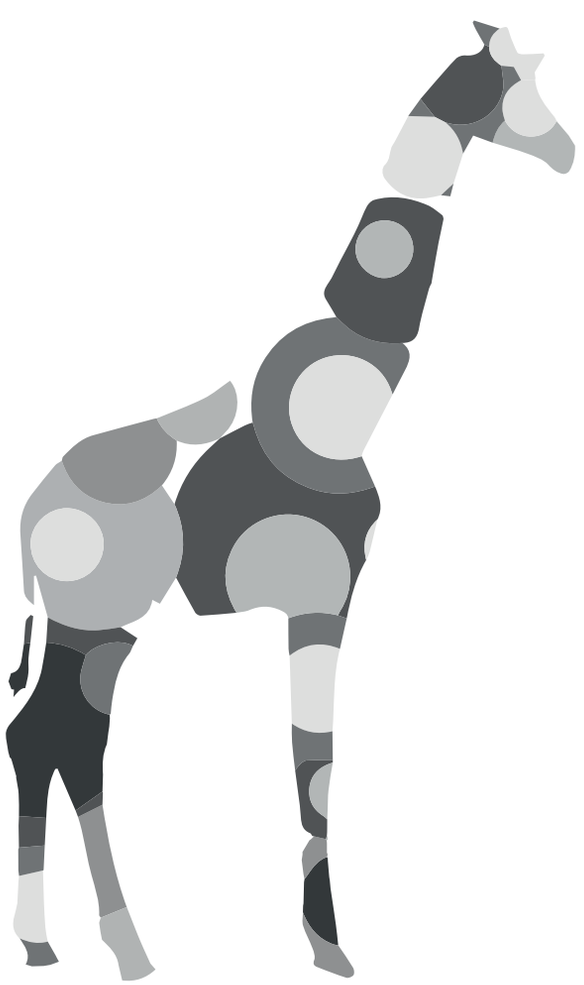
The Future Zoo

Developing a method for sustainable exotic wildlife exhibition within the urban environment



Pim de Haas

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the future zoo

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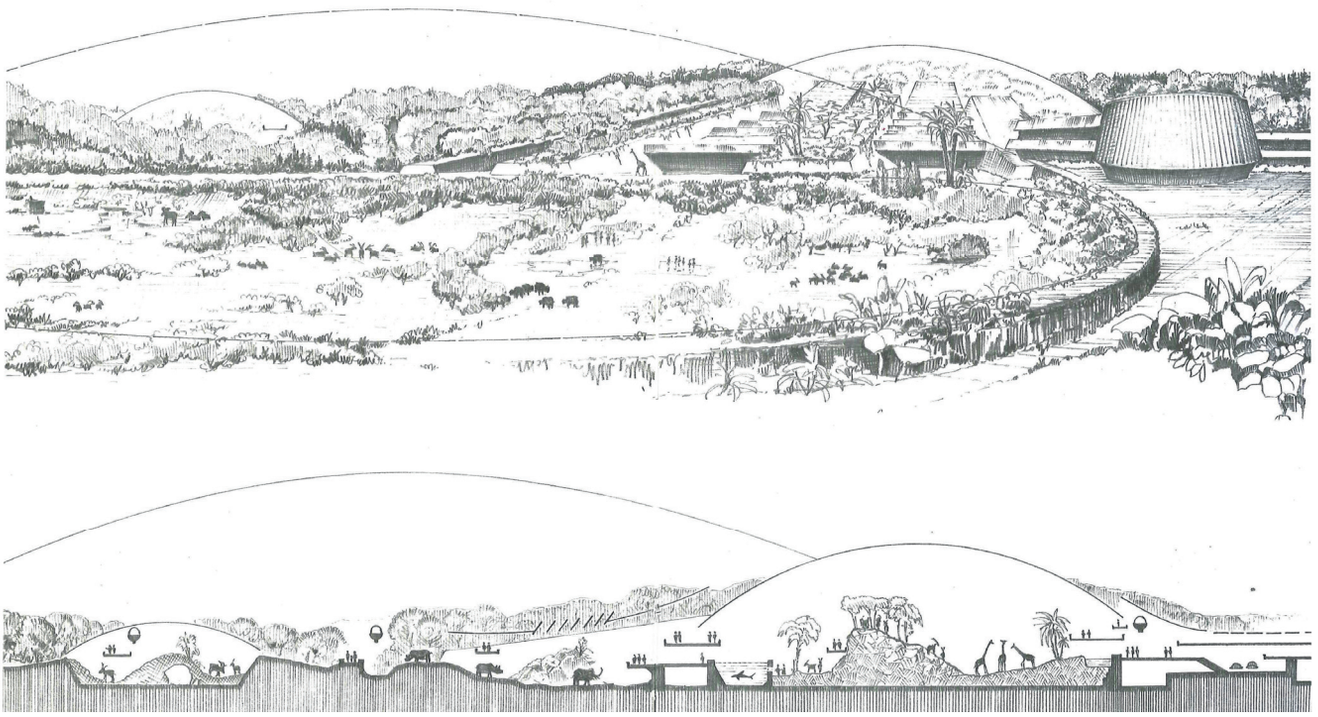
Adam and Eva in the Garden of Eden,
by Peter Wenzel



sketch by Raymond Moriyama for
future Toronto Zoo 1968

Preface

Being very fascinated by zoos and exotic wildlife, my starting point for this thesis revolves around how the zoo can have a sustainable place in our urban environment against the growing welfare concerns present in our society. Zoos are both loved and despised by people. Loved for their ability to bring people closer to exotic wildlife and despises for the ethics of keeping exotic animals in captivity. The existence of zoos is more and more challenged by for instance the 'Partij voor de Dieren' or Party for Animals, currently holding 5 seats in the Dutch parliament, calling in their election program the ban of all zoos in the Netherlands since animals should not be used for entertainment. In Argentina, the Buenos Aires government has announced that it will close its zoo after 140 years since 'captivity is degrading'. Today a zoo can be found in almost every big city, but will this be the same in the future? Although many people regard them as a primary recreation attraction, modern zoos are also valuable conservation, education, and research centres.

My thesis focusses finding a method for sustainable exotic wildlife exhibition within our urban environment, by a case study on the Rotterdam Zoo. This thesis researches what needs to change adapted or implemented to make form the current zoo and future zoo, a place where urban life and exotic wildlife can come together. The end results of this research hope to achieve are a tool to evaluate zoos and following from this guidelines and advice on how exotic wildlife can be exhibited within our cities with great regards to animal welfare. By the design case study in Rotterdam Zoo, I hope to test and prove how these guidelines will work spatially. I hope that this sustainable future zoo will you provide your inspiration on the interaction between wild animals and the city.

Zoos have the marvelous potential to develop a concerned aware, energized, enthusiastic, caring, and sympathetic citizenry. Zoos can encourage gentleness towards all other animals and compassion for the well-being of wild places. To help save all wildlife, to work towards a healthier planet, to encourage a more sensitive populace: these are the goals for the new zoos

- David Hancocks (Maple & Perdue, 2013)

Content

Figure 1 Me and my family at the zoo in 2005, by collection author

Figure 2 Trip to the 'world famous' San Diego Zoo, by collection author

Personal interest

The natural world has always been of great appeal to me, especially the wild exotic animals. Unfortunately, here in the Netherlands monkeys, giraffes, elephants and lions don't roam around on the Veluwe so I could go spot them. Luckily there is the zoo, a place that can give you a glimpse or sometimes almost transfer you to these far-off places of natural beauty and wildlife.

My appreciation for zoos already started as a child as be seen in *Fig 1*. Growing up in Arnhem on a nearby Burgers Zoo I visited the zoo regularly. On Sunday morning, I frequently went with my father to the zoo. As my father is a volunteer guide at the zoo I often listened to the stories he told about these wild animals and exotic nature.

Over the courses of years, I have been in lucky to observe the real wild jungles, savannas and deserts and have seen zoos in many countries on different continents from variety quality, in the meantime establishing a collection of zoo maps, guide books and flyers of these zoos. Allowing me to have a broad frame of reference, having visit many zoos in the Netherlands multiple times as well as zoos all around the world, such as San Diego Zoo *Fig 2* , Singapore Zoo and Buenos Aires Zoo. Within time of this thesis field-trips and observations have been done in Burgers Zoo, Diergaarde Blijdorp, Artis, Ouwehands Dierenpark, Wildlands Adventure Zoo, Parc Zoologique de Paris de Vincennes, Bioparc de Doué la Fontaine, Praha Zoo, only now looking at this zoos through new perspectives.

Growing a fascination for how they world and inter-react and how they are build and design. Following to the which of designing a zoo or exhibits, first as a child with just wooden blocks and playmobile but later with making some small designs on paper ultimately encouraging the wish to plan and design which brought me here to Bouwkunde.

But the architecture of zoo is often overlooked under-appreciated within the field of architecture nowadays, invisible architecture almost. As are the connections between the zoo and the urban environment. With the project of the future zoo, I want to use and expand the knowledge about the zoo and the urban environment and how they interact and find a way how the zoo could be a part of urban life for the next 50 years. So, that other people again like me can be amazed and educated by elegance of the natural world from faraway places near to their home. Creating places where wild animals and people can come together.

Chapter 1

Introduction research

1.1 Introduction

A trip to the zoo is a wonderful experience for young and old. The excitement of observing exotic wildlife up close or the warmth and enjoyment one feels when seeing young animals play with each other or only two of the many emotion one can encounter when visiting a zoo (Balk, 1982). Zoos are the connection between are human urbanized environments and (exotic) nature within the city. In an urban human world that is more and more detached from the wild. Zoos are "an open window to nature" as the director of the Copenhagen zoo stated.

Zoos are the bridge between exotic nature and the city or urban realm. Zoos can offer the people a tour around the natural world and can give people a taste of exotic natural places they are probably never able to visit themselves. In this way zoos can create, besides a nice day-trip, an awareness of these often-endangered places with the public and encourage protection, conservation and educate the public about far away ecosystems (Tribe, 2004). Expanding the knowledge and interest of the natural world by the public like nothing else can do. Further zoos are a place for all people, regardless of culture, income, education, age, gender, etc (Tribe, 2004). As a place for culture, education, research and recreation they play an important role in a cities or regions tourism and leisure industry. But the ethical question, objectives and manners of captivity raise question about the future of the zoo, especially in the urban environment.

People coming in close contact with wildlife in the Sydney Zoo, by John Gollings

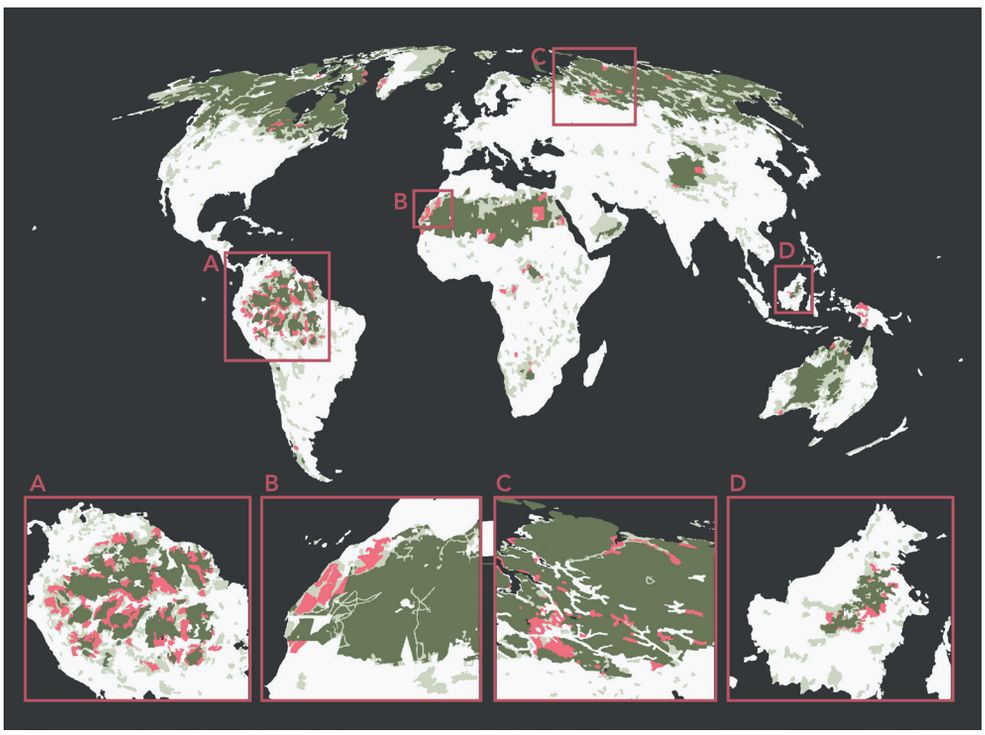


Figure 3 Change in the distribution of wilderness since the early 1990s, source Current Biology

1.2. Need for change

The main development that the zoo will need to adjust to is the increasing criticism on animal captivity. The human relationship with other animals symbolises many aspects of the links between humans and nature (Reiser, 2017). In recent decades, the relationship society has towards nature, biodiversity and animals has been shifting. Though to increase in knowledge and understanding of nature and global processes such as globalisation, mass consumptions effects on the food industry, climate change, land use and land cover change, deforestation and desertification have a disputative impact on plant and animal's life (Keulartz, 2015). As seen in *Fig 3* the only very inhospitable places like desert and tundra's have been untouched by humans and are still wilderness. Although this wilderness is decreasing. The awareness of these trends with the public have brought the way humans think about treating other animals more and more in to question in our western society. This includes the caging of animals in zoos for variety of reasons such as conservation, education, research and entertainment.

1.2.1 Loss of the wild

Besides the pressure from human society onto the zoo there is also pressure form nature onto the zoo. The magnitude of our human influence on the natural environment of wild animal form bio invasion, habitat fragmentation, biodiversity loss and climate change is enormous. Therefore a more proactive and interventionist strategy is needed (Keulartz, 2015). The zoo could and should play in species conservation under threat by us. 'Captivity for conservation' could be an ethically acceptable goal for the modern zoo is being argued (Keulartz, 2015). This becomes evident in publications form the Living Planet Report published by the World Wildlife Fund in 2016. As visualised in *Fig 4* since 1970 our planet has lost 58 percent of its total vertebrate animals. In this period

Deforestation in Borneo for palm-oil-plantages has a catastrophic impact on the existing ecosystem, by M. Klum

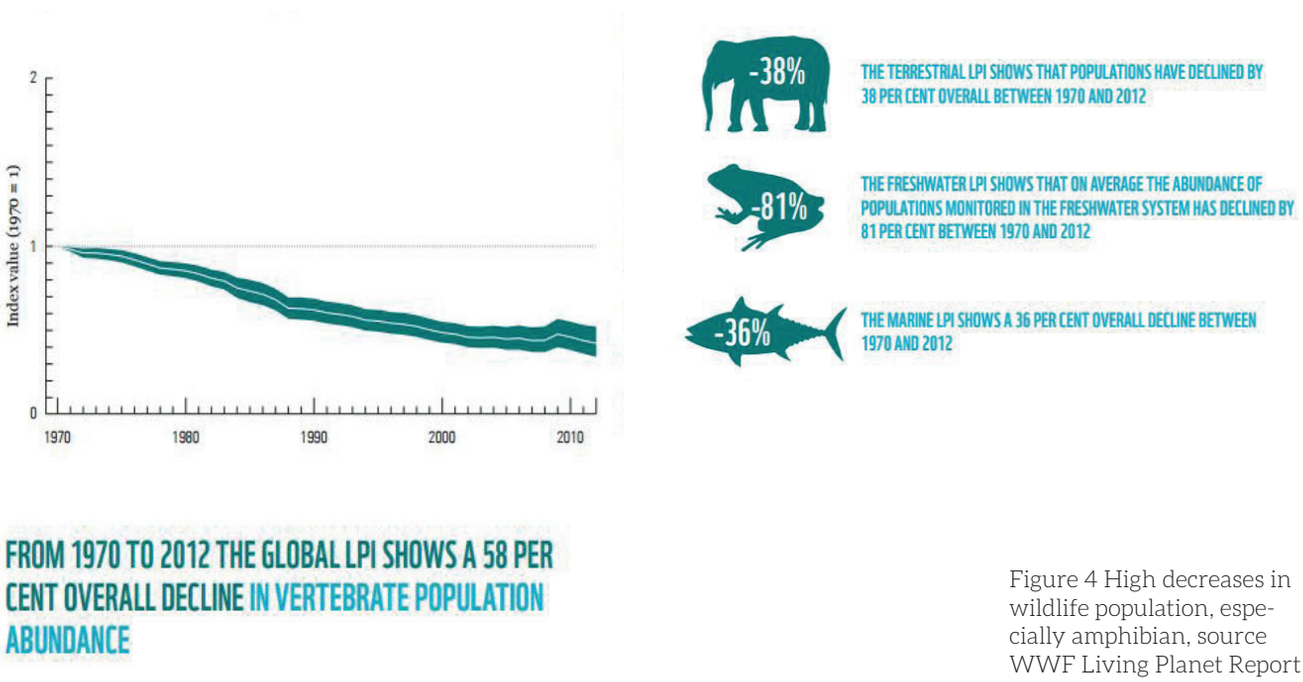


Figure 4 High decreases in wildlife population, especially amphibian, source WWF Living Planet Report 2016

there has been an average decline of 2 per cent and there is no sign yet of that this rate will decrease. The strongest decline has been observed with the freshwater species, since their habitats have been strongly influenced by our human presents (WWF, 2016). The zoo could play a key role in preserving, protecting and be an insurance for the ecosystems on the planet.

