated budget for the 10 years plan period for the year 2012-13 to 2021-22 is Rs. 4381.50 lakh.

The Budget 2012-13 to 2021-22.

Sl.No,	Year	Proposed Budget (Rs in Lakh)
1	2012-13	245.00
2	2013-14	551.50
3	2014-15	480.00
4	2015-16	466.60
5	2016-17	515.00
6	2017-18	463.50
7	2018-19	448.70
8	2019-20	448.50
9	2020-21	408.00
10	2021-22	417.75
Total		4444.55

The detailed activity wise budget for implementation of the Master Plan works on priority basis for fulfilment of the proposals in the Master Plan for development of Manipur Zoological Garden is given in the following Table 1 to Table 10.

Table No.1

Budget for the year 2012-13

Physical and Financial

Rupees in lakh

Sl.No	Budget Head	Physical target	Financial
1	2	3	4
1	Construction and Development	Land development Const. of enclosures: Open moat Bear enclosure 80.00 Leopard enclosure phase I 10.00 Porcupine enclosure 15.00 Infrastructure construction: Const. of boundary wall at 2 nd home Sangai 100m 20.00 Visitor amenities: Const. of approach foot path from entrance gate phase-I 5.00 Const. of visitor shed---1 no. 15.00 Drinking water facility--- 1 no. 5.00 Visitor foot path --- 100 m 5.00	20.00
	Sub total		175.00
2	Day to day maintenance	Maintenance of enclosures and shelters, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	70.00
	Sub total		70.00
	Total:		245.00

Table No.2
Budget for the year 2013-14

Physical and Financial

Rupees in lakh

Sl.No	Budget Head	Physical target	Financial
1	2	3	4
1	Construction and Development	<p>Land development</p> <p>Const. of enclosures:</p> <p>Sangai enclosure 70.00</p> <p>Leopard enclosure Phase II 45.00</p> <p>Leopard Cat enclosure 27.00</p> <p>Water Bird aviary 77.00</p> <p>Renovation of Chital enclosure 20.00</p> <p>Mrs. Humes pheasant enclosure at 2nd Home (extension) 15.00</p> <p>Infrastructure construction:</p> <p>Construction of Ticket counter 25.00</p> <p>Service path – 200m 12.00</p> <p>Const. of approach road from entrance gate Phase II 8.00</p> <p>Boundary wall construction at 2nd home 100m 22.00</p> <p>Installation of pipe lines for water supply system 20.00</p> <p>Staff toilet complex 10.00</p> <p>Visitor amenities:</p> <p>Interpretation centre cum zoo shop-Phase I 30.00</p> <p>Providing signboards of animals, conservation slogans, Acts and Rules 10.00</p> <p>Construction of visitors' stand off barrier 5.00</p> <p>Kiosk 10.00</p> <p>Visitor shed 5.50</p> <p>Drainage & Sewerage:</p> <p>Construction of boundary drainage - 200m 15.00</p> <p>Const. of 1 Sewerage Treatment Tank 10.00</p>	10.00
	Sub total		446.50
2	Day to day maintenance	Maintenance of enclosures and shelters, Landscaping, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	105.00
	Sub total		105.00
	Total:		551.50

Table No.3
Budget for the year 2014-15

Physical and Financial		Rupees in lakh	
Sl.No	Budget Head	Physical target	Financial outlay
1	2	3	4
	Construction and Development	Land development Construction of enclosures: Jackal enclosure 20.00 Barking deer enclosure 40.00 Goral enclosure 30.00 Primate enclosure 1 & 2 40.00 Infrastructure Construction: Director's office 60.00 Watch tower 10.00 130 Cum ground sump (water tank) 30.00 Overhead tank 35000 ltr (1no.) 20.00 Soak pit 1 no. 4.00 Visitor's amenities: Interpretation centre cum zoo shop-Phase II 30.00 Visitor Shed of 1 no 6.00 Drainage & Sewerage: Construction of internal drainage 200m 18.00 Construction of boundary drainage 350m 31.00 Const.of 1 Sewerage Treatment Tank 11.00	20.00
	Sub total		370.00
	Day to day maintenance	Maintenance of enclosures and shelters, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	110.00
	Sub total		110.00
	Total:		480.60

Table No.4

Budget for the year 2015-16

Physical and Financial

Rupees in lakh

Sl.No	Budget Head	Physical target	Financial
1	2	3	4
	Construction and Development	Land development Construction of enclosure: Land bird enclosure 30.00 Crocodile enclosure 40.00 Gharial enclosure 40.00 Infrastructure construction: Veterinary hospital 40.00 Service path - 100 Rm 7.00 Boundary wall at 2 nd Home Sangai - 100Rm 26.00 Overhead tank of 1 no. 9.00 Boundary wall construction at 2 nd home 100m 26.00 Const. of approach road from entrance gate 14.00 Phase III Visitor amenities: Visitor footpath - 100Rm 15.00 Signboards, Signages, Guide-maps 10.00 Visitor stand off barrier 100m 6.00 Visitor shed 1 no. 6.60 Drainage & Sewerage: Internal drainage 200m 20.00 Boundary drain 200m 20.00 Const. of 1 Sewerage Treatment Tank 12.00	20.00
	Sub total		341.60
	Day to day maintenance	Maintenance of enclosures and shelters, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	125.00
	Sub total		125.00
	Total:		466.60

Table No.5

Budget for the year 2016-17

Physical and Financial

Rupees in lakh

Sl.No	Budget Head	Physical target	Financial outlay
1	2	3	4
	Construction and Development	Land development Construction of enclosure: Nocturnal Animal House Reptile house Humes pheasant enclosure Kalij pheasant enclosure Infrastructure construction: Food distribution centre Store cum guard house Guard house of 2 no at 2 nd Home Sangai Overhead tank of 3 no Control gate 2 nos. Visitor amenities: Visitor footpath 100m Drainage & sewerage: Construction of internal drainage 200m Construction of boundary drainage 200m Soak pit 2 nos	20.00 50.00 30.00 40.00 40.00 25.00 25.00 15.00 30.00 20.00 16.00 22.00 22.00 10.00
	Sub total		365.00
	Day to day maintenance	Maintenance of enclosures and shelters, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	150.00
	Sub total		150.00
	Total:		515.00

Table No.6
Budget for the year 2017-18

Physical and Financial

Rupees in lakh

S I.No	Budget Head	Physical target	Financial
1	2	3	4
	Construction and Development	Land Development Construction of enclosure: Hornbill enclosure 40.00 Small Carnivore enclosures 70.00 Infrastructure construction: In-patient house 40.00 Service path – 100 Rm 8.50 Construction boundary wall at 2 nd Home of Sangai 100m 30.00 Construction of toilet 1(one) no at 2 nd Home of Sangai 10.00 Soak pit 2 nos 11.00 Visitor amenities: Construction visitor footpath – 100 Rm 17.50 Construction of stand off barrier-100m 7.50 Drainage & Sewerage: Construction of internal drainage - 200 Rm 24.50 Construction of boundary drainage- 200 Rm 24.50	20.00
	Sub total		303.50
	Day to day maintenance	Maintenance of enclosures and shelters, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	160.00
	Sub total		160.00
	Total:		463.50

Table No.7
Budget for the year 2018-19

Physical and Financial

Rupees in lakh

S l.No	Budget Head	Physical target	Financial outlay
1	2	3	4
	Construction and Development	Land development Construction of enclosure: Primate enclosure 3 & 4 Kalij pheasant at 2 nd Home of Sangai Infrastructure construction: Soak pit 1 no. Construction of boundary wall 100m at 2 nd Home Sangai Construction of 5 water holes at 2 nd Home Sangai Service path 200m Overhead tank of 2 no Visitor amenities: Construction of visitors' footpath - 100 Rm Construction stand off barrier – 100 Rm Drainage & Sewerage: Construction of internal drainage - 200 Rm Sewerage treatment tank 1 no.	20.00 60.00 40.00 6.20 33.00 7.50 19.00 24.00 19.00 8.00 27.00 15.00
	Sub total		278.70
	Day to day maintenance	Maintenance of enclosures and shelters, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	170.00
	Sub total		170.00
	Total:		448.70

Table No.8

Budget for the year 2019-20

Physical and Financial

Rupees in lakh

Sl.No	Budget Head	Physical target	Financial outlay
1	2	3	4
	Construction and Development	Land development Construction of enclosure: Sambar enclosure 40.00 Indian Peafowl enclosure 50.00 Wild boar enclosure 40.00 Infrastructure construction: Service path of 200 Rm 21.00 Overhead tank of 2 nos 26.00 Food preparation centre at 2 nd Home 25.00 Home Night shelter of 1 no. at second home 8.00 Visitors' amenities: Construction of visitor footpath 100 Rm 20.00 Construction stand off barrier – 100 Rm 8.50	30.00
	Sub total		268.50
	Day to day maintenance	Maintenance of enclosures and shelters, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	180.00
	Sub total		180.00
	Total:		448.50

Table No.9
Budget for the year 2020-21

Physical and Financial			Rupees in lakh
Sl.No	Budget Head	Physical target	Financial outlay
1	2	3	4
	Construction and Development	Land development Construction of enclosure: Aviary (Extension) 40.00 Burmese peafowl enclosure (extension) 40.00 Infrastructure construction: Service path of 100 Rm 11.50 Construction of burial site at Second Home 5.00 Visitors' amenities: Visitor shed 2 nos. 20.00 Construction of visitor footpath – 100 Rm 22.00 Construction stand off barrier – 100 Rm 9.50 Drainage & Sewerage: Construction of internal drainage - 200 Rm 30.00	30.00
	Sub total		208.00
	Day to day maintenance	Maintenance of enclosures and shelters, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	200.00
	Sub total		200.00
	Total:		408.00

Table No.10
Budget for the year 2021-22

Physical and Financial		Rupees in lakh	
Sl.No	Budget Head	Physical target	Financial outlay
1	2	3	4
	Construction and Development	Land development Construction of enclosure: Emu enclosure (extension) 20.00 Infrastructure construction: Service path of 50 Rm 6.25 Construction of boundary wall 100m at 2 nd Home Sangai 38.00 Construction of Guard sheds at 2 nd home 2 nos 15.00 Control gate 1 no. 14.00 Overhead tank 2 no. 30.00 Visitors' amenities: Drinking water facility 1 no. 12.00 Kiosk 1 no. 20.00 Construction of visitor footpath - 50 Rm 12.00 Construction stand off barrier - 100 Rm 10.50	30.00
	Sub total		207.75
	Day to day maintenance	Maintenance of enclosures and shelters, second Home of Sangai, visitor amenities, sewerage treatment and drainage, waste disposal, general cleanliness of the zoo, campus, veterinary facilities, transport and vehicles, rescue of animals, transportation cages, water supply and electricity, staff amenities, watch ward and protection zoo, feed and hygiene, godown, feed distribution, daily wages, Zoo foundation Day Celebration, Wildlife Week Celebration, maintenance of offices and staff quarters, lawns and gardens, feed storage and feed preparation and distribution systems, general administration components staff training.	210.00
	Sub total		210.00
	Total:		417.75

Source of fund:

- 1) State Schemes
- 2) TFC Awards
- 3) Central Sponsored Schemes
- 4) Other Sources

Revenue:**Revenue collected in the past 10 years:**

Sl. No	Year	Revenue amount (Rs)
1	2002-03	188634
2	2003-04	225800
3	2004-05	173593
4	2005-06	310970
5	2006-07	308752
6	2007-08	263797
7	2008-09	292275
8	2009-10	296434
9	2010-11	321942
10	2011-12	736640

Revenue to be collection target for the coming 10 years:

Sl.No	Year	Revenue target (Rs)
1	2012-13	10,00,000
2	2013-14	11,00,000
3	2014-15	12,00,000
4	2015-16	13,00,000
5	2916-17	14,00,000

6	2017-18	15,00,000
7	2018-19	17,00,000
8	2019-20	18,00,000
9	2020-21	19,00,000
10	2021-22	20,00,000

Procedure to be adopted:

Annual Plan of Operation will be prepared based on the Management Plan (Budget) as reflected in the Master Plan and formal approval of the APO will be obtained from the Administrative Department of Forest, Government of Manipur. The proposals made in the Master Plan will be strictly followed while preparing the Annual Plan of Operation for management of the zoo. The guidelines under the General Financial Rules, Treasury Rules and the Delegation of Financial Power Rules (Manipur) will be strictly observed while implementing the Master Plan. The guidelines issued by the Donner/Funding Agency will be strictly adhered to. There will be supervision and stage wise monitoring of the works at the Departmental level and also any external monitoring agency. The state government will be the sanctioning authority for the works funded by the State and also the Centrally Sponsored Schemes. The Governing Body of the Manipur Zoological Garden Society will be the sanctioning authority of the works sponsored by the CZA. The accounts of the Manipur Zoological Garden is open for audit inspection by the Accountant General, Manipur and also the Chartered Accountant Audit Group to ensure proper utilization of the fund allotted by the funding agency. Progress Report of works and Utilization certificate of the amount made available will be submitted timely to the funding agency with request for release of further fund.

Person responsible for carrying out the works with financial and administrative power:

The Director, Manipur Zoological Garden will be responsible for carrying out different items of works. The Conservator of Forests/Wildlife under the Chief Wildlife Warden is the controlling officer and the Chief Wildlife Warden is the head of Wildlife Wing under the administrative control of the Principal Chief Conservator of Forests, Manipur. All the officers listed above will exercise their financial and administrative power for enabling the Director to

carry out the works under the annual plan. Administrative approval and sanction will be obtained from the Government for works beyond the financial and administrative power of the Principal Chief Conservator of Forests.

PART – IV

Annexure to the Master Plan

I. Lay-out Plan

Lay out plan maps are provided in two categories separately showing the existing lay out of the zoo and another being the lay out plan for the proposed activities for the 10 year years. Lay out maps are provided for the Zoo and the Captive Breeding Centre which is part of the zoo in the Langol hill. The following layout plans are appended herewith.

- A. Existing Lay out Plan of Manipur Zoological Garden in 1:2000 Scale and 5 m interval contour.
- B. Proposed Lay out Plan of Manipur Zoological Garden in 1:2000 Scale and 5 m interval Contour.
- C. Existing Lay out Plan of Sangai Captive Breeding Centre at Second Home in Langol Hill in 1:2000 Scale with 5m interval contour.
- D. Proposed Lay out Plan of Sangai Captive Breeding Centre at Second Home in Langol Hill in 1:2000 Scale with 5m interval contour.

II. Lay out map indicating distribution of electricity

The layout map indicating the distribution of electricity from the Transformer/Generator to the main focal points of the zoo near animal enclosures, museum, water points, offices, veterinary hospital, quarter etc. are provided in the scale of 1:2000.

III. Layout map indicating storm water

The layout map indicating the storm of water to be distributed from the underground sump and the major overhead tank to the mini overhead tanks near the animal enclosures and the visitor water points and offices are provided in the scale of 1:2000.

IV. Existing animal inventory

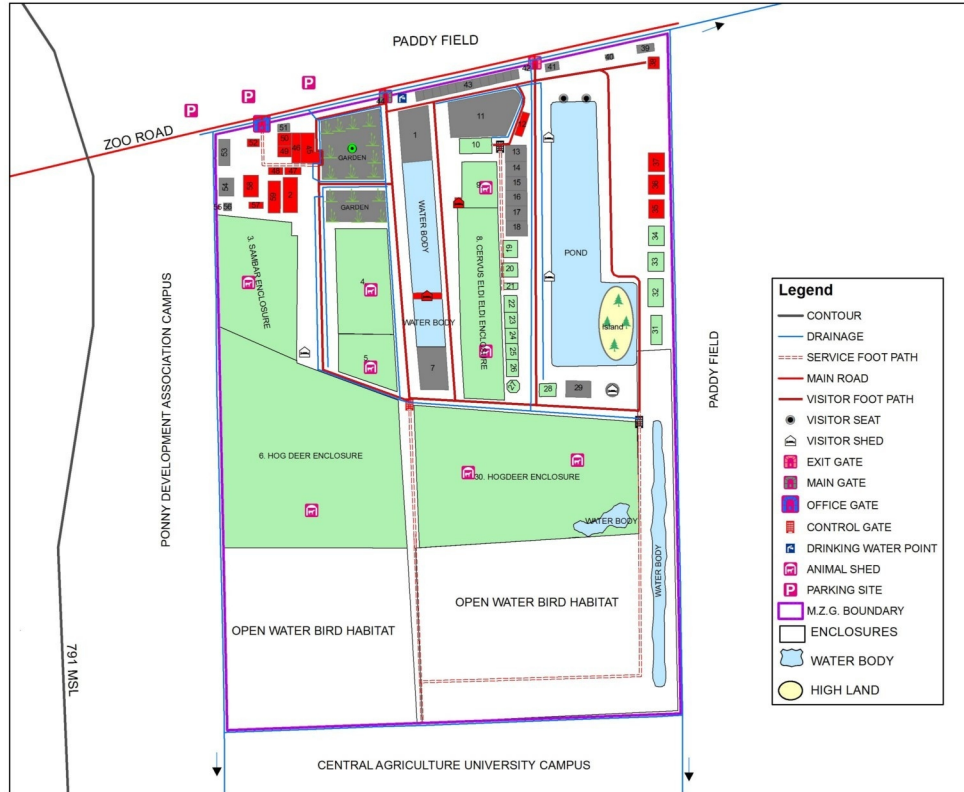
Inventory of existing animals in Manipur Zoological Garden consisting 52 species and a population of 371 is provided.



1:2,000

1 centimeter = 20 meters

EXISTING LAYOUT PLAN OF MANIPUR ZOOLOGICAL GARDEN AREA :- 8.17 Ha.