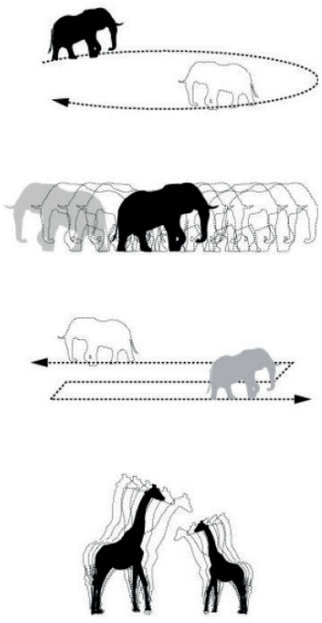


Figure 5 Signs of zoochosis by different zoo animals, by Chutchawanjumrut

1.2.2 Zoos are prisons

But there is also increasing opposition to exotic wildlife captivity, regardless of the circumstances. Especially the inability of zoos to for fill the needs of their animals to express the important aspects of their behaviour, lacking sufficient space or social structure may lead to 'zoochosis'. The symptoms of 'zoochosis' arise by zoo animals under conditions of stress, depression, frustration and boredom. Signs of 'zoochosis' by animals indicate that a zoo is neglecting or have been unable in their attempts to enhance the animals physiological and psychosocial welfare (Chutchawanjumrut, 2015). Examples of repetitive 'zoochrosis' behaviour can be seen in *Fig 5* and *Fig 6*.

Originally wild animals face many challenges in captivity. The artificial environment of the zoo can sometimes not offer the choice and varieties of behaviour to them. Leading to an animal feeling bored, frustrated and stressed. As a result of this animals may develop stereotypic behaviour that is both compulsive and unnatural (Chutchawanjumrut, 2015). Zoochosis is in believed to be a brain dysfunction that is the result of stress.

Besides stress there are several other factors that can bring about stereotypical behaviour of zoochosis. Most importantly, the few stimulations, enrichment or opportunities to hide form the view public in their artificial environments. Most often the exhibits don't facilitate in their species-specific behaviour needs. Also, the generalization of animal's behaviour of a species don't that the individuality and personal needs of the animal in to account. All animals are different, with different, backgrounds, temperaments and personalities. Sometimes a zoo might for full the species-specific needs but not the individual animal ones, which creates a decrease in the welfare of the individual animal. To what extend and with which reasons is part of an ongoing ethical debate with the society.

Figure 6 Repetitive behaviour types, by Chutchawanjumrut

1.2.3 Societal debate on animal welfare

In the animal welfare debate different two different points of view prevail, the animal rights view and the conservationists view.

Best organised and mostly vocally active are the groups that view animal captivity as ethically wrong such as PETA and the Born Free movement. First, these groups have the opinion that keeping animals in captivity is wrong as seen in one of their anti-zoo campaign posters *Fig 7*. Animals have not enough space, can't preform and experience wild behaviour and are constantly under boredom and frustration about their captive situation. In addition, these groups have the opinion find that zoos do little to nothing beneficiary for conservation, education and research on animals (Foundation, 2017; PETA, 2017). They debate on a foremost individual animal welfare level rather than an overall species approach. In the 'Partij voor de Dieren' or Party for Animals, currently holding five seats in the Dutch parliament (150 seats), called in their last election program for the ban of all zoos in the Netherlands since animals should not be used for entertainment (PvdD, 2016).

Next to these animal's right view is the animal welfare view which is not as strong mobilised as the previous view. This view states that holding animal's captive can be ethical if it is done for the right reasons (conservation, education and research) and that the animals being held captive get the optimum opportunities to live a life as if it was in the wild. Especially on conservation they find it ethical to hold some animals in captivity of it can safeguard the species as a hole, even though it may lead to lower welfare of those individual animals. This view of animal conservationist is most clearly advocated by the different larger high standard zoos associates (EAZA, 2017a, 2017b; NVD, 2017) and by famous and largely respected wildlife conservationists and researches such as Frans de Waal and Jane Goodall.

In the debate on the ethics of wildlife captivity them doesn't seem to be a compromise possible, because of their so different starting points of their perspectives. Which seems contradictory since both views want the best for the animals both in zoos and in the wild. As the great stresses on 'wild 'nature are still increasing this thesis finds it ethically viable to hold wildlife in captivity for educational and conservation purpose to save the species as long as the methods of captivity guarantee the highest level of animal welfare., following the conservationist viewpoint.

1.3 Perspectives for future zoo

Nowadays in our western society our perception of wildlife captivity is changing. Resulting in an increasing criticism on zoos. Questioning what the function of the zoo in our modern society is? Forcing zoos to rethink their position. Why it should be in the city, which so limited space available for the animals. Most of all if it is ethical for zoos to even keep animals in captivity and how their welfare is ensured. Meanwhile with the loss of biodiversity all over the world, zoos are increasingly becoming Noah's Arks in our world. These changing circumstances raise the question if there will be a zoo in 50 years in the urban environment? Will this historic institution close or have found new or different meaning and validation within our urban environment?

Figure 7 Anti-Zoo campaign, by PETA

The main goal of this thesis is to develop a (future) Zoo Evaluation Tool (ZET) to identify the performance of a zoo on several aspects and formulate guidelines and design principles for the future zoo. This will be done through an analysis of the zoos objective, urban fabric and layout in chapter two till five. The ZET formulated in out of the synthesis form the analysis in chapter six. The ZET will be applied and tested in a case study design for the future Rotterdam zoo in chapter seven.

Focus points will be how the different objectives of the zoo (education, recreation, conservation and research) in the future will be incorporated and spatially manifested. What the layout of the zoo will be and how the animals and plants will be accommodated. Lastly what will be the place of the zoo within the urban fabric and searching for new opportunities through the analysis and design process.

Research into the future zoo needs to be undertaken because the current zoo is under increasing pressure which may prove a new way in the development of this urban institution or the end of its existence.
The zoo is an interesting place within our urban environment, being a complex system of various interdependent and contradicting elements.

The zoo can be understood on a spatial, social and mental level. Spatially one can see the zoo as a collection of buildings and exhibits in which humans keep animal. Socially we can understand the zoo as a place within humans interact with animals and each other in the urban environment. on a mental level the zoo plays a role within our society a reason for keeping the animals. overtime the way the layout, urban connection and role of the zoo has changed and developed to contemporary zoo.

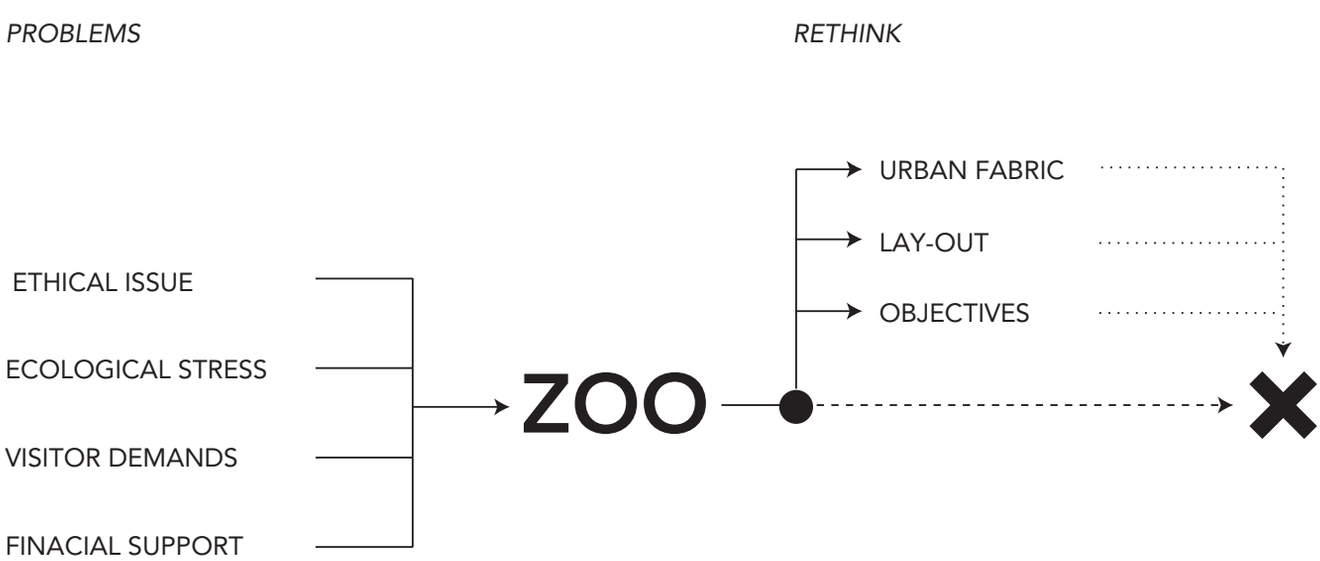


Figure 8 Problem statement scheme, by author

1.4 Problem Statement

As previously mentioned ethical issues and ecological stress demands put increasing pressure on the objectives of the zoo, the lay-out of the zoo and viability within our urban fabric. But also changes in visitor demands and the decreasing in governmental financial support bring up the need for zoos rethink and transform themselves or otherwise possibly face closure *Fig 8*. The zoo has been part of our society a very long time and has established a strong position within the urban fabric of cities, cultural, education and recreational infrastructure. It is therefore important to find a new method of exhibition wildlife within our urban environment.

The future zoo will need to tackle in how to be economically feasible and thereby properly how recreation is going to be manifested within and surrounding their institution. Attracting enough visitors to accomplish it's educational, conservational and research goals. Meanwhile answering to zoo critics about the welfare of the animals.

On one hand, if we want the zoo to have a focus conservation of endangered species and as a place for research, zoos will need probably a lot more space, something which is a scares resource within the city. Pushing the zoo out of are urban environment to places where sufficient land is available but weakening the connection between exotic nature and the urban life. On the other hand, if the zoo develops towards a centre for education and finds new ways of combining the people with exotic wildlife a position within the urban environment is probably preferred.

Challenge for zoos today is to transform themselves into future wildlife institutions enjoyable for both animal and visitor meanwhile having a viable place within the urban environment. In other words, what is the sustainable method in the future for exotic wildlife exhibition within the urban environment?

1.5 Research goal

The main objective of this research will be describing a method for the sustainable exotic wildlife exhibitions within our urban environment. Therefore developing a tool to evaluated and describe (future) zoos based on different components. By making use of this tool guideline and design principles for the future zoo are formulated, which are shown and tested with a case study design for the future zoo in Rotterdam.

The future method for sustainable exotic wildlife exhibition should allow animals a stress-free, exciting environment as close to their original habitat as possible all the time. So, they no longer should suffer from physiological and psychological problems.

Furthermore, zoos should better connect with the urban environment together so that they can be mutually beneficial towards each other. The future zoo should truly be conservation centres with a strong role of education of the public and research. Apart from creating the facilities to maximize the breeding capacities of the endangered animals, they should also try to make the first steps of reintegration of animals into the wild.

These requirements for a future zoo need to be fitted within a framework which can make the future zoos economically feasible, leisure and recreation will most probably be key in achieving this. For developing a future method of sustainable exotic wildlife exhibition, the objectives, urban fabric and lay-out of the zoo will need to be revised.

1.6 Research Questions

To achieve these goals the following main research question must be answered

"What is a method for sustainable future exotic wildlife exhibition within our urban environment?"

The following sub-questions help to answer this question:

1. What are the reasons and methods for the exhibition of exotic wildlife in our western society and how have they developed?

2. How can we describe zoo based on different basic elements and function of the zoo and its urban environment?

3. What are future potential of the zoo in our urban environment?

To understand the future of the zoo must be aware of the origin and development of exotic wildlife exhibitions, leading up to the formulation first sub-question. Insights given can help to give context or identify background information for the further research. When there is understanding of the development of the zoo it is important to study the different elements and connections the zoo and its place within the urban environment. The second sub-question tries to do this and thereby aims to pose design guidelines for the future zoo and the urban environment it is in. Lastly current trends, opportunities and threats need to be diagnosed and discussed as will be done by sub-questions three and four to embrace the futuristic perspective within the research and design proposal.

Main Research Question: – *What is a method for sustainable future exotic wildlife exhibition within the urban environment?*

Question	Method	Output	Goal
What are the reasons and methods the exhibition of exotic wildlife in western cities has developed?	Literature study Mapping and analysing the developments in different zoos in history in the Netherlands *(looking at menageries, bear pits, circuses, zoos, children farms)* *(comparing map zoo/ exhibit in different role/style periods)*	Paper reviewing the reasons and methods of wildlife exhibition within the city Overview of different types of exotic wildlife exhibitions	Describing the zoo as a type has developed and what influenced these developments Finding out how the exhibit for animals has developed and what were courses of these developments.
How can we describe zoos nowadays based on the different basic elements and functions of zoo in its urban environment?	Literature study Semi structured interviews with experts on the field of urban planning, leisure industry, zoo industry etc. Comparative study between different zoos in the Netherlands Mapping different elements within a zoo, like exhibits, paths, food drink, shops etc. Analysing different elements between different zoos, like layout, entertainment, number of species, type of species, education, research and conservation etc. Analysis of space and welfare of different types of captive animals	Model that describes the interrelations between a zoo and the urban environment Categorisation of different zoos Rating major western European zoos according to different topics/functions Developing (design) guidelines how leisure and the zoo - urban environment context can be the most beneficial of each other Framework or model with the core design guidelines of an (future) zoo Design principles for keeping animals in captivity Framework of different types of animal captivity and how they are viewed and socially accepted. Related to wellbeing of the animals	Finding out how the zoo and the urban environment related to each other Describe how the zoo and the urban environment can better benefit from each other using urban flows of people, knowledge, food, waste, water etc. Categorise different types of zoos Develop a balance between research, education and conservation of captive animals and the leisure industry Finding out the core elements a zoo is based on Developing guidelines a future zoo should be based on to create the optimal environment for animals, people and the city *Reflect on how are western European society related towards animals in captivity* *Describe how changes in the attitude towards the exhibition of exotic wildlife influence the zoo typology* *Finding out what the optimum way is for keeping exotic wildlife in captivity within urban environments in western Europe*
What are potentials for the zoo in our future urban environment?	Literary study Different scenario creation Analysing future zoo and urban trends	Different scenario for how the zoo may develop in the next 50 years	Developing creative, new and out of the possibilities of urban in combination with exotic wildlife exhibition

Main research zoos: Artis (city centre), Blijdorp (urban), Burgers Zoo (edge),
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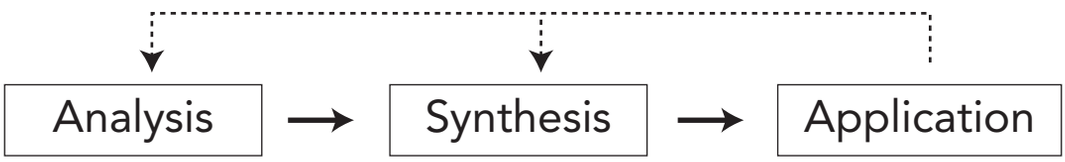