SL NO	EXISTING STRUCTURE
1	MIXED WATER BIRD AVIARY
2	OBSERVATION CENTRE
3	SAMBAR ENCLOSURE
4	SPOTTED DEER ENCLOSURE
5	BARKING DEER ENCLOSURE
6	HOG DEER ENCLOSURE
7	ROSY PELICAN MIXED BIRD ENCLOSURE
8	CERVUS ELDI ELDI ENCLOSURE
9	GORAL ENCLOSURE
10	MUSEUM
11	CHILDREN PARK
12	INDIAN ROCK PYTHON ENCLOSURE
13	HOOLOK GIBBON ENCLOSURE
14	HOOLOK GIBBON ENCLOSURE
15	RHESUS MONKEYENCLOSURE
16	RHESUS MONKEYENCLOSURE
17	RHESUS MONKEYENCLOSURE
18	RHESUS MONKEYENCLOSURE
19	KALU PHEASANT ENCLOSURE
20	Mrs. HUME'S PHEASANT
21	INDIAN PIED HORNBIL ENCLOSURE
22	VULTURE ENCLOSURE
23	VULTURE ENCLOSURE
24	EAGLE ENCLOSURE
25	HAWK ENCLOSURE
26	HAWK ENCLOSURE
27	BURMES GREEN PEAFOWL
28	WILD BOAR ENCLOSURE
29	EMU ENCLOSURE
30	HOGDEER ENCLOSURE
31	VULTURE ENCLOSURE
32	LEOPARD ENCLOSURE
33	JACKAL ENCLOSURE
34	HIMALAYAN BLACK BEAR ENCLOSURE
35	HIMALAYAN BLACK BEAR ENCLOSURE
36	HIMALAYAN BLACK BEAR ENCLOSURE
37	HIMALAYAN BLACK BEAR ENCLOSURE
38	PROCPINE ENCLOSURE
39	BEAR FEED PREPARATION CENTRE
40	SNAKE HOUSE
41	TOILET COMPLEX
42	SANTRI POST
43	SMALL CARNIVORE ENCLOSURE
44	TICKET COUNTER
45	OFFICE
46	FEED GODOWN
47	NURSING CENTRE FOR RESCUED ANIMALS
48	VET. OFFICE
49	STORE
50	GODOWN
51	WATER RESERVOIR
52	FEED PREPARATION SHED
53	STORE
54	VETERINARY CARE UNIT
55	INCINATOR
56	TOILET
57	STAFF QUARTER
58	STAFF QUARTER
59	STAFF QUARTER

* The difference between maximum and minimum elevation inside the zoo is less than 1 (one) meter, hence no contour can be drawn

MASTER LAYOUT PLAN OF MANIPUR ZOOLOGICAL GARDEN IROISEMBA, IMPHAL AREA :- 8.17 Ha.



1:2,000

1 centimeter = 20 meters



Legend

- CONTOUR (780 MSL)
- VISITOR SEAT
- VISITOR SHED
- EXIT GATE
- MAIN GATE
- OFFICE GATE
- ANIMAL SHED
- INCINERATOR
- PARKING
- PROPOSED CONTROL GATE
- PROPOSED VISITOR SHED
- EXISTING CONTROL GATE
- OVERHEAD TANK
- TRANSFORMER
- DRINKING WATER POINT
- KIOSK
- WATCH TOWER
- TOILET
- VISITOR FOOT PATH
- SERVICE FOOT PATH
- INSPECTION FOOT PATH
- APPROACH ROAD
- DRAINAGE
- FENCING WALL
- ENCLOSURES
- WATER BODY
- GREEN BELT

Sl. No	STRUCTURE	DIMENSION
1	MIXED WATER BIRD AVIARY	70m x 15m
2	CHEETAL ENCLOSURE	93m x 45m
3	SAMBAR ENCLOSURE	73m x 41m
4	HOG DEER ENCLOSURE	76m x 50m
5	GORAL ENCLOSURE	81m x 41m
6	CROCODILE ENCLOSURE	80m x 21m
7	GHARIAL ENCLOSURE	80m x 21m
8	IRIS BAKERII CONS.PLOT	61m x 16m
9	WILD BOAR ENCLOSURE	45m x 25 m
10	OPEN WATER BIRD HABITAT	98m x 17m
11	BARKING DEER ENCLOSURE	85m x 52m
12	SANGAI ENCLOSURE	77m x 65m
13	AVIARY	70m x 15m
14	BURMESE GREEN PEAFOWL ENCLOSURE	36m x 12m
15	INDIAN PEAFOWL ENCLOSURE	36m x 12m
16	HUMES PHEASANT ENCLOSURE	36m x 12m
17	KALJU PHEASANT ENCLOSURE	36m x 12m
18	HORNBILL ENCLOSURE	36m x 12m
19	PRIMATE ENCLOSURE	18m x 15m
20	INTERPRETATION CUM MUSEUM	30m x 10m
21	NOCTURNAL ANIMAL ENCLOSURE	30m x 12m
22	SMALL CARNIVORE ENCLOSURE	50m x 15m
23	TOILET COMPLEX	
24	REPTILE HOUSE	25m x 5m
25	PORCUPINE ENCLOSURE	12m x 4m
26	BEAR ENCLOSURE	44m x 28m
27	LEOPARD ENCLOSURE	25m x 26
28	LEOPARD CAT ENCLOSURE	27m x 11m
29	JACKAL ENCLOSURE	27m x 10m
30	LAND BIRD ENCLOSURE	35m x 15m
31	VULTURE ENCLOSURE	26m x 15m
32	EMU ENCLOSURE	20m x 10m
33	SOAK PIT	
34	GARDEN	
35	TICKET COUNTER	
36	INPATIENT HOUSE	
37	VETERINARY HOSPITAL	
38	GROUND SLUMP WITH OVERHEAD TANK	
39	STORE CUM GUARD HOUSE	
40	FOOD DISTRIBUTION CENTRE	
41	DIRECTOR OFFICE	
42	TOILET	
43	STAFF QUARTER	
44	FEED GODDOWN	
45	SANTRI POST	
46	SEPTIC TANK	

* Black Colour indicates Existing structure
Green Colour indicates Existing structure to be modified
Blue Colour indicates New Construction

* Water Supply from P.H.E.D. is dependable

The difference between maximum and minimum elevation inside the zoo is less than 1(one) meter, hence no contour can be drawn.

Director
Manipur Zoological Garden, Iroiseмба
Imphal
Manipur

Chief Wildlife Warden
Manipur

Member Secretary
Central Zoo Authority, New Delhi

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

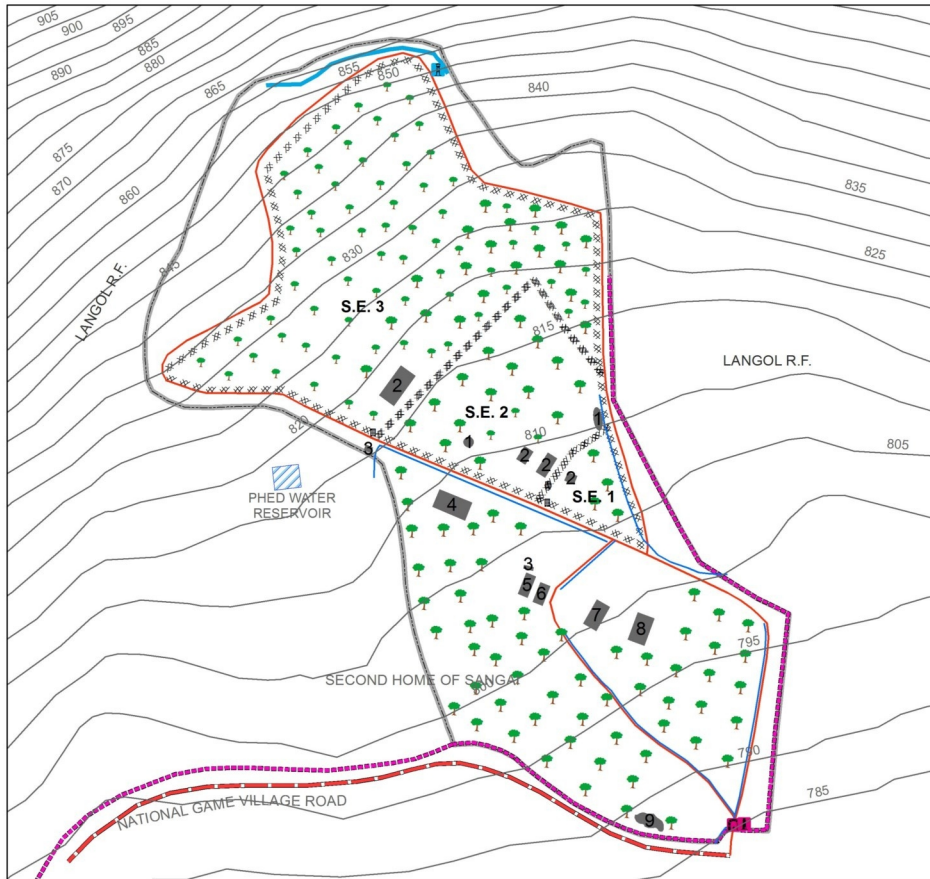
Approved
11/10/15
66/10/15

EXISTING LAYOUT PLAN OF
SANGAI CAPTIVE BREEDING CENTRE
AREA:- 6.007 Ha.



1:2,000

1 centimeter = 20 meters



SL NO	STRUCTURE
1	WATER HOLE
2	NIGHT SHELTER
3	WATER TANK
4	NONGYIN ENCLOSURE
5	CHOUKIDAR KITCHEN
6	CHOUKIDAR QUARTER
7	OFFICE
8	WATCH MAN QUARTER CUM STORE ROOM
9	BURIAL SITE

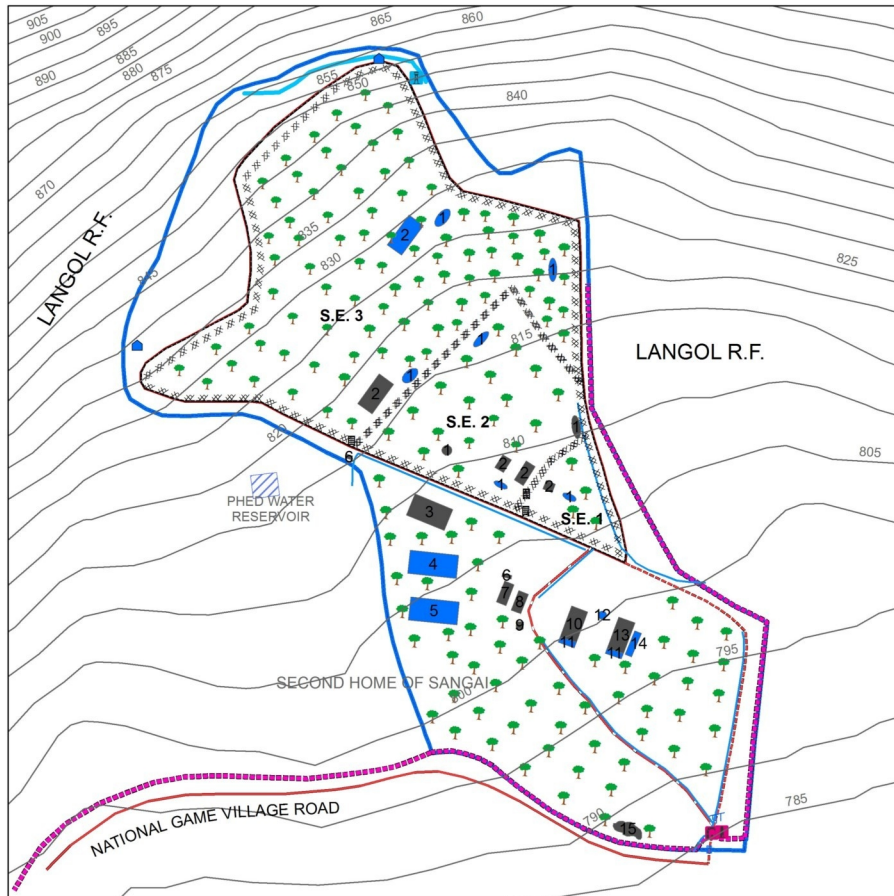
Legend	
—	CONTOUR INTERVAL 5m
—	DRAINAGE
—	PUGCA WALL
—	RUN OFF CATCH DRAIN
—	APPROACH ROAD
—	NATIONAL GAME VILLAGE ROAD
—	POROUS BOUNDARY
●	TREE
■	MAIN GATE
■	GATE
■	WATCH TOWER
■	SANTRI POST
* S.E. Sangai Enclosure	

ELEVATION:
HIGHEST:- 865 MSL
LOWEST:- 785 MSL

PROPOSED LAYOUT PLAN OF
SANGAI CAPTIVE BREEDING CENTRE
AREA:- 6.007 Ha.



1:2,000
1 centimeter = 20 meters



SL NO	STRUCTURE
1	WATER HOLE
2	NIGHT SHELTER
3	NONGYIN
4	KHALIJ PHEASANT ENCLOSURE
5	TRAGOPAN ENCLOSURE
6	WATERTANK
7	CHOUKIDAR KITCHEN
8	CHOUKIDAR QUARTER
9	CHOWKIDAR TOILET
10	OFFICE
11	TOILET
12	WATCH SHED
13	WATCH MAN QUARTER CUM STORE
14	FOOD PREPARATION CENTRE
15	BURIAL SITE

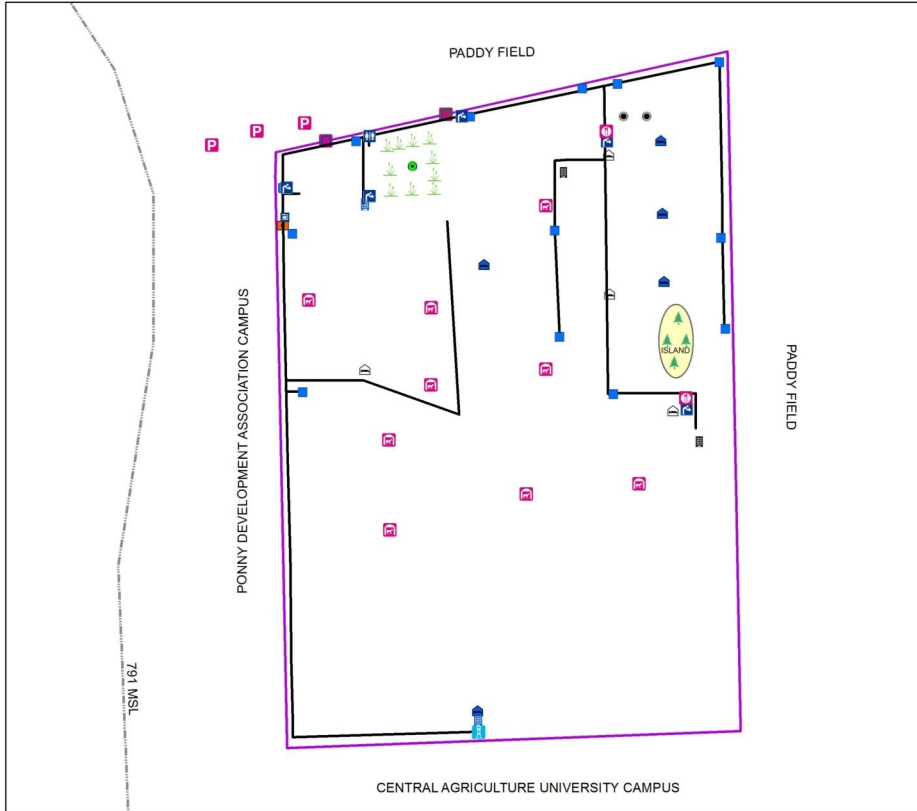
Legend	
—	CONTOUR INTERVAL 5m
—	DRAINAGE
■	TREE
■	MAIN GATE
■	GATE
■	WATCH TOWER
■	SANTRI POST
■	RESTRICTED GATE
■	GUARD SHED
■	PICCA WALL
—	RUN OFF CATCH DRAIN
—	INSPECTION PATH
—	NATIONAL GAME VILLAGE ROAD
—	NEW APPROACH ROAD
—	OLD APPROACH ROAD
—	PROPOSED BOUNDARY

* S.E. Sangai Enclosure

ELEVATION
HIGHEST:- 865 MSL
LOWEST:- 785 MSL

* Black Colour Symbol = Existing structure
Blue Colour Symbol = Proposed structure

LAYOUT MAP OF ELECTRICITY SUPPLY LINES OF
MANIPUR ZOOLOGICAL GARDEN IROISEMBA, IMPHAL (AREA :- 8.17 Ha.)



1:2,000

1 centimeter = 20 meters

	CONTOUR
	ELECTRIC LINE
	PROPOSED CONTROL GATE
	PROPOSED VISITOR SHED
	EXISTING CONTROL GATE
	OVERHEAD TANK
	TRANSFORMER
	DRINKING WATER POINT
	KIOSK
	WATCH TOWER
	TOILET
	VISITOR SEAT
	VISITOR SHED
	EXIT GATE
	MAIN GATE
	OFFICE GATE
	ANIMAL SHED
	INCINERATOR
	PARKING
	M.Z.G. BOUNDARY

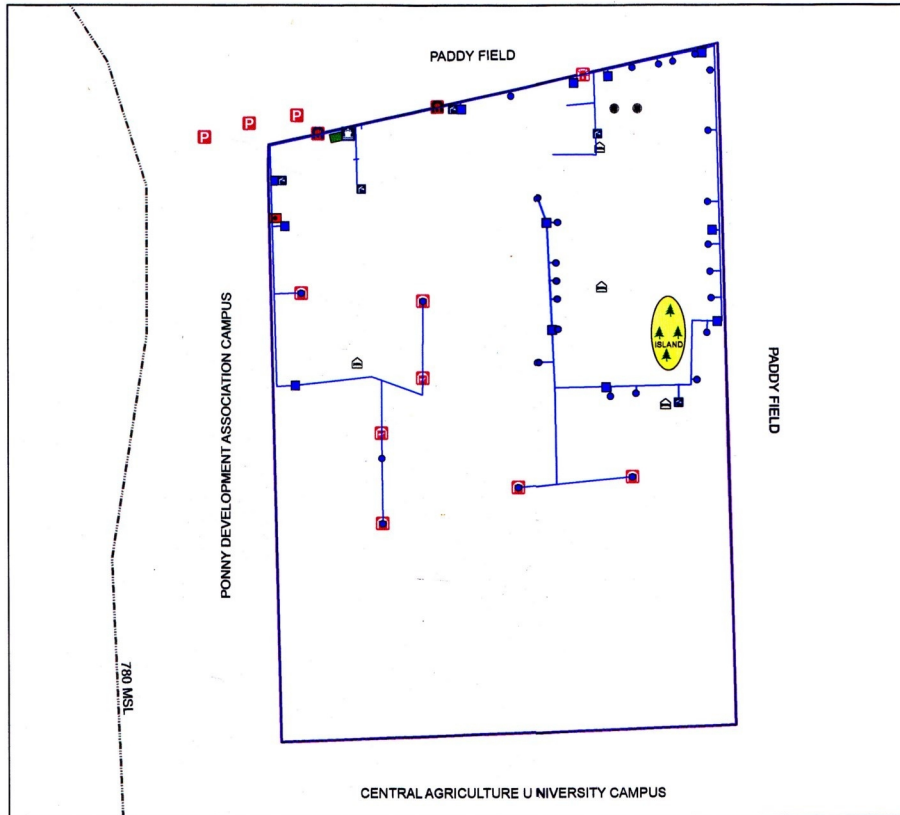
* The difference between maximum and minimum elevation inside the zoo is less than 1 (one) meter, hence no contour can be drawn

LAYOUT MAP INDICATING DISTRIBUTION OF DRINKING (VISITOR AND ANIMAL) WATER OF MANIPUR ZOOLOGICAL GARDEN IROISEMBA, IMPHAL (AREA :- 8.17 Ha.)