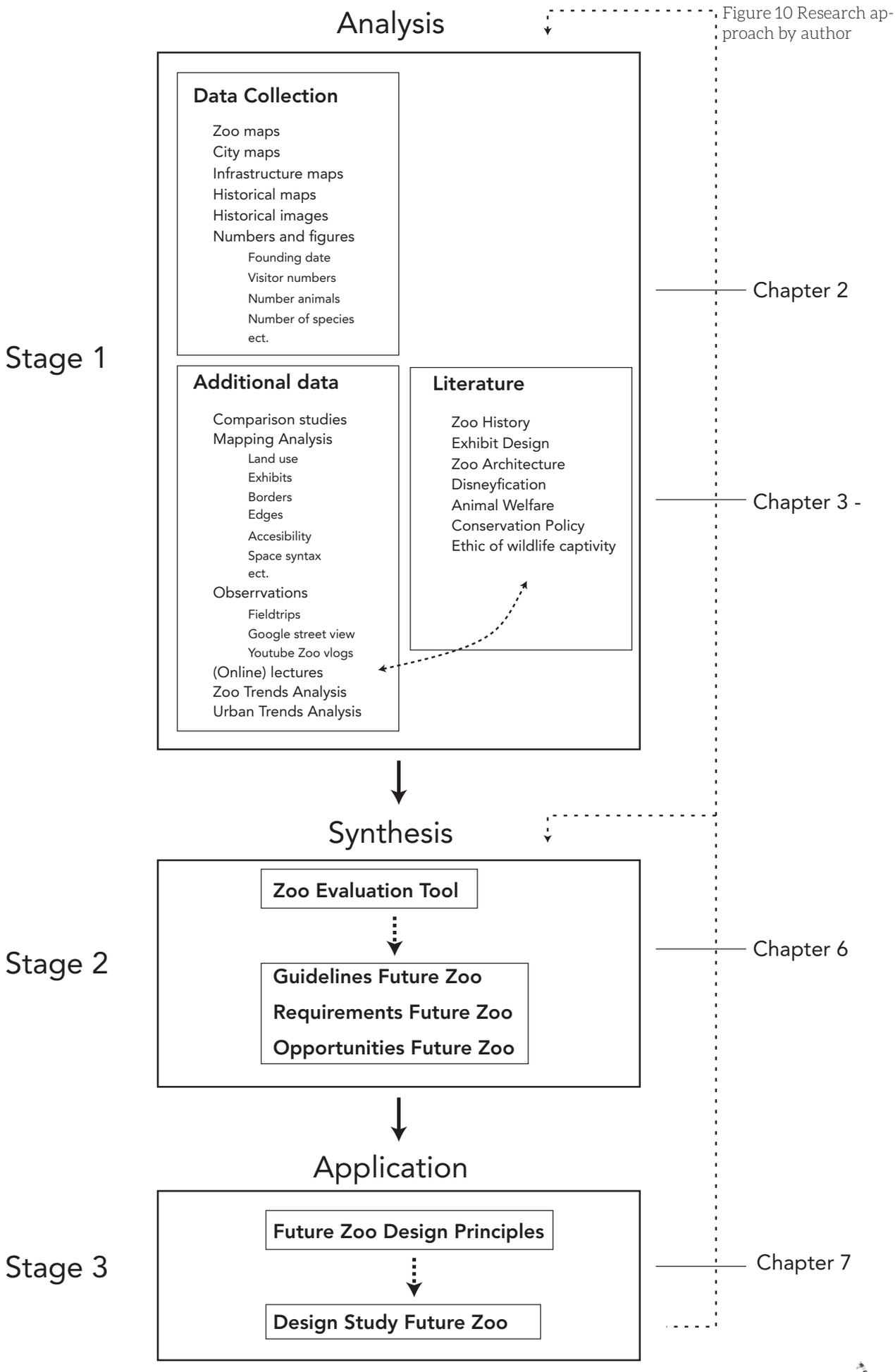
Figure 9 stages of research
by author

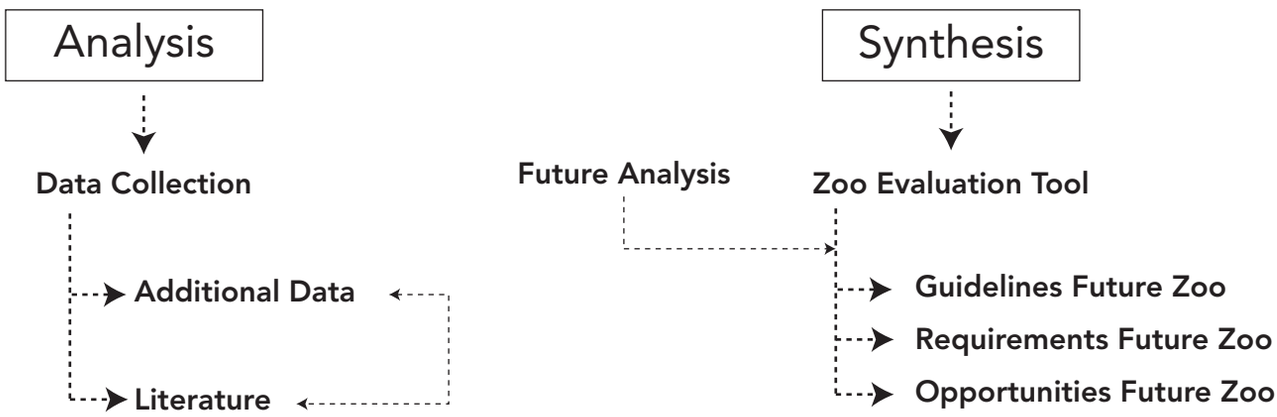
1.7 Research approach

The research approach of this thesis follows research- design and research by design approach with a clear research question and goal that needs to be accomplished during the research process. Starting point is understanding the zoo and its characteristics. The research tries to achieve the explanation of this urban element by using relevant methods of data collection and analysis in an integrated manner with the help of classification and typology study. Furthermore, this research attempts to develop and use a Zoo Evaluation Tool (ZET) as catalogue that informs on the position of zoos currently and zoos that are being designed. The design proposal is tested for its spatial interventions adhere to the requirements and guidelines intended by the ZET.

In the research processes consists of three stages: analysis, synthesis and application (*Fig 9* and *Fig 10*), the central focus of the research are the larger zoos in the Netherlands. Although in certain analysis, trend and comparisons studies the context of larger western European zoos has been looked at or world class zoos. Prominent in this research is the relation the zoos have with the urban position and urban fabric. In the first stage, which corresponds with the analysis, involves the collection and analysis of data and material and lose a literature study. The second stage, the synthesis, the collected information from the analysis stage will be used to develop a Zoo Evaluation Tool, further the analysis and model will then be used to formulated guidelines for the Future zoo. In the last stage, the application, the guidelines will be transformed into Future Zoo design principles, which will then be implemented in a design study.

Figure 10 Research approach by author



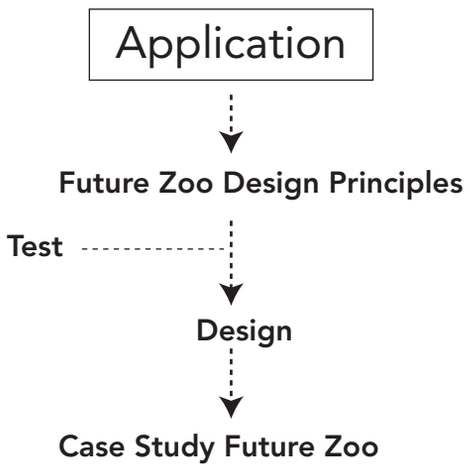


1.7.1 Analysis

The Analysis stage consists of three segments. The first segment was the starting point of the research by collection existing material in form of spatial data, numbers and figures. This desk analysis of data collection consisted of information on zoo, city, infrastructure and historical maps, historical images of zoos and collecting numbers and figures concerning zoos such as founding dates, annual visitors, number animals in a zoo etc. Based on these, further analysis was done in the second segment. Here additional data was gathered by doing comparison studies, mapping analysis, observations, (online) lectures and trend analysis. From these analysis qualitive characteristics of the future zoos objectives, design and urban relation could be made. The third segment in the analysis stage was the Literature study on to different fields that have a relationship with the future zoo. Literature studies have been done in Zoo History, Exhibit Design, Zoo Architecture, Disneyfication, Animal Welfare, Ethic of wildlife captivity and Conservation Policy. From the literature study the gathering of additional data was instigated and vice versa.

1.7.2 Synthesis

The Synthesis stage of the research knowledge and conclusion reached in the previous analysis are formed in to a Zoo Analysis Model. From this Model zoos can be compared to each other and conclusion can be drawn on how they list on different fields. further by combining the analysis and the model guidelines, requirements and opportunities for the future zoo can be established.



1.7.3 Application

In the Application stage guidelines, requirements and opportunities are made spatial in Design Principles for the Future Zoo. These design principles are indications of spatial measure a zoo can undertake to develop towards a future zoo. By using the Zoo Analysis Model for the case study zoo and the desired future zoo there can be identified were changes need to be made. In a case study the guidelines and design principles will be tested to see indicate how the future zoo in the urban environment might appear, and if it is able to deliver on the demands. Findings form the case study may reveal a further need for analysis or specification to the guidelines and the model. As location for the case study the Rotterdam Zoo has been selected, being a zoo within the urban environment, with strong historical links with the city of Rotterdam and also being the most visited zoo in the Netherlands.

1.8 Understanding zoo 'space'

The zoo as a 'space' can be understood in various manners. Within this thesis 'space' interpreted as done so by Ed Taverne Henri Lefebvre and Edward Soja. They argue that there are three approaches to space; first space, second space and third space (Lefebvre, 1991; Soja, 1989; Taverne, de Klerk, Ramakers, & Dembski, 2012),. First space is the physical space, spaces that are measurable and mappable. Second space is the mental, concept or conceived space which follows form are thinking and ideas. The third space is the social space or lived space which is a social product that is a space created by society.

Within the zoo context of space first space has been identified as the spatial layout of the zoo. Second space as the objective the zoo within its space is achieving. Third space is regarded as the urban fabric of the zoo and the interactions between human and animal, zoo and city.

1.8.1 First zoo space

Spatially a zoo could be understood as a collection of different enclosure for keeping exotic animals. The 'cage' in which animals have been kept have is a dynamic entity that has has had and still has many different forms changing over time influenced by animal welfare, public expectations and goals of the zoo. Single barred cages in the 18th century have developed in immerse exotic exhibits where humans sometimes are more encaged than the animals nowadays. Besides the single 'cage' of an animal it's is the collection of exhibits that make the zoo a zoo, the exhibits, buildings, landscaping and layout together form the zoo typology.

How we treat other being can tell a something about have we treat each other within a society. Analysing exhibits, buildings, landscape and layout/ maps can tell us something about our relationship with nature and wildlife over time and how we value them in our society. The zoo layout and buildings can also tell us something about us as a society and what we like to see and do.

1.8.2 Second zoo space

The capture of exotic wildlife and caring for them is a difficult undertaking. Wildlife collections ask a lot of resources and effort to maintain. Doing this always achieves some form of goal either for a person or the society. Understanding the reasons and objectives of the establishment and maintaining of a wildlife collection, is to understand also our society and its human-wildlife relation.

1.8.3 Third zoo space

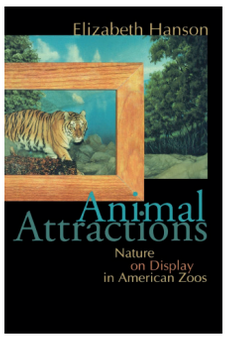
The zoo and the urban environment have strong connection to each other. As the first societies and cities emerged, so did the first forms of zoos.

Nowadays, the zoo is the central place within our urban environment for the viewing of life exotic wildlife. It is a place where people and animals encounter one other. Especially, in are increasingly urbanised would where the distance between the 'human' city and 'wild' nature seems to ever increase, the zoo offers unique possibilities but limitations as well.

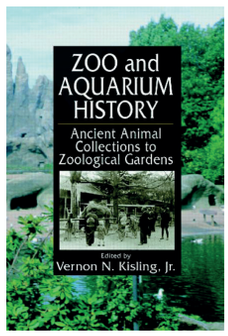
The zoo is an urban institution playing a part in a city's cultural, recreational, educational etc life. Indication that the zoo besides human-animal interaction also human-human interaction facilitates and promotes, for fulling an important social function within our urban environments.

The social, mental and spatial relation with the urban setting and the zoo knows various manner, each with its one characteristics and strengths. This place of the zoo in the urban environment has also changed over time and is still changing due to the constant developments within the urban environment and the zoo.

Figure 11 Impression of literature



Animal Attractions by E. Hanson, Princeton University Press



Zoo and Aquarium History by N. Kissling, CRC Press

1.9 Social relevance

Nowadays zoos hold an important place in connecting people with exotic wildlife. Since the up close real experience of seeing a living animal is far greater than by television or as a stuffed animal in a museum. Therefore zoos over an extra ability to create awareness for the conservation of species and ecosystems all over the world. In this, they play an important educational role for the public. Furthermore, the zoo is a place for recreation and leisure that attracts both high and low-income greats as well as higher and lower educated people. Zoo has a place within the high culture in for of lectures about the natural world that they often give but also a nice and easy place to go with your family and children.

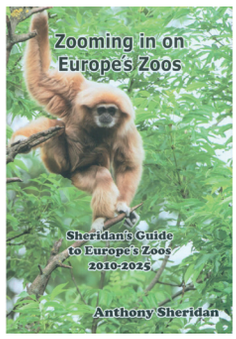
As the ethical discussion around exotic wildlife, captivity becomes increasingly commonplace. The zoo especially the ones with spatial constraints within our city need to rethink what their functions will be in the future and if and how they are going to exhibit exotic wildlife. The urban environment and especially the inner-city zoos like the Amsterdam Zoo or Antwerp Zoo will have to find a method to maintain an institution for living nature education and recreation within the dense urban constraints. And keep playing the important cultural function they play in their communities.

1.10 Scientific relevance

Previous research and literature into the zoo has mainly focussed upon the history or exhibits/architecture of zoo *Fig 11*. There has also already been a lively discussion surrounding the ethics of wildlife captivity and objectives/validations for holding animals captive. Until now very little research has been done into the zoo and its urban relationship, not looking to the surrounding fence or beyond. Something which will be described in this research.

Additionally, as described previously zoos play an important part in the recreation and tourism industry of cities, attracting sometimes millions of visitors. Besides a cultural institution, they are now increasingly important as conservation centres. We're as ethical concerns are brought spatial pressure on the layout of zoos. Zoos are a special and characteristic spatial, cultural and economic element within our urban environment. Investigating how this type may change in the future can give us insides in how also our cities and society might change regarding the experience and handling of nature and wildlife. And what the future cultural and economic function of exotic wildlife exhibitions will be and how cities can add or benefit from this.

ZooBauten by N. Meuser, DOM Publishers



Zooming in on Europe's Zoos by A. Sheridan, Schuling Verlag

1.11 Link to the research group

The layout of the zoo, its exhibits and its building reflect the different historical periods and parts the zoos has had within our society. Historical analysing this also can tell us something about our view towards animals and animals welfare in the past and present. The Design & History chair within urbanism states that one needs to have 'knowledge of the past, and the spaces it has created, is an important prerequisite for designing the future' (Delft, 2018).

Zoos have formed like botanical gardens or museums as important educational and recreational function within our cities for centuries. Especially the older zoos from now a day play a part of collective memory, they are part of our history and heritage. Investigating the development of this special urban institution through history can give fundaments in predicting on how this institution will develop in the future within our urban environment. Or possibly point to its inevitable end. Understanding of the future by history may be accomplished by researching how over time the reasons and ways of exotic wildlife exhibition have developed within our urban environments and what social and cultural or natural changes were at the origin of these changes.

1.12 Indication for possible bias in research

It is of importance to know the perspective and bias that may occur within the thesis (Coe, 2012). This thesis has been written from a Western Europe (Netherlands) perspective towards zoos, animal captivity and recreation. One must be careful with generalizing the 'zoo', since 'quality' varies around the world. Results from this thesis are thereby primarily applicable for zoos in the Western Europe.

Further there is an economic bias at stake. By only considering the future zoos in the Western Europe, wealthy region. There are more opportunities and possibilities for the future zoo and fewer economic limitations. Since this wealth allows zoos to have more means for exhibition and objective realisation.

Within the research there is a bias towards elite zoos. Elite zoos excellence versus standard zoos general zoos offers an imbalance. By focussing only on these elite institutions, the general zoo landscape may get out of side. These elite zoos, and examples from them, are the exception not the norm. Although the quality of the Dutch zoos is considered on average high.

1.13 Build up Report

The report has been build-up corresponding ping with research approach. The chapters two till five are part of the analysis stage.

Chapter 2: the zoo (industry)
Chapter 3: objectives for exotic wildlife exhibitions
Chapter 4: urban fabric in which zoos are situated
Chapter 5: lay-out of the zoo

The sixth chapter corresponds with the synthesis stage of the research here the Zoo Evaluation Tool is introduced and implemented.

Chapter 6: Zoo Evaluation Tool

The seventh chapter corresponding with the application stage of the research. The design principles following form the tool and guidelines will be introduced and apply in a design. The design for the future zoo will test and show implementation of the tool and guidelines done in a case study at the Rotterdam Zoo.

Chapter 7: Design

Lastly an evaluation of the research and thesis will be given. Containing conclusion, limitations, recommendations etc.

ANALYSIS

Chapter 2

The zoo


OGIQUE

2.0 Introduction

Chapter two is part of the analysis stage. This chapter presents an in-depth understanding of the basics of the zoo. Answering questions like what a zoo is, how the zoo industry works and what kind of place the zoo has in our society.

The current positions zoos find themselves in now a day has been shaped and changed though social, economic, ethical, ecological and conveyance developments. In establishing guidelines for the future zoo understanding of how the zoo (industry) currently is characterized.

This chapter will make a characterization of the current zoo industry and its social position and an overview of the main zoos in the Netherlands will be given. However, first, short, a definition for what 'a zoo' entitles should be identified.

Monumental zoo entrace in Antwerp, by Antwerp Zoo

2.1 Definition

The zoo is a worldwide phenomenon, were each zoo is unique (HUTCHINS, 1988) and differs in terms of size, location, management and marketing, expertise, organisational structure, number and variety of species displayed and manner of displaying those animals (Hunter-Jones & Hayward, 1998; Tribe, 2004). Consequently, there is a large number of facilities in the world that call themselves zoo, wildlife park, biopark or anything of the in similar manner. Since there is such a great variety amongst institutions that are known as 'zoos', it is difficult to finds a precise definition, which would cover all of these wildlife exhibitions. However, as the World Zoo Conservation Strategy explains, there are two main characteristics that all such 'zoo' institutions have in common.

•Zoos possess and manage collections that primarily consist of wild (non-domesticated) animals, of one or more species, that are housed so that they are easier to see and study than in nature.

•Zoos display at least a portion of this collections to the public for at least a significant part of the year, if not throughout the year

Environmental professor and zoo ethicist Dale Jamieson (1985) and Dirk Reiser (2017) also add the components of recreation/tourism and education to these special public parks. Because, regardless of the composition of their collections, their official name (zoo, aquarium, sanctuary, fauna park etc.) and their type of ownership, all these zoological institutions will be known by the general term 'zoo' in this thesis. Were the zoo will be defined as 'gardens designed for the public with enclosures and animal's houses for keeping and presenting of, predominantly exotic, wildlife.

2.2 Zoo Types

The definition of zoos is very broad, so various types of zoo can be identified. These institutions although collectively designated as 'zoos' very greatly in respect to their animal collections, which is one of the easiest and fast manner to identify types. They may include:

•General collections consisting of representatives of all the vertebrate classes: mammals, birds, reptiles, amphibians and fish. Institutions such as these usually call themselves 'zoos'.

•Specialized bird collections. Theses may be called bird parks, waterfowl parks, parrot gardens etc.

•Specialized reptile collections (e.g. reptile parks, vivaria)

•Specialized marine mammal collections (e.g. aquaria, dolphinaria, marine zoos)

•Specialized fish collections. These may include aquatic and terrestrial vertebrates (e.g. aquaria)

•Specialized insect collections (e.g. insectaria, butterfly houses)

•Specialized collections of other mammal groups (e.g. primate zoos)

Within the general collections there can be made between the safari parks and the traditional zoo. In the safari park visitors have the possibility to drive with their personal vehicle through the animals exhibits.

This thesis will focus on the general collections of wildlife in the Netherlands that are accredited. Specially regard within this group will go to the larger and more visited institutions. Since these zoos are the most important and recognizable zoos by the general public as well as having the largest exhibitions of exotic wildlife.

2.3 Zoo industry

Its impossible state how many zoos there are around the world, since as previous described the definitions of exotic wildlife collection can be very broad, also depending on objectives there are for the collection. The world zoo conservation strategy estimates that there are around 1200 'core' zoos in the world. This are the zoos how are members by one or multiple international accredited zoo associations (Tribe, 2004).

In zoo association zoos come together to in animal care and welfare, environmental education and global conservation by exchange of wildlife knowledge and coordinate conservation efforts both in situ as ex situ. Most important zoo association in the Dutch situation are the World Association for Zoo and Aquariums (WAZA) 280+ members, the European Association for Zoo and Aquariums (EAZA) 300+ members and the Nederlandse Vereniging van Dierentuinen (NVD) 14 members of Dutch accredited zoos. Besides these larger accredited zoos there are many more wildlife exhibitions in the Netherlands and around the world.

2.3.1 Recreation industry

Zoos have an often a great share in the recreation industry of cities and regions. Around the world zoos are annually visited by over 700 million people. In Europe the EAZA zoos receive annually around 140 million visitors. In the Netherlands around 10 million people visited the zoos each year. Most zoos are found in cities or highly urban environments, where because of good accessibility and a large market they have the potential to attract a large number of visitors (Tribe, 2004).

By receiving many visitors' zoos can make a considerable contribution to economy of their region, city or even nation. Throughout their business activities, zoos create employment purchase goods, materials and services, earn foreign exchange through their overseas tourists, and generate operating surpluses which are usually reinvested in zoo development projects (Tribe, 2001).

It is important for both the zoo and the city that this strong position within the recreational economy is maintained. In the recreational landscape of the future the zoo needs to be still a popular attraction.

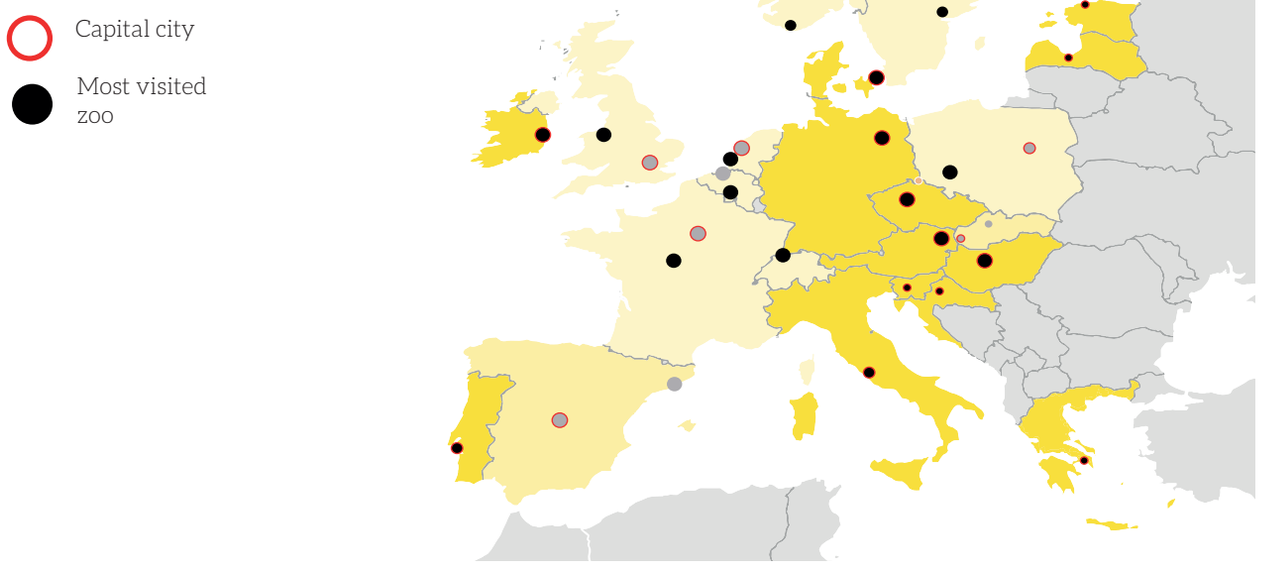
2.3.2 Most visit zoos

Zoos are a traditional and popular form of wildlife recreation (Tribe, 2004). In many countries they are among the most well visited attractions for a day out (van Linge, 1992). Trips to the zoo can have different forms. Zoos can be visited for a recreation or a day-out, educational excursion or for a short break, lunch for instance, making use of zoos as schools or public parks, especially zoos in more urban or centre areas tend also to be used in this manner. In these shorter stay visits lays a lot of potential for the future zoo within the urban environment.

140 million people visit in Europe the zoos each year as previously mentioned. Especially in Germany and the Netherlands zoos are very popular wildlife recreational facilities as can been seen in *Fig 12*. With the zoos in the Germany among the most well visited zoos in Europe,

Figure 12 Most visited European Zoos, source A. Sheridan

Figure 13 Capital cities in relation to most visited zoo in the country, source A. Sheridan



Berlin (3,3 million) Stuttgart (2,25 million) and Munich (2 million) (Sheridan, 2016). The zoos in the Netherlands may receive fewer visitor per zoo then their German counterparts, but their proximity and attendance make the Netherlands the highly dense zoo country in Europe. The well visited zoos very often in a capital or one of its bigger cities of a country *Fig 13*. Such as Prague (1,3 million), Budapest (1,1 million) or Barcelona (1,15 million) (Sheridan, 2016). Indication that the future zoo has the most chance of attracting visitor being located in or close by a larger city.

Although in recent years there have been some strong climbers in the rural areas, Pairi Daizi in Belgium received 900,000 more visitors in the period between 2010-2015 with 1,8 million now one of the most visited zoos in Europe and Beauval increased its attendance by 600,000 up to 1,2 million now the most visited zoo in France. In this period, both zoos opened many new exhibits and both received giant pandas. The importance of attraction visitor with a new exhibit is most visible with the strongest climber in the 2010-2015 period, Wroclaw zoo. since the opening of their Africarium, they are now the biggest paid visitor attraction in Poland and the fifth most visited zoo in Europe, their attends increased by 1,3 million to 2 million visitors annual. This huge increase in visitors is even felt in number of people flying between Warsaw and Wroclaw, previously nearly empty weekend flights are now filled with tourist to visit the zoo in the weekend. If the future zoo offers special attractions that are rarely seen in zoo it has the ability to attract visitors form further distances and to less urban locations.

Most visited zoos in the Netherlands are the Rotterdam Zoo and the Amsterdam Zoo both between 1.4 and 1.5 million visitors in 2017. Also, the zoos of Arnhem, Rhenen, Emmen and Amersfoort received more than one million visitors. Although the visitor numbers vary from year to year there is an increasing discrepancy between the seven larger zoos and seven smaller zoos between 2009 and 2017 *Fig 14*. Overall zoo attendances has been relatively stable between 9,5 and 10,4 million within this period *Fig 15*.

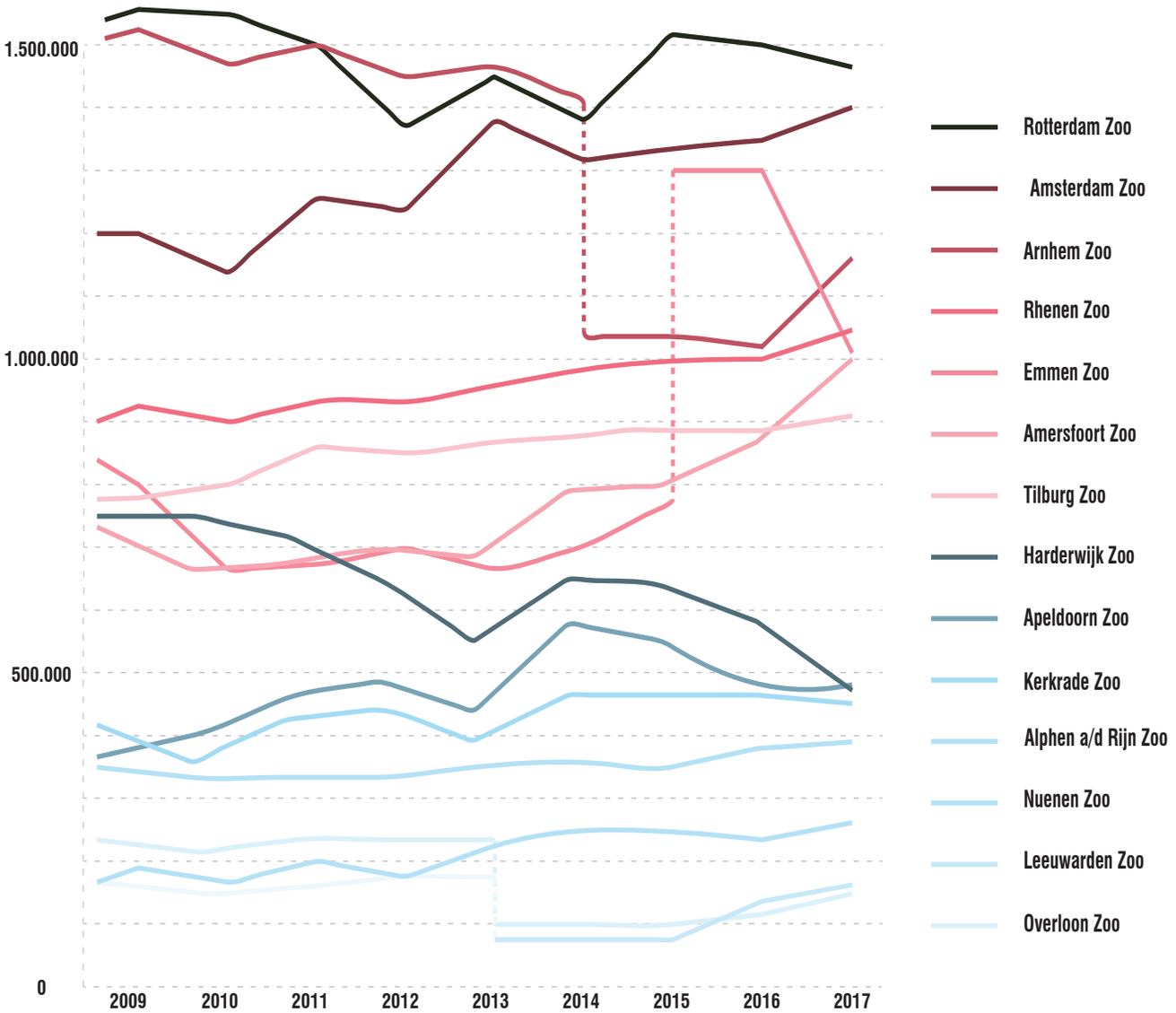


Figure 14 Development visitor numbers larger Dutch Zoos, source Laafsekikkers.be

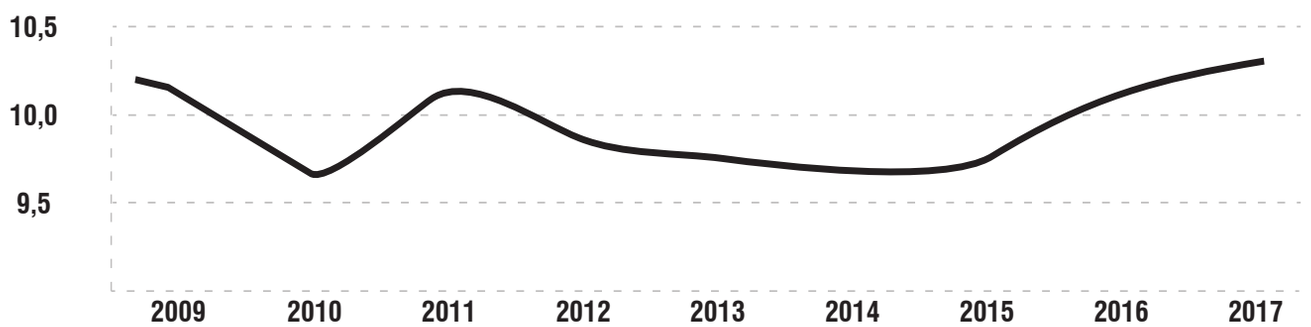


Figure 15 Development total number of annual visitors Dutch zoos, source Laafsekikkers.be

2.3.3 competition

Yet, regardless of their popularity, zoos find themselves in a increasingly competitive market trying to attract an audience that is becoming more critical (Hunter-Jones & Hayward, 1998). In recent decades the recreation market and variety in attraction has seen great growth (Tribe, 2004). Consequently, (Hunter-Jones & Hayward, 1998) imply that the attraction market is in danger of becoming oversupplied. Some even suggesting that in real terms, demand for traditional recreation attractions such as zoo is actually declining (Stevens, 2003). On the one hand there is strong competition for amusement parks, that often might be a more expensive, but offer more excitement with their attractions, especially for an older audience. On the other hand, are attraction as museum which also have very specific focus groups. Zoos are positioned between these two type of attractions, experiencing competition from both sides. Moreover, a visit to the zoo can be expensive wildlife attraction, especially compared with the petting zoos. Besides the increased competition in the recreation market, harder market circumstances are caused by changing demographics, changes in leisure consumption, limited rejuvenation of the zoo, lack of funding and animal welfare concerns (Tribe, 2004).

In this competitive recreation market, the future zoo will need to find its own unique place to attract visitors. In trying to attract an specific audience, some zoos that have become hybrid recreational attraction with both attractions and wildlife exhibition. Such as Disney Animal Kingdom in USA, Bellewaerde in Belgium and Emmen zoo in the Netherlands.

2.3.4 Expensive business

Operating zoos is acknowledged as being a highly expensive business (Tribe, 2004)and the closer they come to the concept of a conservation centre, the costlier they become (Hediger, 1969).

These high operation costs are primarily the result of high maintenance costs for the animal like, food, water, heating, cooling, medical care etc. which must be provided year-round. Additional this feeding, cleaning and other ways of caring for the animals and the park is a labour-intensive business. Further maintaining and building new exhibits as well as maintain the park itself is expensive if on one wants to uphold the best standers for animal welfare and visitor attraction. Therefore there are generally no big profits made in this recreational industry, where revenue can vary year to year in response to an number of factors the zoo has little or no control (Mason, 2000), like the weather and competition from other recreation attractions. The zoo industry is therefore increasingly busy with finding other revenue stream then gate receipts to create additional income (Turley, 1999). Zoo are organising after-hours or value-added events to increase their income, for example after-hours openings, up-close with the animal experiences and ‘behind-the-seen’ tours, concerts or congress facilities (Mazur & Clark, 2001).

In the future zoos will more and more need to extra activities or add specially functions to generate enough ‘extra’ income to maintain their expensive business operations.

2.3.5 zoo ownership

Within the zoo industry there are various forms of zoo ownership. Mainly they can be distinguished in public zoos and commercial zoos. Public zoos are often directly or indirectly owned by municipal governments or non-profit zoological societies. Commercial zoos can be held by private individual, family-companies or leisure industry corporations. Most of the European zoos are public zoos, often established by municipal governments. In contrast most zoos in the Netherlands are commercially held.

Both public and commercial are striving towards the four objectives of conservation, education, research and recreation but between the zoos in very different ways often regardless if these zoos are public or commercial. Although, the zoos that are commercial owned by larger recreation corporations tend to focus slightly more on the recreational objective.

Especially since Instigated by cutbacks form government support in recent years, public zoos have been trended towards economic rationalism (Tribe, 2004). This has resulted in zoos that have increasingly been run like business that must operate 'efficiently' (Mazur & Clark, 2001; Tribe, 2004).

However, while the desire to increase revenue, efficiency and sustainability is both necessary and desirable, the challenge for zoos is in how to achieve this without losing sight of their fundamental objectives (Tribe, 2004). The recreation objective should not become too dominant within the zoo industry. 'Animal management must never be made subordinate to the pleasure of the visitors' as van Linge (1992) states.

The ownership form will hardly determine the objectives or running of the future zoo. The financing of the zoo will have a greater influence than then the ownership itself.

2.4 Zoo in society

Zoos play and important role in the life of their local community. Besides theirs economic, educational and conservation benefits for the community, zoos can also reflect and participate in the culture of a society (Tribe, 2004). Zoos are in many ways a sort of museum or art galleries, especially in their historical past and have earned over time a place within our cultural tradition (Mullan & Marvin, 1999). In contrast to museums and art galleries zoos as a cultural institution are able to attract and entertain also outside of the high culture realm.

Since zoos do not culturally intimidate people, visitors are able to enjoy themselves without having composes much knowledge about the animals they are watching. This helps for the zoo in its ability to attract visitors as well as in a perception with the publics that zoos are 'entertaining' and 'friendly' (Tribe, 2004). Thereby zoos form a recreation attraction that is accessible and enjoyable for all people, young and old, rich and poor, high educated and low educated, etc.