1:2,000

1 centimeter = 20 meters



- CONTOUR (780 MSL)
- ANIMAL DRINKING WATER POINT
- MAIN OVER HEAD TANK
- OVER HEAD TANK
- VISITORS DRINKING WATER POINT
- WATER DISTRIBUTION LINE
- VISITOR SEAT
- ⌂ VISITOR SHED
- ⌂ EXIT GATE
- MAIN GATE
- OFFICE GATE
- ANIMAL SHED
- INCINERATOR
- PARKING
- GROUND SUMP
- M.Z.G. BOUNDARY

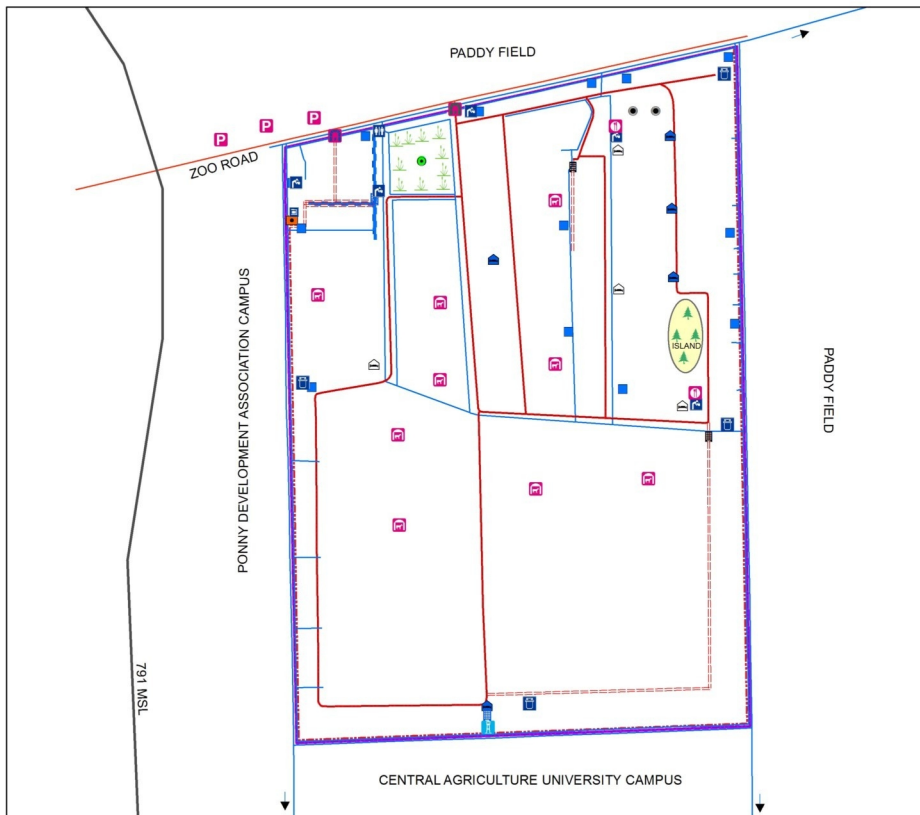
The difference between maximum and minimum elevation inside the zoo is less than 1(0 me) meter, hence no contour can be drawn.

LAYOUT MAP INDICATING SEWAGE AND DRAINAGE OF
MANIPUR ZOOLOGICAL GARDEN IROISEMBA, IMPHAL (AREA :- 8.17 Ha.)



1:2,000

1 centimeter = 20 meters



- CONTOUR
- SOAK PIT
- PROPOSED CONTROL GATE
- EXISTING CONTROL GATE
- PROPOSED VISITOR SHED
- EXISTING VISITOR SHED
- OVERHEAD TANK
- TRANSFORMER
- DRINKING WATER POINT
- KIOSK
- WATCH TOWER
- TOILET
- VISITOR SEAT
- VISITOR SHED
- EXIT GATE
- MAIN GATE
- OFFICE GATE
- ANIMAL SHED
- INCINERATOR
- PARKING
- VISITOR FOOT PATH
- SERVICE FOOT PATH
- INSPECTION FOOT PATH
- APPROACH ROAD
- DRAINAGE
- FENCING WALL
- M.Z.G. BOUNDARY

* The difference between maximum and minimum elevation inside the zoo is less than 1 (one) meter, hence no contour can be drawn

ANNEXTURE- V: Existing Animal Inventory

Inventory of existing animals in Manipur Zoological Garden

Sl. No.	Name of Species	Scientific name.	Stock (as on 31/3/2013) M. F. U. T.	Remarks
	<u>SCHEDULE – I</u>			
	<u>BIRDS</u>			
1	Burmese Peafowl	<i>Pavo muticus</i>	2 - - 2	Local
2	Himalayan Griffon Vulture	<i>Gyps himalayansis</i>	- - 4 4	Local
3	Kalij pheasant	<i>Lophura leucomelamos</i>	3 5 - 8	Local
4	Nongneen (<i>Hume's bar back pheasant</i>)	<i>Syrmaticus humiae</i>	2 - - 2	Local
	<u>MAMMALS</u>			
5	Cat leopard	<i>Felis bengalensis</i>	4 4 - 8	Local
6	Deer brow antlered	<i>Recurvus eldi eldi</i>	7 8 2 17	Local
7	Slow loris	<i>Nycticebus bengalensis</i>	3 4 - 7	Local
8	Hoolock Gibbon	<i>Hylobates hoolock</i>	1 - - 1	Local
9	Leopard	<i>Panthera pardus</i>	- 1 - 1	Local
	<u>REPTILES</u>			
10	Python	<i>Python molurus</i>	1 1 - 2	Local
11	Monitor Lizard	<i>Voranus salvator</i>	- - 5 5	Local
	<u>SCHEDULE – II</u>			
	<u>MAMMALS</u>			
12	Himalayan black bear	<i>Ursus thiabetaus</i>	7 4 - 11	Local
14	Jackal	<i>Canis aureus</i>	1 1 - 2	Local
15	Rhesus monkey	<i>Macaca mulatta</i>	25 15 - 40	Local
16	Toddy cat	<i>Paradoxurus hermophroditus</i>	1 - - 1	Local

17	Himalayan yellow throated marten	<i>Martes flevigula</i>	1 - - 1	Local
18	Jungle Gat	<i>Felis chaus</i>	1 - - 1	Local
	<u>SCHEDULE – III</u>			
	<u>MAMMALS</u>			
19	Barking deer	<i>Muntiacus muntjak</i>	8 10 - 18	Local
20	Spotted deer	<i>Axis axis</i>	13 20 - 33	Regional
21	Hog deer	<i>Asix porcinus</i>	12 18 - 30	Local
22	Sambar	<i>Cervus unicolor</i>	8 10 3 21	Local
23	Goral	<i>Nemorhaedus goral</i>	1 - - 1	Local
24	Wild boar	<i>Sus scrofa</i>	1 1 - 2	Local
25	Ferret Badger	<i>Melogale moschata</i>	1 1 - 2	Local
	<u>SCHEDULE – IV</u>			
	<u>MAMMALS</u>			
26	Porcupine	<i>Hystrix indica</i>	7 2 - 9	Local
	<u>UNSCHEDULE</u>			
	<u>REPTILES</u>			
27	Asian Forest Tortoise	<i>Manauria emys</i>	4 1 - 5	Local
28	Keeled box turtle	<i>Pyxidea mouhatii</i>	- - 1 1	Local
29	Amboina box turtle	<i>Curora amboinesis</i>	- - 14 14	Local
30	Asian leaf turtle	<i>Kachuega sythetensis</i>	4 1 - 5	Local
	<u>BIRDS</u>			
31	Rosy pelican	<i>Pelicanus onocrotalus</i>	- - 1 1	Local
32	Adjutant stork	<i>Leptoptilos dubius</i>	- - 2 2	Local
33	Cattle Egret	<i>Bubulcus ibis</i>	- - 10 10	Local
34	Pond Heron	<i>Ardeola grayii</i>	- - 15 15	Local
35	Nighyt Heron	<i>Nycticorex nycticorex</i>	- - 8 8	Local
36	Purple Moorhen	<i>Porphyrio porphyrio</i>	- - 3 3	Local

37	Moorhen	<i>Gallinula chloropus</i>	- - 20 20	Local
38	Common teal	<i>Anas crecca</i>	- - 6 6	Local
39	White eye pochards	<i>Aythya ryroca</i>	- - 11 11	Local
40	Coot common	<i>Fulica atra</i>	- - 6 6	Local
41	Water cock	<i>Gallixrex cinerea</i>	- - 1 1	Local
42	Spot bill duck	<i>Anas p0ecilorhyncha</i>	- - 2 2	Local
43	Parrot	<i>Psitacula cyanocaphalla</i>	4 4 - 8	Local
44	Lesser caucal	<i>Centropus bengalensis</i>	- - 1 1	Local
45	Whistling teal	<i>Dendrocygna Javavica.</i>	- - 17 17	Local
46	Crested Serpent eagle	<i>Spilornis cheela</i>	- - 2 2	Local
47	Orangle bill blue magpie	<i>Vuocissa crythrorhyncha</i>	- - 1 1	Local
48	Purple Heron	<i>Ardea purpurea</i>	- - 2 2	Local
49	Brahmini duck	<i>Toderna ferruginea</i>	- - 2 2	Local
50	Falcon Laggar	<i>Falco jugger</i>	- - 3 3	Local
51	Emu		4 1 - 5	Exotic