The zoo is a culturally accessible institution for all people, the future zoo will need to maintain and possibly enlarge this position.

As cultural institutions zoos have also become closely related with the identity and image of a city. People are proud of their zoo and are a city icon. For instance, the San Diego Zoo is world famous and is even joked about in the popular DreamWorks movie Madagascar. In the Netherlands Amsterdam Zoo is closely link with the image of Amsterdam and the Rotterdam Zoo (Diergaarde Blijdorp) is its neighbourhood Blijdorp in Rotterdam. For these cities zoos have very important cultural value as many of their citizens have grown up with a close relationship with these zoos, holding happy memories to previous visits and experiences.

In our western society zoos have also taken up a remarkable spot in different medias. On television multiple series and documentaries are take place in zoo and are broadcasted. Online and in newspaper frequently articles are written about events or specialties that happen in zoos, such as animal births or the opening of new exhibits. Also in social media animals doing funny behaviour often filmed in zoos is widely viewed and shared.

The zoo is a culturally accessible institution for all people, and very present even for non-visitors by different forms of media. The zoo is a very present part of our cultural society. The future zoo will need to maintain and possibly enlarge this position.

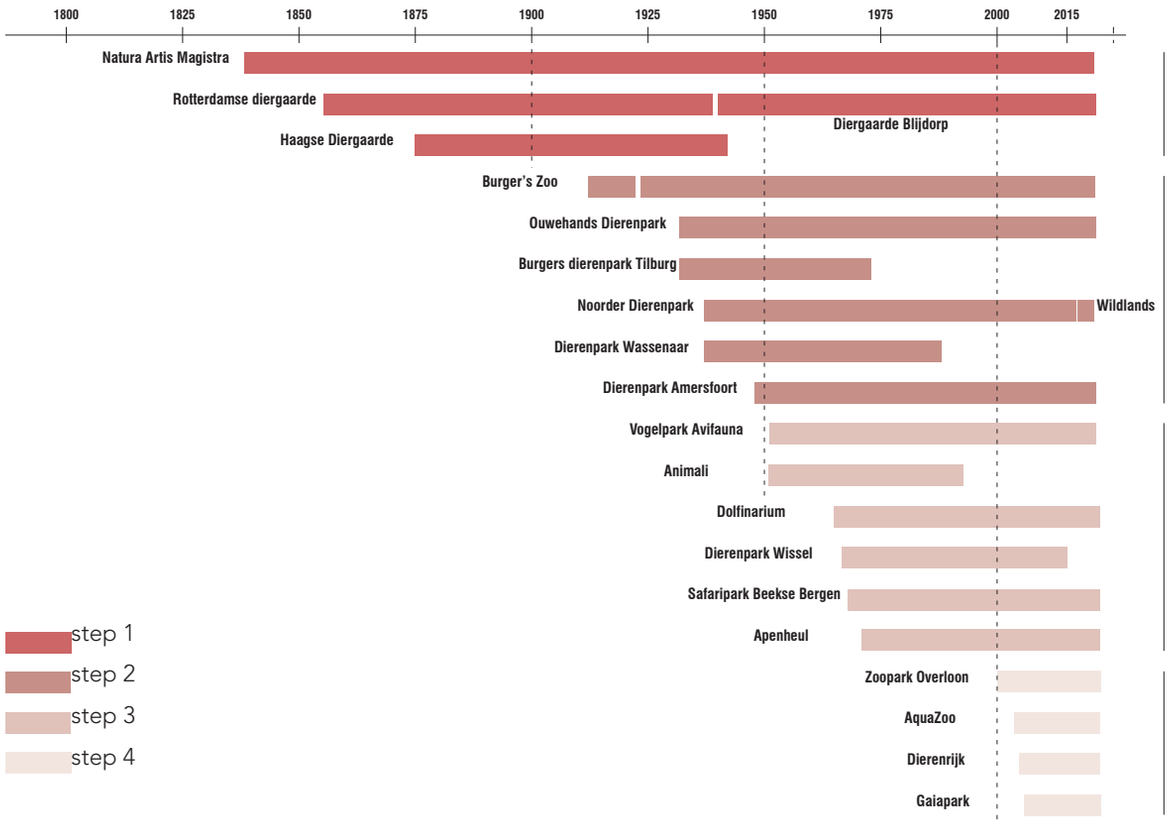
2.5 Visitor Motivation

Studies consistently show that visiting a zoo is foremost a social experience, with few people visiting alone (Holzer, Scott, & Bixler, 1998; Tribe & Booth, 2003; Turley, 1999b). Most of the people visiting a zoo do so with either close friends or relatives, often with children (Tribe, 2004).

That zoos are social experience is well-known, lesser clear known is the attitude people have with going to a zoo both towards their reason of visiting as of the role of the modern zoo (Tribe, 2004). Regardless of the zoo as an recreation attraction, very little study has been done to investigate the nature, attitudes and motives of zoo visitors (Mason, 2000; Tribe, 2004). Since zoos create a recreational setting and the often visiting in social groups indicate that enjoyment is prime motive for visiting a zoo. Literary studies by (Tribe, 2004) indicate that assumption is correct. Multiple studies agree that while people visit the zoo for a variety of reasons, most importantly they go for recreation (Woods, 1998). Significant in the decision making of going to a zoo are children. Children both facilitate and make a zoo visit more enjoyable (Turley, 1999b, 2001).

A major concern appears to be the perception of captivity and captive conditions of zoo visitors (Mason, 2000). A great number of people associate traditional zoos with bars and unnatural conditions, whilst over one third indicate that they do not visit a zoo since they don't like to see animals in captivity (Turley, 1999b). More importantly the conservation message of zoos does not appear to be a major motivation for zoo visitors (Turley, 1999b). People believe the zoos purpose to be educational and conservation. But form a contradiction for visiting them for primarily recreational purpose. There has been little research done how conservation and education influence visitor attention both positively or negatively (Mazur & Clark, 2001; Turley, 1999a).

A visit to the zoo is a social experience and will continue to be this within the future. While visitors want the zoo to be about education and conservation they visit zoos because of recreational reasons. The transition towards future zoo with a stronger emphasis on those topics my not hinder the recreational aspect of the zoos, as this might entail a decrease in visitor numbers and make it thereby harder to be operational in the industry and a vicious circle might appear



2.6 Timeline Dutch Zoos development

Exotic wildlife exhibitions in the Netherlands date back centuries. But the first 'modern 'zoo to open in the Netherlands in 1838. Since then the number of zoo in the Netherlands has continued to grow, although there have also been some closures. As seen in figure X for steps or time frames for zoo establishment can be identified. These steps are can be associated with trends in the objectives of the zoos, the relationship with the urban fabric or the lay-out of the zoo. On the following pages the characteristics of each of the steps will be shortly described and with also important developments noted on the time-line, starting form the foundation of the first 'modern' zoo in the Netherlands the Amsterdam Zoo.

STEP 1 1820 - 1900
STEP 2 1900 - 1950
STEP 3 1950 - 2000
STEP 4 2000 - present

Women feeding giraffe at the Amsterdam Zoo, from Artis Collection

Papagaaienlaan Artis

Aquarium Artis

1838
AMSTERDAM ZOO
opens

1828
LONDON ZOO
opens

1855
ROTTERDAM ZOO
opens

1875
THE HAGUE ZOO
opens

1820 1830 1840 1850 1860 1870 1880 1890 1900

1852
ARTIS RECEIVES THE
DESIGNATION ROYAL

1852
ARTIS OPENS TO
NON-MEMBERS

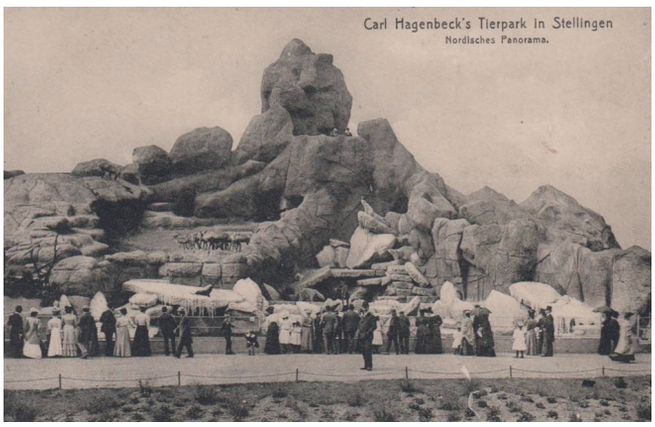
1855
ARTIS OPENS
'GROOTE' MUSEUM

1882
ARTIS AQUARIUM,
FIRST IN THE
NETHERLANDS

'Groote' Museum Artis

Dutch zoo history Step 1

The first zoos were established in the west of the Netherlands in the larger cities of Amsterdam, Rotterdam. In these harbour cities, the urban elite was large and wealthy and in search for knowledge and recreation, because of the Industrial Revolution and Enlightenment ideas. In this light and because of the larger trading network those cities had, there was fruitful ground for the founding of the new urban phenomenon, the zoological garden. Further high-class city of The Hague a large and wealthy urban elite let to the establishment of a zoo relatively early. This was in accordance with similar developments all over Europe in the industrialising cities. As a scientific and elite institution, the zoos build wonderful green parks with exotic palace like building with an enormous variety of different species. Forming privileged green islands to escape the poor and dirty urban environment.
In their scientific endeavour and prestige gathering the most complete collection of exotic wildlife was of great importance. Urban symbols for research, status and recreation.



Naturalistic exhibit: Nordic panorama
Tierpark Hagenbeck

1900
1910
1920
1930
1940
1950

1907
TIERPARK HAGENBECK, START NATURALISTIC EXHIBITION STYLE

1913
ARNHEM ZOO opens

1923
BURGERS ZOO MOVES TO ARNHEM

1832
RHENEN ZOO opens

1932
BURGERS TILBURG ZOO opens

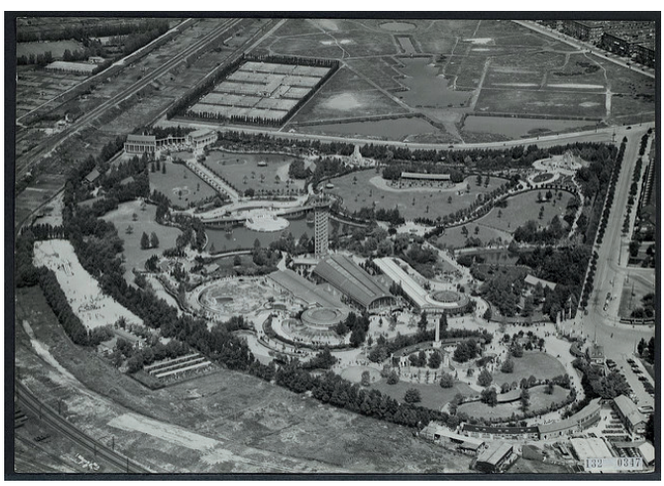
1935
NOORDER DIERENPARK

1937
WASSENAAR ZOO opens

1940
DIERGAARDE ROTTERDAM MOVES TO BLIJDORP NEIGHBORHOOD

1943
THE HAGUE ZOO closes

1948
AMERSFOORT ZOO opens



Newly build zoo in Blijdorp Rotterdam designed by S. Ravesteyn

Demolition of main society building Haagse Diergaarde

Dutch zoo history Step 2

After initial zoos in the large cities in the west in the second step zoos opened in smaller cities of the Netherlands connected with a railway. These new zoos often developed of of first small private (bird) collections into zoos, with a new main objective recreation. They were all immediately open to all public offering a nice day-trip. A change also the elite zoos in the west had to make because of financial and social pressure. These new zoos were often highly influenced by the Hagenbeck-style exhibition, in more naturalistic exhibits, a very popular exhibition style by the public. Only The Hague Zoo had to close because of the World War II when it had to make place for battlements.

Cars parking at the entrance of Avifauna

F. de Waal presenting Chimpanzee politics based in research at the chimpansee group i Burgers Zoo

1950
ALPHEN A/D Rijn
ZOO opens

1965
HARDERWIJK ZOO
opens

1967
DIERENPARK
WISSEL

1968
TILBURG ZOO
opens

1971
APELDOORN ZOO
opens

1973
BURGERS
TILBURG ZOO
closes

1985
WASSENAAR
ZOO
closes

1950 1960 1970 1980 1990 2000

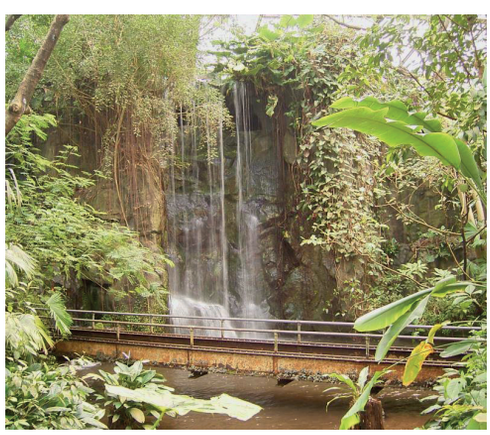
1971
BURGERS ZOO
STARTS CHIMPANZEE
RESEARCH GROUP

1975
WOODLAND ZOO
SEATTLE BUILDS
FIRST IMMERSION
EXHIBIT

1985
EVOLUTION MUSEUM
BIOCHRON OPENS IN
EMMEN ZOO

1988
BURGERS BUSH OPENS
FIRST LARGE INDOOR
IMMERSION EXHIBIT

Cars driving through the lion exhibit
in safaripark beekse bergen



Waterfall and recreated rainforest with free roaming animals at the Bush in Burgers Zoo

Dutch zoo history Step 3

Due to changing recreation demands and competition the new zoos are often specialized in a certain species of animals or used new ways of exhibition their wildlife. Making it possible to drive or walk through the exhibits like in SafariPark Beekse Bergen, Apeldoorn Zoo. This development was also influence by the objectives of the zoos that change in this period to conservation, education and research. The older zoos also changed their objectives, although some found it hard to adapt and had to close. Like the Wassenaar Zoo, Tilburg Zoo and Eindhoven zoo. Others found ways to adapt like Arnhem Zoo how had a safaripark with the zoo and Rhenen Zoo with its Dolphianrium. These new objectives bring about a new type of exhibiting, the immersion exhibit where the boundaries between animal habitat and visitor space even further intertwine, best coming to light in Emmen Zoo which also opened an educational museum.

New main entrance Diergaarde Blijdorp orientated towards the highway and parking

King Willem Alexander at polar bears during the opening of Wildlands

2000
OVERLOON ZOO opens

2003
LEEUWARDEN ZOO opens

2004
NUENEN ZOO opens

2005
KERKRADE ZOO opens

2015
ZODIAC ZOOS DOES BANKRUPT DIERENPARK THE WISSEL closes

2016
EMMEN ZOO MOVES

2000 | 2005 | 2010 | 2015 | 2020

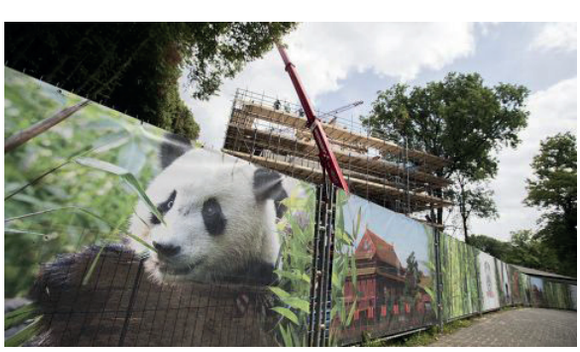
2000
DIERGAARDE BLIJDORP RELOCATES MAIN ENTRANCE

2008
DIERENRIJK EUROPA RENAMES TO DIERENRIJK AND STARTS HOLDING SPECIES OUTSIDE EUROPE

2016
PARTIJ VOOR DE DIEREN CALL FOR ZOO BAN IN ELECTION CAMPAIGN

2017
GIANT PANDAS ARRIVE IN OUWEHAND DIERENPARK

Giraffes in a very naturalistic savanne exhibit at Gaiazoo



Construction works on the giant panda exhibit in Ouwehands Dierenpark, first giant pandas ever in the Netherlands

Dutch zoo history Step 4

In recent years, may more zoos have opened, especially on the rural part of the Netherlands or the economically left behind ones, to enhance tourism and economic productivity in that region. These and the zoos themselves have in recent years made great steps in improving their conservation and education message by opening many large new exhibits. In these new exhibits and zoos, the influence of disneyfication are also becoming more and more prevalent. These changes are also necessary as the society is becoming more vocal on animal welfare issues.

2.7 Future developments concerning the zoo industry

2.7.1 Social and demographic trends

The future zoo will be a place for biodiversity in an increasingly urbanized world due to the trend of people migration from the rural areas towards (mega) cities and continues population growth. Making the possible an island within an urban sea according to Donna (Fernandes, 2012). Another democratic trend that will influence the future zoo context is aging of the population, especially in the western would. For this older audience provisions need to be made to keep the zoos well assessable. Furthermore, she expects a shift from the traditional families visit the zoo (parents and children) towards more grandparents with their grandchildren visiting zoos, as the parents will be working. Technological advancements and different manners of animals keeping and exhibiting will make it possible to bring the individualism trend also in the zoo experience with more personalisation, for instance in education. For the future zoo there is also an opportunity to counteract the trend of children spending more and more indoors, instead of playing outside exploring nature.

2.7.2 New technologies

Currently National Geographic and other nature channels already live stream with a webcam spots in nature on youtube and other digital media. Bringing people live in to exotic place and able so observe nature. Even safaris conducted by national geographic are live stream with the ability of viewers to interact with the tour guide. In the future such forms will only increase and could pose a great opportunity for zoos to link their zoo visitors with in situ conservation and education projects. From this point is not a big leap to imaging some forms of a virtual 3D zoo. the future zoo will have to anticipate on this trend.

Likewise, Jesse (Donahue, 2012) predicts that 24/7 live animal tracking both inside as well as outside the zoo will become possible. Especially in the zoo context it will allow people, especially animal rights activist, to actively uninterrupted follow the treatment of animals in zoos. This could increase awareness for the conservation status of these animals and possible health and welfare could be easier monitored. It will also make it easier for such groups to deliver evidence when animals are not treated in the right manner.

2.8 Zoos in the Netherlands

The research will be focussed on the major zoos in the Netherlands associated in the NVD. The Netherlands and these zoos have been choosen for the research since the Netherlands has extensive zoo culture compared to other western European nations with also a high number of visitors (Sheridan, 2016). Further, the NVD holds high social norms and ethical standards towards animals in captivity. Meanwhile the ethical concerns a vocal in the form of the political party Partij voor de Dieren in the Dutch parliament. This mix paradox between having elite zoos and also a lot of social critizen makes the Netherlands an interesting case to study the future of zoos.

The zoo is a complex system with many different aspects and components. Zoos in the Netherlands can measured in all kinds of manner depending upon the criteria one takes. Anthony Sheridan made comparison study and overview of the larger European zoos. The themes the main themes he used; Visitor experience, education and conservation, commercial and marketing and associated sub topics have been taken into account in the developing aspects and components for the ZET.

On the following pages an overview of the Dutch zoos will be given with basic data about these different institutions. Further additional data based on the research done by Sheridans has been added, as well as data the followed from the research in chapters three, four and five.

Zoos in the Netherlands,
by author

NVD Zoo

other exotic wildlife
exhibitions

City: Alphen aan de Rijn

Zoo: Vogelpark Avifauna

Urban type: Urban

Zoo type: Specialized

Foundation: 1950

Specialization: birds

Annual visitors (2015): 345,000

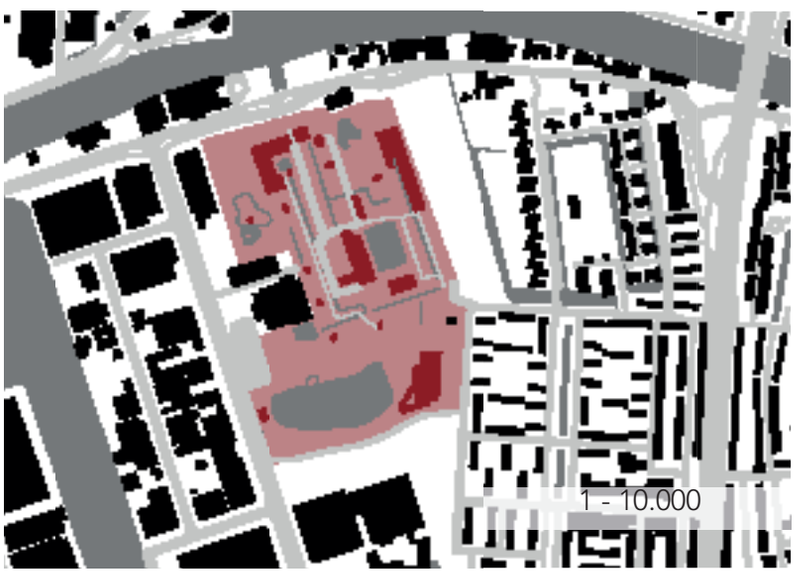
Number of species: 300

Number of top animals: 0

Area: 15

Lay-out: random

Ownership: non-profit



City: Amersfoort

Zoo: Dierenpark Amersfoort

Urban type: Edge

Zoo type: large zoo

Foundation: 1948

Specialization: non

Annual visitors (2015): 801,000

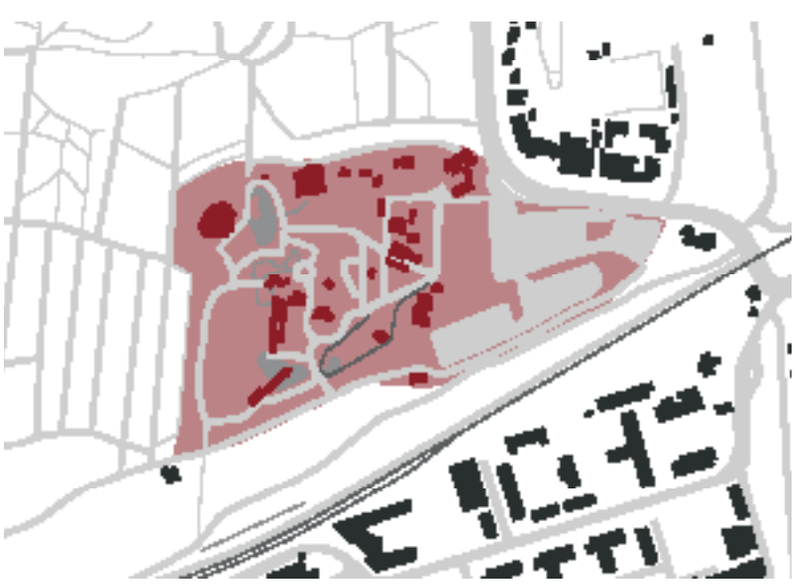
Number of species: 134

Number of top animals: 7

Area: 20

Lay-out: random

Ownership: commercial - family



City: Amsterdam

Zoo: Natura Artis Magistra

Urban type: City Centre

Zoo type: larger Zoo

Foundation: 1838

Specialization: non

Annual visitors (2015): 1,342,000

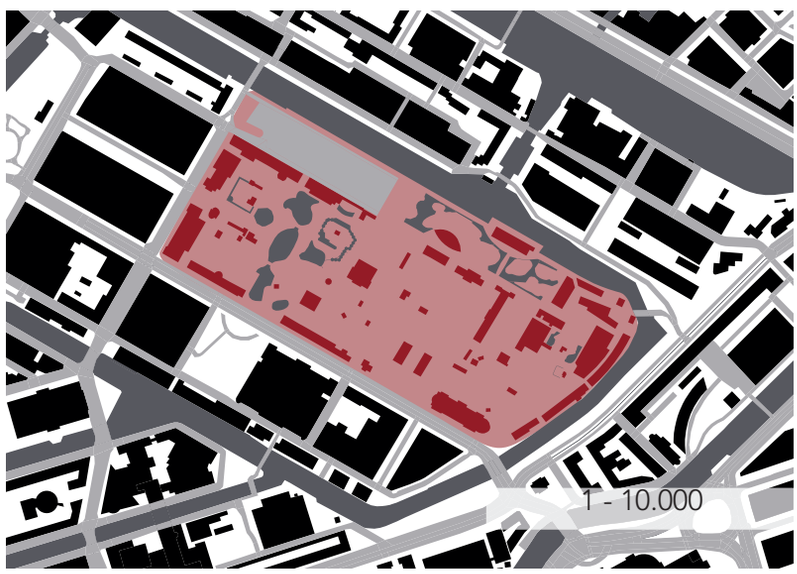
Number of species: 413

Number of top animals: 8

Area: 15

Lay-out: random

Ownership: non-profit



City: Apeldoorn

Zoo: Apenheul

Urban type: Edge

Zoo type: specialized

Foundation: 1971

Specialization: Apes

Annual visitors (2015): 550,000

Number of species: 69

Number of top animals: 2

Area: 13

Lay-out: random

Ownership: non-profit

City: Arnhem

Zoo: Burgers Zoo

Urban type: Edge

Zoo type: large zoo

Foundation: 1923 (1913)

Specialization: non

Annual visitors (2015): 1,040,804

Number of species: 338

Number of top animals: 11

Area: 45

Lay-out: ecosystem

Ownership: commercial - family

City: Emmen

Zoo: Wildlands adventure zoo

Urban type: Urban

Zoo type: large zoo

Foundation: 2016 (1935)

Specialization: non

Annual visitors (2015): 1,300,000

Number of species: 90

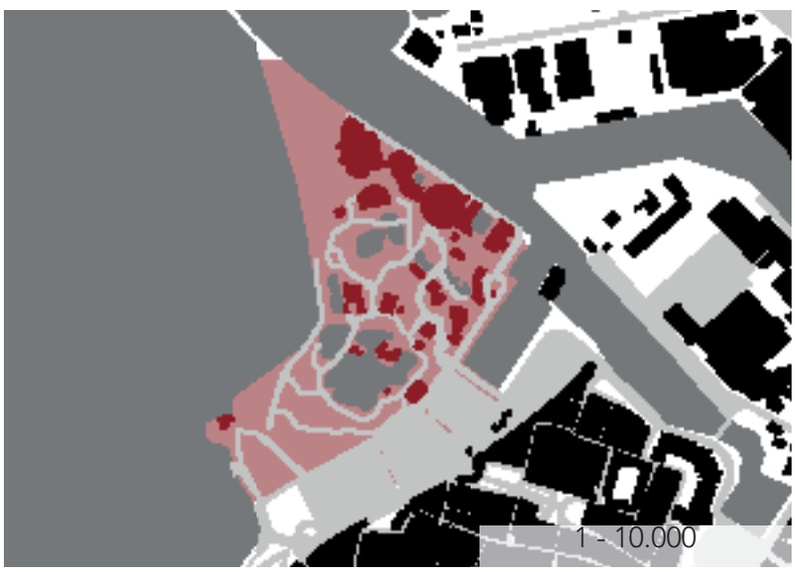
Number of top animals: 7

Area: 45

Lay-out: climate zones

Ownership: commercial

City:	Harderwijk
Zoo:	Dolfinarium
Urban type:	Urban
Zoo type:	Specialized
Foundation:	1965
Specialization:	marine park
Annual visitors (2015):	650,000
Number of species:	30
Number of top animals:	1
Area:	12
Lay-out:	random
Ownership:	commercial - corporation



City:	Kerkrade
Zoo:	GaiaZoo
Urban type:	Edge
Zoo type:	large zoo
Foundation:	2005
Specialization:	non
Annual visitors (2015):	475,000
Number of species:	156
Number of top animals:	5
Area:	25
Lay-out:	geographic
Ownership:	commercial

City: Leeuwarden

Zoo: AquaZoo

Urban type: rural

Zoo type: small zoo

Foundation: 2003

Specialization: non

Annual visitors (2015): 90,000

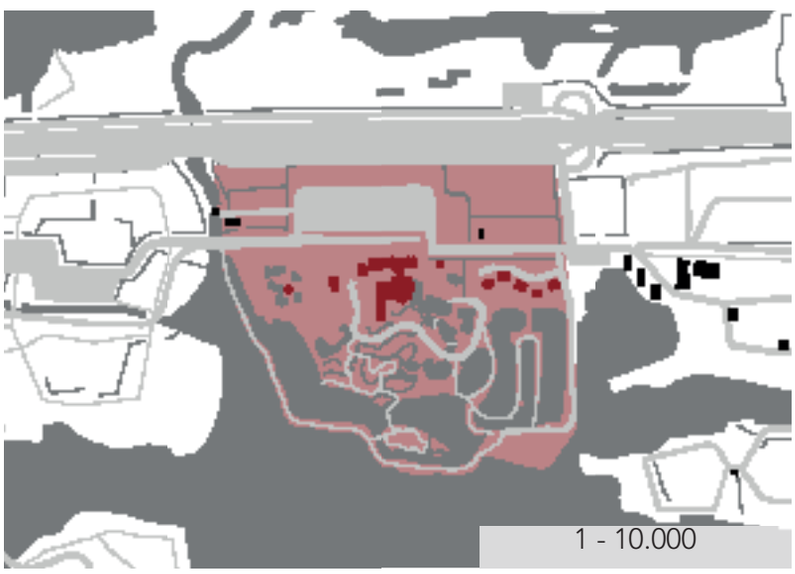
Number of species: 79

Number of top animals: 1

Area: 15

Lay-out: random

Ownership: commercial-corporation



City: Nuenen

Zoo: Dierenrijk

Urban type: rural

Zoo type: small zoo

Foundation: 2003

Specialization: non

Annual visitors (2015): 250,000

Number of species: 89

Number of top animals: 7

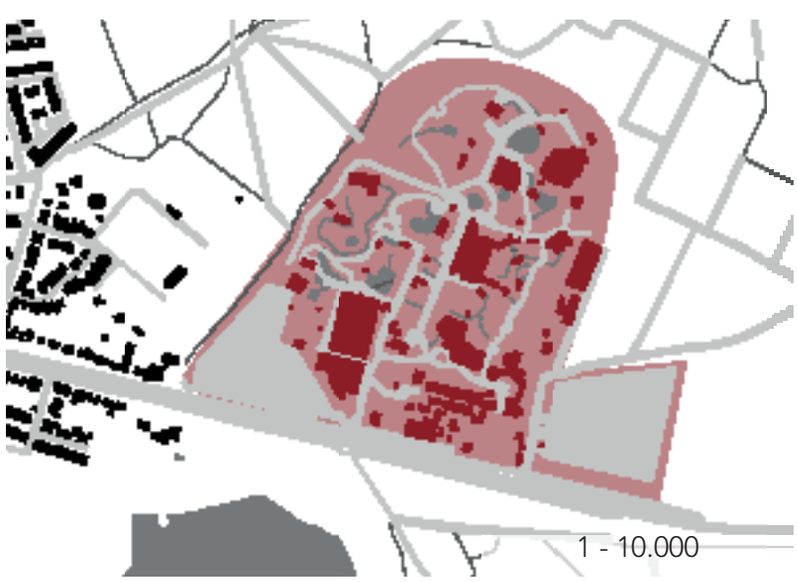
Area: 16

Lay-out: random

Ownership: commercial-corporation

City:	Overloon
Zoo:	Zoopark Overloon
Urban type:	Edge
Zoo type:	small zoo
Foundation:	2000
Specialization:	non
Annual visitors (2015):	100,000
Number of species:	71
Number of top animals:	3
Area:	20
Lay-out:	random
Ownership:	commercial-corporation

City:	Rhenen
Zoo:	Ouwehands Dierenpark
Urban type:	Edge
Zoo type:	large zoo
Foundation:	1932
Specialization:	non
Annual visitors (2015):	997,500
Number of species:	268
Number of top animals:	10
Area:	24
Lay-out:	random
Ownership:	private



City: Rotterdam

Zoo: Diergaarde Blijdorp

Urban type: Urban

Zoo type: larger Zoo

Foundation: 1855

Specialization: non

Annual visitors (2015): 1,520,000

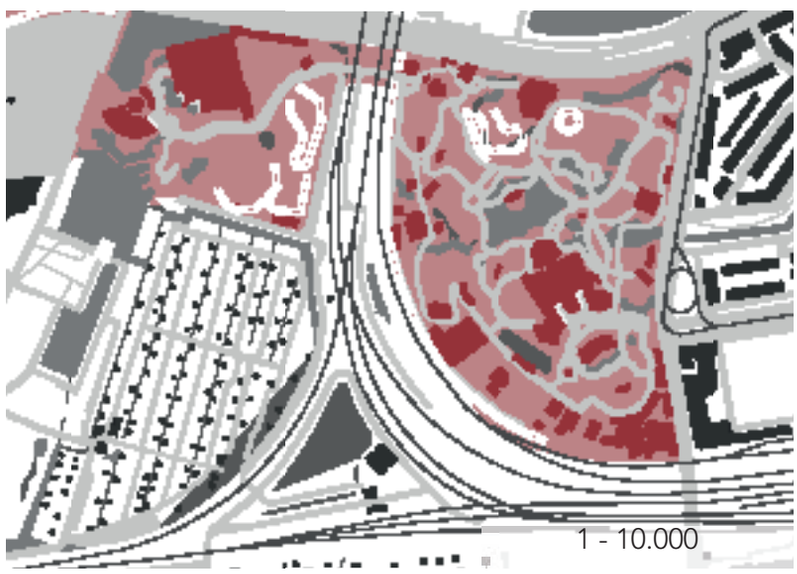
Number of species: 430

Number of top animals: 11

Area: 31

Lay-out: geographic

Ownership: non-profit



City: Hilvarenbeek

Zoo: Safaripark Beekse Bergen

Urban type: rural

Zoo type: safari park

Foundation: 1968

Specialization: non

Annual visitors (2015): 904,000

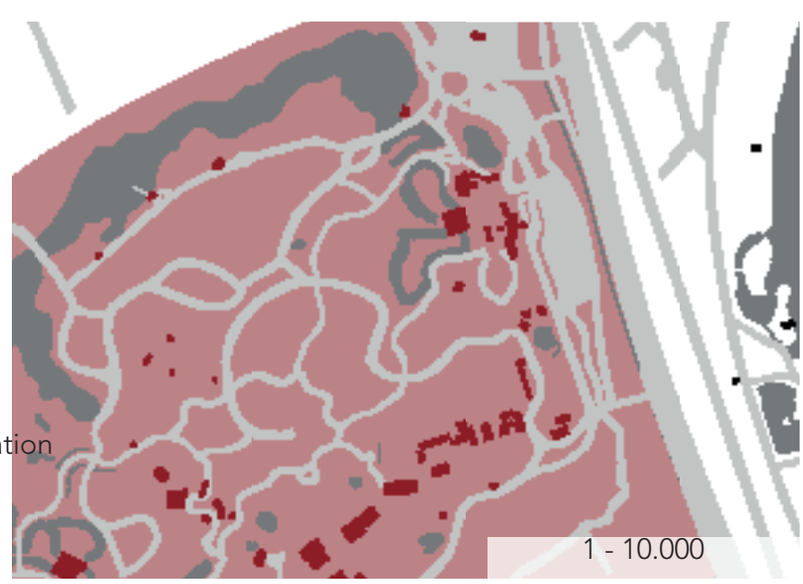
Number of species: 148

Number of top animals: 10

Area: 165

Lay-out: random

Ownership: commercial- corporation



Chapter 3

Objectives

Monumental zoo entrace in Antwerp, by Antwerp Zoo

3.0 Introduction to the objectives of the zoo

This chapter presents a in depth understanding of what a zoo is and what it objective were, are and should become. Connecting to the first and second research questions:

1.What are the reasons and methods for the exhibition of exotic wildlife in our western society and how have they developed?