Nos. of Species: 51

Population: 380

ANNEXTURE-VI: Free living species occurring in the zoo campus

Flora and Fauna

Flora:

Tree species found in the zoo premises and captive breeding centre are *Mangifera indica*, *Bischoffia javanica*, *Mallotus philippensis*, *Eucalyptus* spp., *Acacia auriculiformis*, *Callistemon lanceolatus*, *Ficus* spp., *Jacaranda mimosaeifolia*, *Toona ciliata*, *Lagerstroemia speciosa*, *Cinamomum camphora*, *Ficus hispida*, *Cassia fistula*, *Bauhinia purpurea*, *Emblica officinale*, *Celtis timorensis*, *Syzygium cuminii*, *Albizia stipulata*, *Pterospermum acerifolium*, *Cordia dichotoma*, *Callicarpa arborea*, *Xylosma longifolium*, *Castanopsis Hystrix*, *Oroxylum indicum*, *Bombax ceiba*, *Quercus* species, *Pinus kesiya*, *Taxodium* sp., *Pongamia pinnata*, *Tectona grandis*, *Dillenia indica*, *Salix tetrasperma*, *Spathodia companulata*, *Artocarpus lakoocha*, *Azadirachta indica*, *Terminalia bellerica*, *Elaeocarpus floribundus*, *Psidium guava*, *Morus alba*, etc.

Shrubs/Ground flora consists of *Polygonum lapathifolium*, *Polygonum barbatum*, *Hydrocotyl javanica*, *Amaranthus campestris*, *Amaranthus tricolor*, *Xanthium strumarium*, *Mimosa pudica*, *Sonchus asper*, *Cyperus kyllingiaeooides*, *Clerodendron indicum*, *Eupatorium* spp., *Centella asiatica*, *Gerardiana heterophylla*, *Drymaria cordata*, *Rubus ellipticus*, *Artemisia nilagarica*, *Solanum erianthum*, *Portulaca oleracea*, *Lantana camara*, *Gynura cusimba*, *Achrysanthes aspera*, *Melastoma malabathricum*, *Hibiscus rosasinensis*, *Duranta plumeri*, *Nerium* sp., etc.

Grasses include *Panicum* spp., *Cynodon dactylon*, *Imperata cylindrica*, *Cymbopogon* sp., *Erianthus* sp., *Bamboos*, Para grass, etc.

Aquatic flora consists of *Eicchornia crassipes*, *Nelumbo nucifera*, *Setaria italica*, *Ipoemea aquatica*, *Zizania* spp., *Marsilea minuta*, *Pistia* sp., *Alisma plantago-aquatica*, *Nymphaea* spp., *Azolla* sp., etc.

The vegetation has been the habitat of many birds including land birds, water birds and small mammals and reptiles (snakes).

Fauna:

The free living bird in the zoo:

1. Cattle egret,
2. Pond heron,
3. Indian white breasted Moor hen,
4. House Sparrows,
5. Bulbuls,
6. Pigeons/Doves, etc.
7. Fruit bats

Free living fauna at Captive Breeding Centre, Langol Hill:

8. Barking Deer
9. Small Indian civet cat
10. Chinese Ferret Badger
11. Mongoose
12. Squirrels
13. Rats
14. Snakes and
15. Land bids.

ANNEXTURE VII: Sanctioned, proposed and present staffing pattern and position

Sl.No	Name of Posts	Sanctioned	Proposed	Present staffing	Remarks
1	2	3	4	5	6
1	Director, (DCF)	1	1	1	
2	Curator, (ACF)		1	-	Present i/c RO/MZG
3	Veterinary Assistant Surgeon	1	1	1	
4	Zoo Education Officer		1	-	Present i/c RO/HQ
5	Zoo Biologist		1	-	Present i/c VAS
6	Forest Range Officer	2	2	2	
7	Deputy Ranger	2	3	2	
8	Forester	2	4	2	
9	Head Forest Guard	1	4	-	
10	Forest Guard	8	6	5	
11	Driver	1	3	-	Engaged on Muster Roll
12	Veterinary Field Assistant	1	1	-	
13	Zoo Keepers		11	-	-do-

14	Zoo Guards		6	-	-do-
15	Watchman		2	-	-do-
16	Mali		1	-	-do-
17	Projector Operator cum Electrician		1	-	-do-
18	Sweeper	2	4	1	-do-
19	Ticket Collector		2	-	2 FGs
20	Office Chowkidar	1	2	-	Engaged on Muster Roll
21	Welder cum Blacksmith		1	-	-
22	Fitter cum Mechanic		1	-	-do-
23	Plumber		1	-	-
24	Carpenter		1	-	-
25	Painter		1	-	-do-
26	Peon	2	2	1	
27	Head Clerk	1	1	1	
28	UDC		1	-	
29	LDC	2	2	2	
	Total	27	68	18	

The zoo has 25 Muster Roll/casual employees as mentioned in column 6.

ANNEXTURE VIII: List of buildings other than animal enclosures

<u>Sl.No:</u>	<u>Particulars:</u>	<u>Number:</u>	<u>Remarks:</u>
1.	Ticket Counter	1	Pucca building
2.	_Director office complex	2	Semi pucca building
3.	Feed Store	1	Semi pucca building
4.	Grain Store	1	Semi pucca building
5.	BO office and Feed Store	1	Semi pucca building
6.	Veterinary Hospital	1	Semi pucca building
7.	Veterinary Office	1	Semi pucca building
8.	General store	1	Semi pucca building
9.	Feed Store	1	Semi pucca building
10.	Zoo Keepers Quarter	3	Semi pucca building
11.	Museum	1	Semi pucca building
12.	Visitor Rest Sheds	6	Semi pucca building
13.	Bear Feed Kitchen	1	Semi pucca building

Government of Manipur
Secretariat: Forest & Environment Department
Imphal Manipur

Notification
Imphal, the 31st Dec 2004

No 57/31/2003-For & Env: In pursuance of guidelines issued by the Central Zoo Authority (CZA) vide its letter No CZA-Zoo-190(FIN)2002(M): dated 1st October 2002 advising the state government to adopt suitable measures in consultation with the Finance Department to find out ways to utilize the grant release by the CZA expeditiously, the Government of Manipur Zoological Garden Society (MZGS) having the following objectives, memorandum of Association, rules and regulations.

MEMORANDUM OF ASSOCIATION OF
MANIPUR ZOOLOGICAL GARDEN SOCIETY
IROISEMBA, IMPHAL MANIPUR, INDIA

- 1) **NAME OF THE SOCIETY:** Name of the society shall be "Manipur Zoological Garden Society" (MZGS).
- 2) **REGISTERED OFFICE OF THE SOCIETY:** The Registered Office of the Society shall be situated at Imphal in the State, Manipur, India.
- 3) **AIM AND OBJECTIVE OF THE SOCIETY :** The Objective of the society shall be :-
 - i) Conservation of the natural resources and preservation of Himalayan, Trans-Himalayan and Indo-Myanmar fauna with special reference to researches on ecology, animal behavior, biology and physiology of the regions' different fauna and flora.
 - ii) Education, motivation and training of people towards the role of conservation.
 - iii) Reintroduction of rare and endangered wild animals into the wild.
 - iv) Co-ordination of conservation breeding programmes
 - v) Management of Zoo/Zoos in the state.
 - vi) Any other objectives as the Society may feels necessary in conformity with the main objectives.

The income and properties of the Society whatever derived or obtain shall be applied solely towards the promotion of the objectives of the Society and no portion thereof shall be paid to or divided amongst any of its members by way of profits provided that nothing herein contained shall prevent the payment in good faith of remuneration of the any servants or employee of the Society or other person in return for any service rendered to the Society.

REGULATION OF
MANIPUR ZOOLOGICAL GARDEN SOCIETY
IROISEMBA, IMPHAL-MANIPUR: INDIA

PREAMBLE: Manipur Zoological Garden was established in 1976 on the advice of the State Wildlife Advisory Board. The Garden is at present under the administrative control of the State Forest Department, Manipur.

In course of time, the whole concept of management of Zoological Park has changed. The Wildlife (protection) Act 1972 was amended and Central Zoo Authority was created in 1992. Posts of Chief Wildlife Wardens in States were created The Wildlife (protection) Amendment Act, 2002 is now giving full recognition of the wildlife and its effective protection. The Zoological Parks have now definite objective like ex-situ Conservation, Education and Research etc.

As per suggestion of the Central Zoo Authority of India and ensure greater transparency and public support in the management of Zoo, the state government has decided to entrust the management of the Manipur Zoological Garden to a Society to be constituted for the purpose.

MEMBERSHIP: The society shall have the following categories of members:

- a. Ordinary members who pay an annual subscription of Rs. 500/- (Rupees five hundred) only.
- b. Life members who pay a lump sum contribution of not less than Rs. 5000/- (Rupees five thousand) only.
- c. Institutional members who pay Rs. 5000 (Rupees five thousand) only annually or 500.00/- (Rupees fifty thousand) only as life subscription.
- d. International members who pay annual subscription of \$100/- in case of individuals or \$1000/- only in case of institutions.
- e. Honorary members who being persons of distinction by virtue of their knowledge.

- f. Members nominated by state governments (Govt. of Manipur) and Central Govt. (Government of India).

Any person/institution shall ordinarily be eligible to be a member of the Society on written application to the Chairmen or Member-Secretary of the Governing Body and on undertaking to observe the relevant rules and regulations of the Society as may be in force. For institutional members, only one person shall be nominated by the institution concerned as its representative.

The power to admit members shall be the sole and absolute power of the Governing Body and Governing Body may refuse to admit any person as a member without assigning any reason thereof. Subscription for the membership may be changed by the Governing Body as and when deemed necessary.

REGISTER OF MEMBERS: The Society shall maintain a register of members as per the available sections of the Manipur Societies Registration Act 1989 and such register shall be opened for inspection by members thereof.

RIGHTS & OBLIGATIONS OF MEMBERS: Any member of the Society shall have the right to:

- a) Forgo the membership after due information in writing to the Governing Body.
- b) To pay subscription (in case of subscribing members only) within the prescribed time.
- c) Defaulting members shall not be allowed to take part in any activities of the Society.
- d) Any member shall have the right to enter into the Garden free of cost throughout the year.
- e) Any member shall have the right to get any brochure books, journals, booklets or leaflets as may be published by the society from time to time along with the annual report of the Society either free of cost or at subsidized rate may be decided by the Governing Body.
- f) To submit suggestion for discussion to Governing Body on any matter.

CESSATION OF MEMBERSHIP: The membership of the Society of Governing Body shall cease on the death or resignation of such members or when the member becomes of unsound mind or insolvent or convicted of criminal offence involving moral turpitude or if the member is removed for any other reason from the membership of the Society by the State Government of India as case may be.

Any other member (in case of subscribing members only) shall cease to be a member of the Society case of default in payment of annual subscription within two months from the renewal date or as decided by Governing Body.

GOVERNING BODY: There shall be a Governing Body consisting of 10 (ten) members all of whom shall be Government Officials either Government of Manipur or Government of India or nominated by the Government. The Governing Body shall consist of the following members:

11. Additional Chief Secretary/Principal Secretary/
Commissioner/Secretary (forest & Env't)
Government of Manipur - Ex-Officio Chairman
12. Principal Chief Conservator of Forests
Government of Manipur - Ex-Officio Vice Chairman
13. Vice Chancellor CAU, Imphal
Or his nominee/representative - Ex-Officio Member
14. Chief Wildlife Warden.
Government of Manipur - Ex-Officio Member
15. Inspector General of Forest (Wildlife)
Ministry of Environment and Forests.
Government of India or his representative - Ex-Officio Member
16. Member Secretary.
Central Zoo Authority.
Government of India or his representative - Ex-Officio Member
17. Inspector General of Police(Law & Order)
Government of Manipur - Ex-Officio Member
18. Director, Veterinary & Animal Husbandry
Services, Government of Manipur - Ex-Officio Member
19. District Magistrate, Imphal West, Manipur - Ex-Officio Member
20. Director, Manipur Zoological Garden,
Imphal, Manipur - Ex-Officio Member

The Governing Body by two third majority of its permanent members present in any meeting may co-opt such other persons as member as it may consider necessary. The Governing Body may also keep some persons as standing invitees. The Addl. Chief Secretary/Pr. Secretary/Commissioner/Secretary (For. & Env't.) to the Government of Manipur, the Principal Chief Conservator of Forests and the Director, Manipur Zoological Garden, Imphal shall be respectively the Chairman, Vice-Chairman and Member-Secretary of the Society.

EXPULSION OF MEMBERS. Frequent action of any member if found by the Governing Body detrimental to the interest of the Society and is in violation of the rules and regulations of the Society, the member may be, after due enquiry, censured, suspended or expelled from the membership by the Governing Body. In that case, the Governing Body shall first serve the Member concerned with a show cause notice showing therein the charges framed and asked the member to submit statement of defense within a month. On the receipt of the explanation, the Governing Body shall have the power to take a suitable action against the delinquent member after allowing him/his case. If no reply to the show cause notice is received within a month, the Governing Body may take an *ex-parte* decision.

POWER AND DUTIES OF THE GOVERNING BODY: The Governing Body shall be the main functioning body of the Society. It shall exercise all power of the Society subject to confirmation by the General Body. The functions and power of the Governing Body shall be -

- a) To develop the forest area under the jurisdiction of the Society and other contiguous lands that may in future be made available to it, into Zoological Garden-Cum-Research Station comprising a Zoological Garden, a Research Laboratory, museum etc. together within residential quarters for the staff, a veterinary unit and accessory buildings.
- b) To sell, lease, exchange and otherwise transfer all or portion of properties of the Society except the land which belongs to the Government of Manipur.
- c) To make amend, alter, modify, cancel and remake rules and regulation for carrying out the objectives of the Society and to register the same under the Manipur Societies Registration Act, 1989 or any other law which may be applicable.
- d) To incorporate or amalgamate any cognate body or bodies, which may exist or may come into existence for furtherance of aim or objects cognate to these for which the Zoological Garden Society is formed.
- e) To frame rules regulating the entry of visitors to the Manipur Zoological Garden, Iroisemba, Manipur.
- f) To frame by-laws on any matter which are required by these regulations or by decisions arrived at in accordance with these regulations to be regulated by such by-laws.
- g) To pass accounts of the Society subject to the same being certified by the auditors.
- h) To create post necessary for the Society on the basis of expert advice of its own member or outside experts, if necessary, with the approval of the Government.
- i) To delegate to such extent as it may deem necessary, any of its power to the Chairman or the Vice-Chairman or the Member-Secretary of the

Society for the conduct of business as they may deem fit on the condition that the action taken by the Chairman, Vice Chairman or the Member-Secretary under the powers delegated by this regulation shall be place at the next meeting of the Governing Body for confirmation.

The Chairman may in writing delegate such of his powers as may be necessary to the Vice Chairman or the Member-Secretary of the Society/Director of the Manipur Zoological Garden.

- j) To prepare all business for transaction at the Annual General Body Meeting of the Society.
- k) To do all such other acts as may generally be considered necessary for achieving the above objects.
- l) To appoint sub-committees with such powers and duties as may be considered necessary or expedient.

MEETING OF THE GOVERNING BODY: The meeting of the Governing Body shall be presided over by the Chairman of the Society or in his absence by a member nominated by the Chairman. At least one meeting in each quarter of the year (once in 3 months) of the Governing Body shall be held at such place and time as the Chairman may determine.

The Chairman of the Society may himself call or request from the Member-Secretary or if a requisition is sent to him by not less than four permanent members of the Governing Body, may required the Secretary to call a meeting of the Governing Body at any time.

Any business which may be required to be place before a meeting of the Governing Body may be carried out by circulation amongst all its members and any resolution s as circulated and approved by the majority of the members singing, shall be as effectual and binding as if such resolution had been passed at a meeting of the Governing Body.

PROCEDURE OF THE MEETING: In case of difference of opinion amongst members in a meeting, opinion of the majority shall prevail. The Chairman may refer any question, which in his opinion is of sufficient importance to justify such a reference for the decision of the Government of India and/or the Government of Manipur, such decision shall be binding on the Governing Body.

Each member of the Governing Body including the Chairman shall have one vote, and if there be any equality of votes; the Chairman shall have in addition a casting vote.

Proceedings of the meetings of the Governing Body shall be recorded by Member Secretary/Director or any other member entrusted by the Governing Body in the form of minutes and such minutes shall be forwarded to (a) all members of the Governing Body (b) the Government of India (c) the Government of Manipur within a month after the meeting. Minutes of the meeting shall to be confirmed at the next meeting of Governing Body.

QUORUM AND NOTICE: At least 7 clear days notice of the meeting of the Governing Body specifying the place, time and general nature of work and business to be transacted shall be given to each member of the Governing Body. Emergency meeting may be called on 24 hours notice with a quorum for the meeting and if a quorum is not present within 30 minutes of the time, the members present may adjourn the meeting. One-third member shall form quorum for the meeting of the Governing Body.

CESSATION OF MEMBERSHIP (Governing Body): A member of Governing Body nominated by the Government of Manipur or the Government of India may resign his office by a letter addressed to the Chairman of the Society, and such resignation shall take effect from the date of its acceptance by the Chairman. Where a member of the Governing Body holds his membership (ex-officio member) by reason of his holding any office, his membership shall terminate when he ceases to hold that office.

POWER OF THE DIRECTOR OF MANIPUR ZOOLOGICAL GARDEN: there shall be a Director, Manipur Zoological Garden to be appointed by the Government of Manipur on such terms and conditions as may be specified by the Society. The Manipur Zoological Garden will act as a Member-Secretary of the Society.