Historically the zoo has been shaped and changed though social, economic, ethical, ecological and conveyance developments. In making the ZET and establishing guidelines for the future zoo understanding of these development is of importance to get a grasp on how the current situation came to be.

This chapter will discuss the history of exotic wildlife exhibitions, primarily focussed on the objectives for establishing such an exhibition.

Zoo keeper education children about at turtle, by Rosamond Gifford Zoo

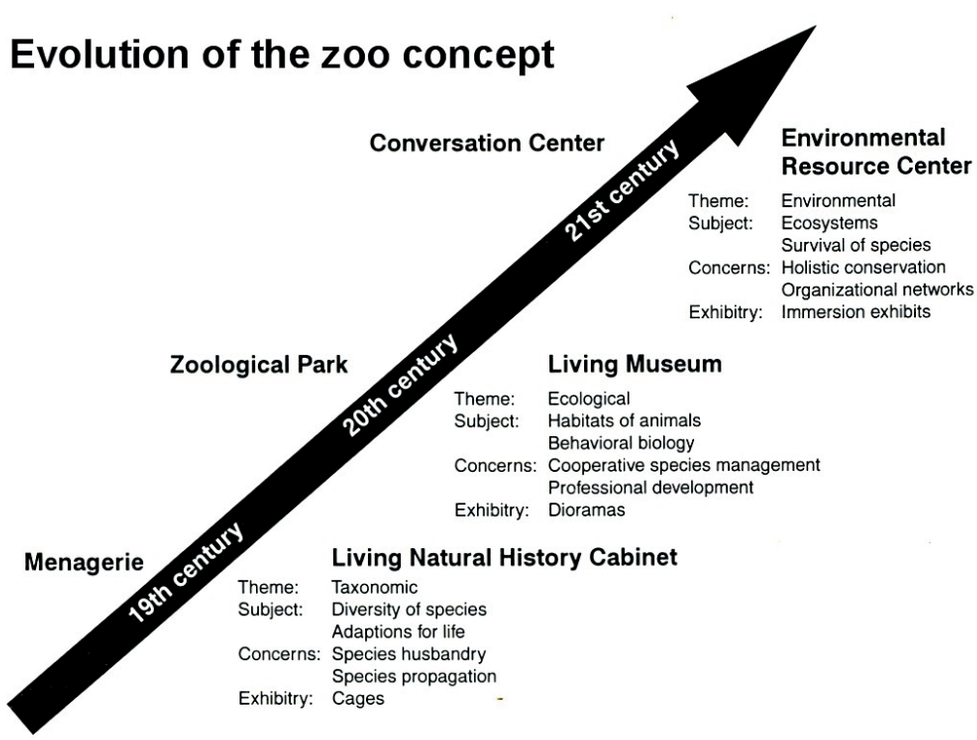
3.1 Zoo Objective History

3.1.1 Zoo evolution

To understand or somehow predict what the objectives of future zoo might look like it is of importance to analysis the zoos evolution. Especially the history of the 'modern' zoos needs to be understood according to John Coe (2012). The zoo evolution model based on the theories George Rabb is one of the most well-known schemes for the developments zoos have undertaken (Rabb, 2004). In his scheme (*Fig 16)* the evolution of zoos form menageries to conservation centres it made in to a linear path. Where zoos constantly have strived to be better places for animals and species conservation.

The idea that exotic wildlife exhibition evolved linearly from first menageries and then into zoological gardens has generated a great deal of discussion. As exotic wildlife exhibitions, have made all kinds of changes in history. From private to public entities, shifted from the domain of the wealthy to that of the public, as individual ownership switched to government or society ownership, as individual collections became cultural institutions, and as animal husbandry and exhibition standards improved, collections have certainly become different kinds of places. Evolutions in exotic wildlife exhibition can therefore not be a linear development. Although it does highlight the trends in zoos development over the past decades. In contrast, aquarium evolution is less complicated since it sprang forth as a relatively modern concept during the 1850s.

Figure 16 Zoo evolution model Rabb, source G. Rabb



3.1.2 Approach

The best way to understand zoo developments is by analysising why zoos have been present overtime and what role these exotic wildlife exhibitions played. In short exhibitions or collections of exotic wildlife have been maintained for many reasons throughout the past 5,000 years. Main five reasons are:

- symbols of power, luxury, diplomatic gifts and prestige
- personal pleasure and recreational use
- educational purposes
- increase zoological knowledge
- conservation purposes

By making a chronological analysis, for this research eight periods are defined, Ancient civilisation (3000 BC – 500 BC), Classical period (500 BC-500), Middle Ages (500-1500), Renaissance and Age of Exploration (1500-1800), Enlightenment and Industrial Revolution (1800 – 1900), Public zoo (1900-1960), Changing Zoo (1960- 1990) and Contemporary Zoo (1990 – present). The indicated time periods are of course always an approximation with some developments happening earlier and others later. Main source for this analysis has been the book Zoo and Aquarium History: Ancient Animal Collection to Zoological Gardens by Vernon N. (Kisling, 2000). This analysis will focus on the objectives for establishing exotic wildlife exhibitions, the (historical) development of the urban fabric and layout are primarily described in chapter four and five.

3.1.3 Characterization of the 'zoo'

What constitutes an exotic wildlife exhibition or zoo and which zoos were first are points of continued debate. It is therefore important to define what is a 'zoo'. Historically the two main types of exotic wildlife exhibition have been the menagerie and the zoo, of which the latter is now again in need of transformation.

Kisling (2000) describes the menagerie as a place where as many species as possible are exhibited, animals are exhibited in taxonomically arranged rows of barred cages, staff is somewhat knowledgeable about animals, and there are limited education and science programs; the main emphasis is on recreation or entertainment. Zoological gardens are quite similar to menageries according to Kisling. Nevertheless, zoological gardens distinguish themselves form menageries by having more naturalistic animal exhibits arranged ecologically or zoo-geographically, staff that is increasingly knowledgeable about animals, and improved education, research, and conservation programs. Conservation parks (or bioparks) are similar to zoological gardens, but with an increased emphasis on immersion exhibits that re-create natural habitats and on conservation.

Looking back, the manner of wildlife exhibitions has constantly developed, in to different forms around the world. Modern usage of the words menagerie and zoo is therefore always difficult when considering past cases of wildlife exhibition.

3.2.1 Ancient civilisations (3000 BC - 500 BC)

For centuries, exotic wildlife has been one of the ultimate collectibles, especially when alive and active. Since they are more fascinating and exciting than natural history (museum) specimens, plants, or cultural artefacts, further encouraged by the fact that alive wildlife is rare to collect, more difficult to acquire, and more expensive to maintain. Therefore, with the rise of the earliest urbanized civilizations also exotic wildlife exhibition/collection start to appear.

Living animal exhibition were, for most of their history, restricted to royalty and the wealthy classes. For these privileged classes, the urbanized lifestyle provided a relatively stable social environment conducive to long-term luxuries endeavours. Showcasing the ruler's dominance over nature and the wildlife stood as a metaphor or their dominance over their land and subjects. And further illustrating the extended of their lands and the foreign connections it held the ruler had. Exhibitions included both domesticated and wild animals for pleasure/ recreation such as hunting or fighting or to impress local and foreign guests as symbols of status. These (smaller) exhibitions were primarily held at het edge or outside the city in the rural landscape.

3.2.2 Classical period (500 BC - 500)

Wildlife exhibitions for foremost status but also recreation continued into the classical period. But interestingly the Greek curiosity, travel, and trade provided favourable conditions for developing large animal collections did not happen in the ruling city-states, where collection stayed modest by royalty and wealthy citizens. Noteworthy exception was Alexandria, as ancient city for scholarship held for this purpose a large and various wildlife exhibition in collaboration of the other excellent cultural and scientific institutions presenting the city linking the objectives of research and education to zoos. The Geek also had small collections in temples for religious reasons and showmen or professional animal trainers travelled and exhibited wild animals for entertainment to the public. Bringing animals both inside as well as outside the city.

In contrast to the Geeks the Romans held great collections of wildlife, especially as the empire expanded. With the creation and expansion of the empire the interest and import of exotic animals increased. For religious ceremonies, triumphant marches, special events, and the venationes (public games with animal versus animal and human versus animal combats). These extravagant public game spectacles organised by emperors, provincial administrators and wealthy citizens sometimes began in the late Republic period, but did not reach full notoriety until the Empire period. The recreational objective of exotic wildlife at these spectacles was enormous. Much has been written about these large spectacles were many animals displayed and killed. Unfortunately, little has been written about the collections where these animals were kept before going to the arena.

Besides these well-known spectacles there were also exotic wildlife exhibition with a more humane, aesthetic uses existed among the wealthy class, civil administrators, and emperors. Both native and exotic wild animals could be found they're in villa and palace garden. Were they still functioned as status symbols.

3.2.3 .Middle Ages (500 - 1500)

The disintegration of the Roman Empire meant the loss of the large exotic exhibitions for almost a millennium. However, monarchs, monasteries, and municipalities continued to keep wildlife in post–Roman Empire Europe. Within the medieval period wealthy elite had for status still (exotic) wildlife forming some proto-menageries, some of these proto-menageries with only one or a few animals travelled from town to town where their owners showed their "beasts" for money at fairs, as a form of recreation.

Most often these proto-menagerie exhibitions, dependent on one individual, and were sold or given away after the person retired or died. Although there were very few larger collections. The exceptional number of small (exotic) wildlife exhibitions in Europe, because of the interest of the elite in native and exotic wild animals, clearly shows that throughout these centuries' collections of wildlife were an important part of the culture of European societies.

The nobility and their guest used the game parks, falconries, and pheasantries besides hunting for relaxation, recreational riding, walking, and even watching the animals. Zoo animals were just another form of livestock for entertainment and status. Primarily enjoyed outside the cities at the estates of the nobility or sometimes at a fair in the city or village.

3.2.4 Renaissance & Age of Exploration (1500 - 1800)

In the fiftieth-century Europe evolved into a continent of nation-states with increasing power, wealth, and influence during its Renaissance. Relatively small and scattered royal, monastic, and municipal collections from the Medieval period began to increase in size and numbers forming the first menageries.

This increase coincided with the expanding European exploration, which encouraged the interest and access to exotic nature. The knowledge of exotic wildlife had always been based upon books, art, exhibitions from wildlife Europe, (near) Africa and (near) Asia. By the exploration further stretches of (southern) Africa and (eastern) Asia and their nature were discovered as well as the 'new' America providing both many familiar species (North America) as unknows species (South America). From these explorations wildlife was brought back that hadn't been seen in Europe since classical time, such as a rhino for King Don Manual I of Portugal in 1515.

The wealthy and trading which came with the exploration done by the Italians, Spanish and Portuguese supported by the good trading contacts with the Arab world help start new menageries (as well as botanical gardens) as the Renaissance and age of exploration began to flourish and to sweep across Europe by the fifteenth century. The menageries were places to increase the status and pleasure of the wealthy owner.

In the philosophy of the renaissance menagerie became a place for the improvement of people's knowledge about nature and foreign countries,

liking ones again research and education back to the zoo. In the sixteenth century, this concept was described by philosopher and scientist Francis Bacon in his drama Gesta Grayorum. Bacon stated that a knowledgeable ruler should have four institutions established under his authority: a library, a combined botanical and zoological garden, a cabinet, and a museum of instruments and machinery. Even describing how this garden with 'beasts, birds and fish' should be organized.

In the Netherlands, the first recorded proto-menageries start in the fourteenth-century (Kisling, 2000). Where the rulers of Henegouw established an exotic wildlife exhibition near their castle at The Hague, including a lion house. Duke of Gelder owned three exotic wildlife exhibitions at his residence. The first in Nijmegen then in Grave, and the lastly at Rozendaal. At the castle Rosendael the duke kept falcons and parrots, as well as lions. Throughout their reign the Princes of Orange maintained menageries at different palaces in Naaldwijk, Het Loo in Apeldoorn and Het Kleine Loo in Voorburg. Most prominent of these three was the menagerie at Het Loo were elephants and an orangutan were held.

One menagerie was different from most other, the menagerie of Blauwe Jan. This prominent menagerie was in contrary to almost all the menageries closed off status enhancing menageries on estates situated in the centre of Amsterdam and open for the public, although it is not known if they paid admission. Although held by a wealthy Amsterdam merchant is was not closed off as normally was the case but is was rather part of the restaurant of Blauwe Jan. Creating an open exotic wildlife exhibition within the urban environment. The menagerie had besides this recreational objective also active in the exotic wildlife trade, which thrived in Amsterdam fuelled by the presents of the VOC (Kisling, 2000).

Besides the stationary menageries at the monasteries, palaces and estates their where also traveling menageries. These travelling menageries went from town to town and court to court. They often had only one animal, such as an elephant or a rhino, but would later develop to offer a variety of exotic wildlife. While there touring these traveling menageries also played roll in the public's education of the exotic nature since they were in contrary to the stationary menageries, travelling menageries were open towards the public, for a fee of course. This gave the common people the opportunities to learn about the animals and about the world outside their village, town, and country. Bringing the first steps in to helping learn the common people about the natural sciences.

3.2.5 Enlightenment & Industrial Revolution (1800 -1900)

The first of the scientifically operating menageries was the on at the Jardin des Plantes in Paris (Kisling, 2000). Establish as garden for medicinal herbs by Louis XIII. In the eighteenth century, a small museum was added to the plant collections. The foundation of the menagerie also date back from the seventeen century when members of the Academy of Sciences of France who appealed to Louis XIV to establish a national menagerie which was done at Versailles in 1662. During the turmoil of the French Revolution the menagerie, like other royal property, was expropriated and moved to the Jardin des Plantes. Here it would serve as a living part of the Muséum d'Histoire Naturelle. The new French nation saw the museum, with its menagerie and garden, as a symbol of the new free nation and the new

scientific consciousness. Thereby in 1793 for the first time establishing a menagerie, exotic wildlife exhibition, was realized for primarily scientific reason.

After the establishment of the menagerie at the Muséum d'Histoire Naturelle, it was 35 years before the next major European exotic wildlife exhibition opened. This was the garden of the Zoological Society of London at Regent's Park opening in 1828. Introducing the term zoo for exotic wildlife exhibitions. In the society, wealthy Londoners with an interest in natural history and the wider natural world came together, fulfilling a social function comparable to an English Gentlemen's Club (Wirtz, 1997), indicating that besides the research objective status and recreation also were prime objectives. The establishment of London zoo was the first time a zoo was founded by a zoological society and forward thinking in the goals it set for scientific endeavour, including contributing to the development and popularization of natural science, taxonomic classification and the making of nature accessible, using results and of these endeavours for public education. Although the London zoo would be a membership only garden and institution until 1847, non-members also would be allowed to visit the zoo.

Fundamental changes came to pass during the period of enlightenment in the 18th century. This was part of a larger cultural shift at the time, instigated by the Industrial Revolution and new found wealth and the ideas instigated by the Enlightenment (Kisling, 2000).Knowledge expanded in all directions and was not yet fragmented into specialized disciplines. Nature was held as the only verifiable source of knowledge, and the natural sciences saw the principal means of understanding the world, society and history (Wagenaar, 2011). Ideas fostered by the Enlightenment went far beyond the field or science inquiry, they promoted social criticism and political action. These new insights should not be exclusively for the elite but also the 'general' public there was the moral obligation to keep them informed. All means where used: newspapers, pamphlets, and books but also the new phenomena, for instance, the public museum, universities, scientific exhibitions and theatre to share their knowledge and ideas. The enlightenment also created new ideas on the design and (re) construction of cities, landscapes and gardens (Wagenaar, 2011).

The appearance of the zoological garden was one of these new phenomena. Starting in the early 19th century they became an important cultural and scientific institution part of the urban renewal and expansion programs. With the city parks, boulevards and squares they formed the new elements for the city, that not only brought necessary entertainment, but also fresh air and space in the polluted city (Baratay & Hardouin-Fugier, 2003).

Zoos being one of these new promises as a new scientific public institution Wirtz (1997) describes. As institutions of science and not recreation the (expensive) membership system allowed to keep out the poorer classes of the larger urban population and establish them self as a facility for the elite, status.

Quickly becoming a very fashionable and elitist club where all urban elite tried to be a part of. Status was related out of the membership of these new and modern scientific institutions. The echoed the new and modern upper-class cosmopolitan atmosphere these people were looking for.

Although at that time there was already tension between the displaying of animals as a source of knowledge and research or as a 'vulgar' entertainment attractions, which in these society clubs became more and more apparent. The latter didn't match with the bourgeois ideas of a genteel institution. Anyhow, the popularity of the zoo and the zoological societies was tremendous with zoos establishing all over Europe with the similar incentives for research, recreation and status.