The Director will work under the Chief Wildlife Warden, Manipur, and Member Secretary of Central Zoo Authority in technical matters as and when necessary. Subject to the overall control of the Governing Body, Director of Manipur Zoological Garden Society shall have the following powers:

- i) To prepare and execute plan estimates and programmes for the establishment and development of Manipur Zoological Garden and to carry on its administration and management.
- ii) To hold control and administer the properties and funds of the Society.
- iii) To receive grants and contributions and to have custody of the funds of the Society.
- iv) To prepare the annual budget estimates and revised estimates of the Society for each year and sanction the expenditure within the limit of the budget as approved by the Government of India and the Government of Manipur.
- v) To hold meetings and discussion, organize lectures and demonstration, publish popular articles, books and journals and conduct excursions collecting and studying relevant material in the field.
- vi) To draw, accept and invest the funds entrusted to the Society and use, utilize and dispose of the same in such manner as may from time be determined by the Society.
- vii) To purchase, take on lease, accept as gift or such conditions and obligations as may be agreed upon or otherwise acquire any land, building,

or any other property whatever situated which may be necessary, convenient or beneficial to the Society.

- viii) To construct or alter any building which may be necessary for the Society with the approval of the Government of India and the Government of Manipur.

DUTIES OF THE DIRECTOR, MANIPUR ZOOLOGICAL GARDEN:

- i) Subject to any order that may be passed by the Government of India in consultation with the Government of Manipur, the Director as the Principal Executive Officer of the Society shall be responsible for the day to day management and administration of the affair of the Society under the general direction and guidance of the Governing Body and its Chairman. For this purpose, he shall be in charge of the cash and will deal with the finance of the Society.
- ii) It shall be the duty of the Director to ensure that accounts are kept in proper form as laid down in the accounts rules in force or such other rules as may be laid down specially in this behalf by the Government of Manipur from time to time by executive orders.
- iii) The director shall prescribe the duties of the officers and staff of the Society and shall exercise such supervision and disciplinary control as may be necessary.
- iv) It shall be the duty of the Director to guide, co-ordinate and exercise general supervision over the scientific researches and other activities of the Society.
- ✓ v) The Director may sign all contracts on behalf of the Society.
- vi) The Director shall liaise with the Member Secretary of CZA for his assistance and suggestions in maintaining the standard of the Garden.
- vii) The Director shall seek suggestions and approval of the CWVW on technical matters including technical estimates.
- viii) Every year the Director shall prepare the revised estimates for the current financial year and budget for the next financial year by 31st August and these estimate shall be forwarded to the government of India and Government of Manipur every year by 15th September, for approval. The Government of India and the Government of Manipur may whatever necessary; modify such estimates in consultation with each other before approval.

FUND: The Society shall have the following funds to be called:-

- i) The Manipur Zoological Garden Society fund.
- ii) Manipur Zoological Garden Development Fund

Provided that the Chairman of the Society shall be empowered to approve any new fund for new schemes. The prevailing system of funding by the state government towards payments of staff salaries and taking-up other development works including feeding shall continue.

To supplement the funding from the state government all fund received by the Society by way of grants, donations, bequests, endowment or loans or other account whatever form any source other than the Government shall be credited to the Manipur Zoological Garden Society Fund. All funds received from the Central Government in the form of grants, subsidy, loan, CDDA, LOC, or in any form or on any account whatsoever, shall be credited to the MZG Development Fund. All expenditure incurred by the Society shall be paid out of the Manipur Zoological Garden Development Fund and the Government in the Manipur Zoological Garden Society Fund.

The Banker of the Manipur Zoological Garden Society shall be the State Bank of India. All funds shall be paid into the Society's accounts with the State Bank of India and shall not be withdrawn except on a cheque signed by Member-Secretary/Director of the Manipur Zoological Garden and any other member(s) as empowered by Governing Body.

ACCOUNTING YEAR: The Accounting year of the Society shall be from 1st April to 31st march

AUDIT: The accounts of the Society shall be audited in May every year or as soon thereafter as possible by a Chartered Accountant to be appointed by Governing Body from the panel approved by the Government of Manipur and/or C & AG.

The audited accounts with Audited Reports shall be place and considered in the meeting of the Governing Body. Copies of these accounts and audit report together with Governing Body's comments thereon shall be submitted to the Government of India and the Government of Manipur not later than 31st December every year.

GENERAL BODY MEETINGS: The General Body is the policy making body. The Member-Secretary shall call the Annual General Body Meeting once in a year by giving 15 days notice. Attendance of one five members present at the meeting shall constitute the quorum. At the annual general body meeting of the Society, the Society shall place for approval.

- a. An administrative report on the activities of the Society since the last General Meeting.

- b. The balance sheet and the audit report with the audited accounts of the Society for the period in respect of which audit has been completed.
- c. Future strategy/plan on the activities of the Society.
- d. Any other business that may be brought forward for discussion in the meeting with the approval of the Chairman.

DUTIES OF OFFICE BEARERS:

Chairman:

- a. He/She shall preside over all meeting of the Society.
- b. Take all disciplinary action such as removal, dismissal etc. in consultation with the Governing Body, in such cases of Group A and Group B staffs.
- c. The Chairman shall have authority to periodically the work and progress of the Society; to order enquires into the affairs of the Society and to pass orders, recommendation of reviewing or inquiry committees.

Member-Secretary:

- a. He/She shall convene all meeting of the Society.
- b. Maintain Minute Books of all Meetings.
- c. Issue General Circulars and notices.
- d. Take all disciplinary action such as removal, dismissal etc. in consultation with the Governing Body in case of Group C and Group D staff.
- e. Sign on behalf of the Society all receipt for all such receipts as subscription, etc.
- f. Receive all applications for membership of the Society, which shall be placed before the Governing Body.
- g. Sign and give pay order on bill for payments.
- h. Transact all other business subject to the direction of the Governing Body.
- i. He/She shall collect and receive all sorts of subscription, donations and deposit of money and grant receipt thereof and
- j. Maintain and keep cash book and other accounts, which are necessary.

SUIT & LEGAL PROCEDINGS: For the propose of the Societies Registration Act, all suits and legal proceedings by or against the Society shall be in the name of the Society

ALTERATION OF RULES AND REGULATIONS: The rules and regulations may be altered, modified, rescinded or added to by special resolutions passed in the Governing Body Meeting called for the purpose by three fourth majority of

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the members of the Society. The Governing Body shall have powers to make alter, modify or rescind such by laws rules as may be considered necessary in the interest of smooth functioning of the Society.

By Order & in the name of the Governor

Sd-

(Saichhuana)

Additional Chief Secretary (Forests & Env't.)
Government of Manipur

Memo No.57/31/2003-For & Env't.

Imphal. The 31st December 2004

Copy to:-

1. Secretary to his Excellency the Governor of Manipur
2. Secretary to his Hon'ble Chief Minister, Manipur
3. PPS to Hon'ble Minister (For & Env't), Manipur.
4. PS to Chief Secretary, Government of Manipur.
5. The Vigilance Commissioner, Government of Manipur.
6. APS to Addl. Chief Secretary (For & Env't), Government of Manipur.
7. The Additional Director General of Forests (WL), Government of India, Paryavaran Bhawan, CGO Complex Lodhi Road, New Delhi-110011.
8. The Member Secretary, Central Zoo Authority (CZA), Bikaner House, Annexe-vi Sahjahan Road, New Delhi.
9. The Principal Chief Conservator of Forests, Government of Manipur.
10. The Additional Principal Chief Conservator of Forests/Wildlife, cum Chief Wildlife Warden, Government of Manipur.
11. The accountant General, Manipur
12. All Ex-Officio Members of Governing Body of Manipur Zoological Garden, Manipur.
13. The Director, Printing & Stationary, Govt. of Manipur for Publication in the Gazette.
14. Treasury Officer.
15. Guard File.

(N Kipgen)

Special Secretary (Forests & Env't.)
Government of Manipur

ANNEXTURE-3

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20/4/13



Ministry of Environment & Forests
Government of India
New Delhi



जहाँ है हरियाली।
वहाँ है खुशहाली।।

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
Central Zoo Authority

THROUGH REGISTERED POST

F. No. 19-58/93-CZA(190)(Vol. III)(M)/2579

DATE: 11.04.2013

To

The Director
Manipur Zoological Garden,
Imphal (Manipur).

Sub:- Master Plan of the Manipur Zoological Garden, Imphal.

Sir,

The Master Plan of the Manipur Zoological Garden, Imphal was scrutinized by Expert Group on Zoo Designing of the Central Zoo Authority in its Meeting held on 01.03.2013 and recommended for approval. Same was placed before 65th Meeting of the Technical Committee held on 22nd March 2013 and approved the Master Plan of the Manipur Zoological Garden, Imphal subject to the condition that:-

- (a) the responsibility of mobilizing the financial resources for implementation of the Master Plan will be the sole responsibility of the State Government or respective Zoo Operator, and
- (b) the State Government or respective Zoo Operator should quantify the resources available for the implementation of Master Plan.

In order to send you a copy of the duly signed and approved Master Plan of the Manipur Zoological Garden, Imphal, you are requested to submit final version of Master Plan (three copies) which should contain the signatures with stamp of the Chief Wildlife Warden, Manipur and Director, Manipur Zoological Garden, Imphal and any other documents relevant to Master Plan and incorporating copy of this letter too.

The soft copy of the digitized and amended Master Plan in any of the format i. e. AUTOCAD/ COREL DRAW/JPEG/TIFF/PDF files on a CD/DVD may also be submitted to this office at the earliest for uploading in website.

Yours faithfully,

(B. S. Bonal)

Member Secretary

Copy for favour of information & necessary action to the Chief Wildlife Warden, Government of Mizoram, Aizawl.

Handwritten notes: "copy of signature" and "20/4/13" with initials.

(B. S. Bonal)

Member Secretary