.2.6 Public Zoo (1900-1960)

The transition of zoos from science towards entertainment happened from the mid-19th century on. The role of the zoo as a place for primary entertainment was mainly established in the early 20th century. The zoos made this change because the demands of maintaining living captive wildlife were high, unlike museums. Member-only zoological gardens opened their gates to paying visitors regardless of status, to foresee in these high expenses. (Wirtz, 1997)

Despite the protests and discontent of zoo directors and members, upholding the pure motives of science and education had come to terms with the bare facts of financial solvency. The truth was that a large part of zoo financing depended on the entertainment value of captive wildlife, not their potential for educational or scientific exploration which the enlightenment tried to bring. When zoo directors, looked at the finances and noticed what public opening and how the acquisition of certain animals' boosted interest in the zoo there was little choice (Wirtz, 1997).

When it appeared that existence depended upon attracting the larger public, zoos, many privately financed by shareholders, began to promote themselves in popular media of the period. By mid-century several began to promote themselves actively as tourist attractions, fully embracing the recreational objective. But the opening of zoos to the public did not mean that the zoo directors spontaneously geared their exhibits towards popular tastes or that bourgeois values regarding proper exhibition and zoo patron behaviour conceded much ground. With still special events and days for members only (Wirtz, 1997). But also, introducing rides on camels and elephants or selling food to feed to the animals.

Nature became a base to various forms of urban recreation in an environment that lacked a wide range of respectable leisure outlets outside the home. Before the age of mass media entertainment, park-going was a popular, socially acceptable form of entertainment and recreation. Zoos benefited from their image as recreational facilities and also from the trend towards reduced working days (Wirtz, 1997). Further before the introduction of film and video, ordinary people had little knowledge and hardly ever seen living exotic wildlife, the ability to let people to get a sneak peak of the great exotic world made it very attractive to visit them (Hediger, 1977; van Linge, 1992). Unlike what they had been in the earlier 19th century, by the end of the century zoos were often symbols of mass leisure (Wirtz, 1997). In this process their focus on education and research faded to the background with status only being present in the city governments how could say that they had a zoo in their city. Within this period also the first conservation was started with the breeding of the European bison, which had almost gone extinct during World War I.

3.2.7 Renature Zoo (1960 – 1990)

In the 1960s, as the social economics vastly improved people had more time and money to spend on leisure. New sorts of recreation facilities were established (Kisling, 2000). These new facilities contributed to increased competition for people's leisure time which reduced the visitation at zoos due to these higher competitions. Further growing welfare concerns and people getting bored with the way of exhibition. This meant that the classical zoos were getting out of favour. Three kinds of exotic wildlife exhibition recreation became popular, one of which was the safari park, where visitors could view the animals from their cars as they drove through the park. Most safari parks were established for a quick profit and then failed, although a few succeeded. A successful safari park is the Tilburg Zoo, Beekse Bergen in the Netherlands.

The other kind of park that became popular was the dolphinarium. Some dolphin exhibitions travelled through Europe commercially, whereas others were just another attraction at leisure parks (Kisling, 2000). Some zoos established dolphinariums with more educational entertainment, such as the zoos in Rhenen, Antwerp, Duisburg, Hamburg (Hagenbeck's), Nuremberg, and at Münster.

Lastly some new zoos became very specialized in a certain type of species or region, often offering new opportunities to experience this wildlife. Such as the Apeldoorn Zoo. Only monkeys and apes are kept here. The smaller species live semi freely, including a troupe of squirrel monkeys. Visitors walk through the forest and can see the free-roaming monkeys overhead in the trees or can wait at a feeding place for the monkeys to come to eat.

Until the 1960s, the zoos objective was primary recreation for people and the number of visitors was high at the time (Kisling, 2000; Tribe, 2004). The influx of money was good and the zoos could repair their war-damaged facilities, as well as build new ones. Meanwhile animal welfare critics became more and more vocal, form the 1960's onwards it became clear that zoos needed to reinvent themselves and what they would stand for, so a new path was chosen (Tribe, 2004). Zoos started to shift their attention more towards conservation, education and research of the wildlife and their native ecosystems. This coincided with further knowledge that was gained of animals and ecosystems, which also more and more became under thread, thereby their now appearing objective of conservation. Moreover, the breeding off exotic animals also became a necessary since the new international accredited zoo organisations EAZA and WAZA banned trade and selling from wild animals into zoos.

3.2.8 Contemporary Zoo (1990 – present)

Since the 1990s new zoo developments have been taking place all over Western Europe. New zoos have been established in the Netherlands, like Kerkrade Zoo and Nuenen Zoo but also in Spain, France, Belgium and other countries. Existing zoos have enlarged their areas, such as Amsterdam Zoo, Rotterdam Zoo, and Zoo Zurich. New masterplans are changing other zoos, such as Hanover Zoo. The new Hanover masterplan will create a different zoo where the animals will roam in apparent freedom and their "edutainment" program, will give the public an

expedition into the world of nature (Kisling, 2000).

Increasingly zoos also see themselves as biopark, or conservation parks. Some features of the conservation park concept had existed previously, such as the exhibition of multi species natural habitats. Other design and exhibition features of the conservation park concept are only now possible because of improved animal husbandry knowledge, animal health care, and modern technology. Since the beginning of the new millennium zoos are strongly influenced by a modern day public social sense on animal welfare and wildlife conservation. Zoos are making the current shift towards conservation parks a reflection of past and current social, environmental and technological changes. As wild nature is becoming under more pressure and national parks are more and more becoming a 'megazoo' the concept of a twenty-first century zoo is also shifting. The concept of the zoo as a conservation park is increasingly changing in viewing the modern zoo as an environmental centre with a broader and more proactive focus on nature conservation, education and research. With not only preserving of natural wild but also rebuilding damaged natural ecosystems. As Jaap Balk states about conservation and biodiversity "Zoos stand on the breach of the genetic capital that the evolution has placed in the hands of man" (Balk, 1982). All of this the zoo will have to combine its recreational functions which have accommodated exotic wildlife exhibition through the centuries.

Next to being conservation centres zoos form today an important part in our urban environment as places for leisure and recreation. Zoos provide a pleasant setting for families, local residents, and tourists to experience the exotic natural worlds. Zoos are an integral part of the social and cultural life of the community (Tribe, 2004).

In the Netherlands and western Europe zoos are developing, each in its own way, new emphases on public education, research support, conservation and/or recreation. With new ideas, new exhibits and a more sophisticated organization for the welfare of animals, both in the zoos and in the wild. In Europe zoos and aquariums are still in a constant development. They are in one form or another trying to make the welfare of the animals better and provide a viable role within the society. Meanwhile still being highly attractive recreation destinations within the urban environment.

3.2.9 Conclusion historic development objectives

The main objectives of the zoo have developed significant over time, is shown in *fig 17* and *fig 18*. Five main objectives have been identified, status, recreation research, education and conservation. Over the different time periods based on the literature the value of the different objectives of the presents of a zoo has been schematically visualized. The objectives of the zoo influence the its relationship with the urban fabric and the lay-out of the zoo, for instance exhibition methods. But the changings of objectives also indicated the relation of a society with wildlife.

For most of history exotic wildlife collection have existed primary to enhance the status of its owner(s). Wildlife is decorative and animal welfare is of little concern, the possessing of animals is the main objective. Nowadays status is of no real relevance f*ig 17*, since the zoo has become an open and public institution. In the future zoo status is can therefore be expected to be of little to non-important zoo objective.

The period of enlightenment and industrial revolution changed the history of zoo and their objectives. Since that period the objectives of the changed significantly, with research becoming the main objective within the period of Industrial revolution. With the progress and increased interest in science wildlife became an object of study and zoos were living laboratories in the city. Overtime other objectives have replaced research as main objective, but still has remained relevant for the zoo. For the future zoo research could become a prominent objective. In possibilities to blend biological research station or laboratory and zoo. But creating this blend would be depended on the animals and plants that would be researched and the type of research, since only semi-wild conditions can be created.

Next to research education has become a prominent objective since the enlightenment for the exhibition of wildlife *fig 17*. Especially since the 1960 as the nature become more and more polluted and animals were increasingly under threat of extinction educating people about these issues has been a growing principle for the objectives of the zoo. Using wildlife as a reflection to interest people in nature and educate them about the natural world. For the future zoo education will be a very important objective to validate holding animal's captive, as examples to showcase nature in the urban environment. As viewing, hearing, smelling an animal up close creates are strong educational engagement.

Besides increasing the educational objective, the degradation of nature also laugh conservation as objective for the zoo, especially since the 1960's Figure X. This came also with an increased attention by the pubic for animal welfare. Wildlife thereby also acts nowadays as ambassadors for their wild counterparts and breeding programs for some endeared species have been set up in captivity. With most of society conservation is seen as a legitimate objective for wildlife captivity. If the current trend both inside as outside the zoo continue, which is likely, conservation will be the most important objective of the future zoo.

Lastly, we see that through the centuries recreation always have been a part of wildlife exhibition. Especially at the beginning of the 20th century when the zoo was one of the only forms of mass recreation. Although the manner of recreation experience with exotic wildlife currently is

very different then is was in classical times. No more fighting in the arenas and shows have become increasingly more education oriented. Recreation form wildlife nowadays comes primarily from viewing and experiencing them and their often 'fun' behaviour or moving character, as animals captivate humans. Recreation wise people view exotic wildlife almost as to large or dangerous of pets that they would have liked to have had themselves. For the future zoo recreation will still be a major objective, not in the least to keep its conservation, education and research objectives economically feasible.

Overall the objectives or significance of the zoo for the city and nature has increased over the centuries and especially since 1960. For the future zoo delivering the objectives for the animals, visitors, zoo and city will create the moral viability of keeping wildlife in captivity.

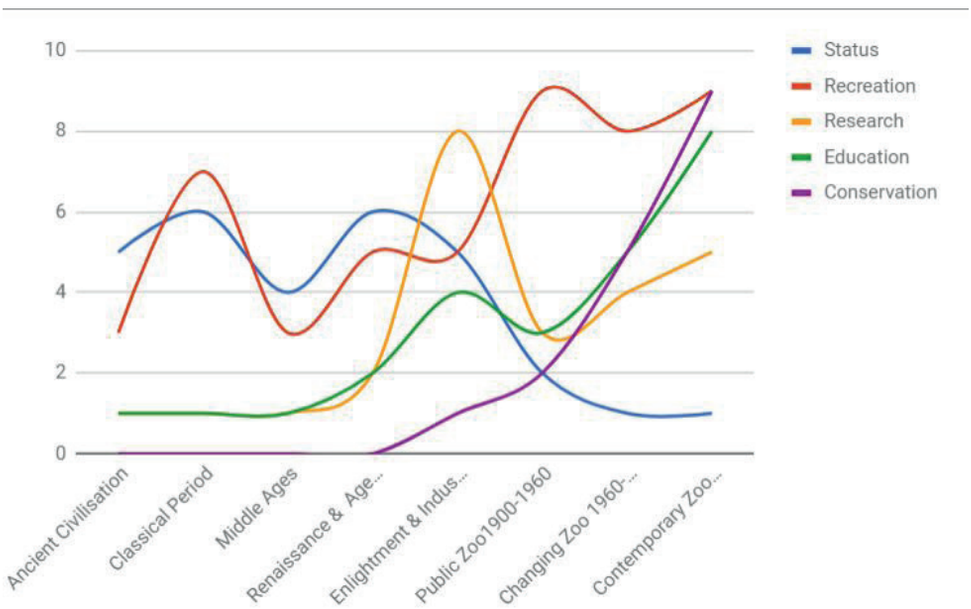


Figure 17 Development of the importance of the different objectives of the zoo through history, by authos

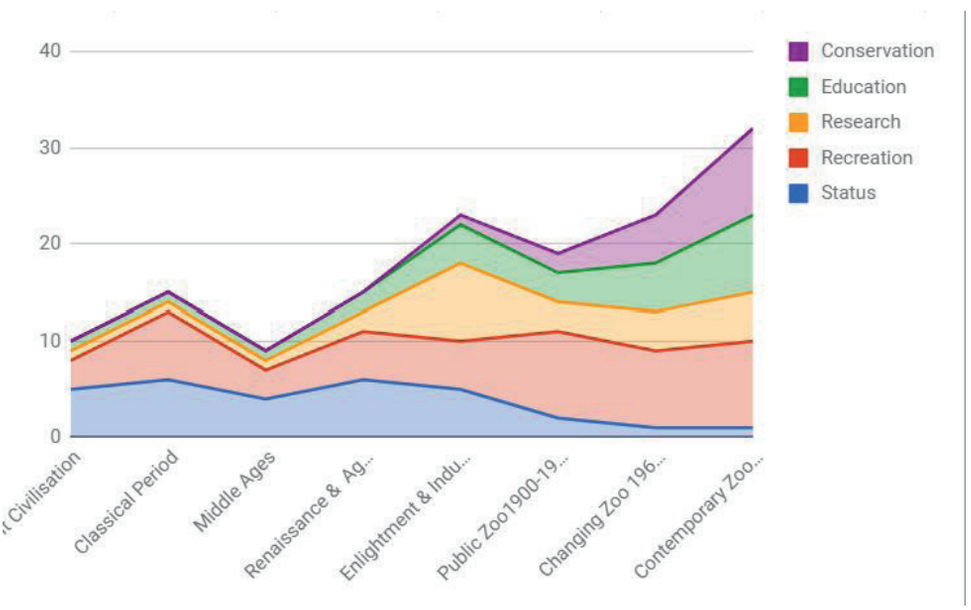


Figure 18 importance of zoo objectives within society, by author

3.3 Animal information signs

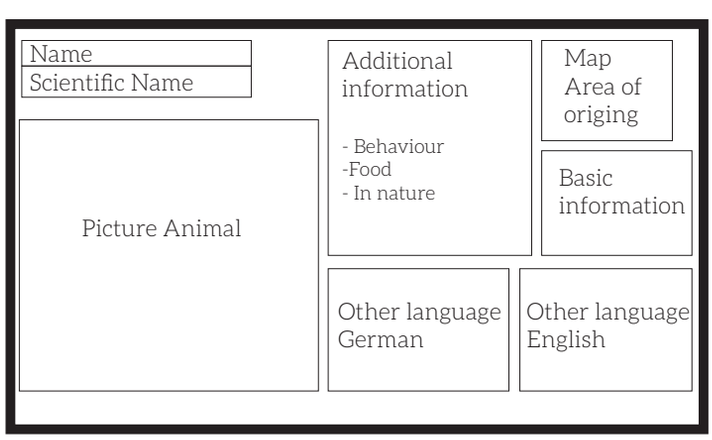
Sign are often the primary source to deliver the education objective and inform about the conservation objective of a zoo. The quality of signs varies from zoo to zoo, and exhibit to exhibit. Sometimes providing high quality information, with additional information about behaviour, conservation efforts, natural environment etc. By doing so a people are educated more about the wildlife and its natural environment or engaged in the conservation efforts of wildlife or habitat as is intended with the signs *fig 19,20,21,22,23*.

Generally most signs only provide the basic information about an animal, such as name, map of origin, diet, height, weight, number of young etc *fig 20* and *fig 21*. Although this is information is needed, it doesn't offer enriching educational experience.

All the shown information signs are form the zoo of Arnhem. Also, here a variety in the amount of information given is visible. There are the basic signs such as *Fig 19*, *Fig 20*,and *Fig 21* and the special separate information signs *Fig 22* and *Fig 23* related to behaviour and conservation. The general information sign, shows the basic information and some short additional information about the animal. But both the basic and additional information is not very in-depth, or could have been worked out more.

In the future zoos, signs need to be more in-depth then they currently are. Also, signs should activate the visitor more, for instance by making the visitor aware of a certain type of behaviour what the visitor then can recognise in the animal in the exhibit.

Figure 19 Standard larger animal information sign at the Arnhem zoo, by author



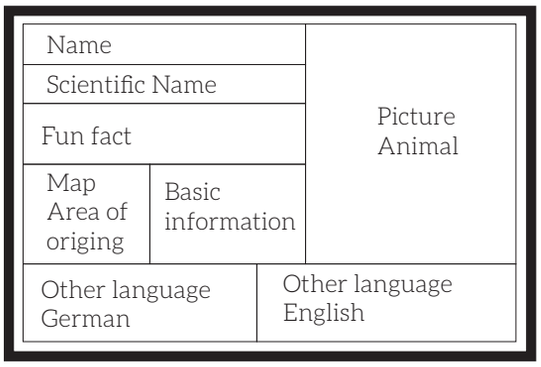


Figure 20 Smaller information signs at Arnhem zoo , by author

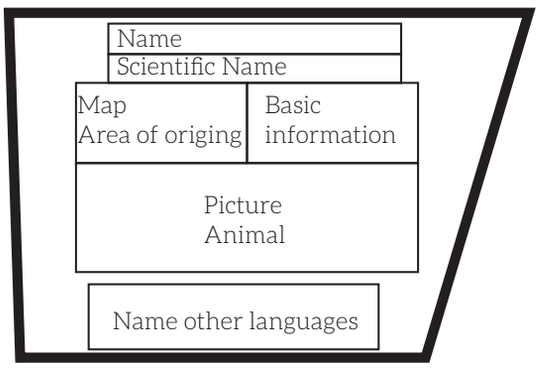


Figure 21 Smaller information signs at Arnhem zoo , by author

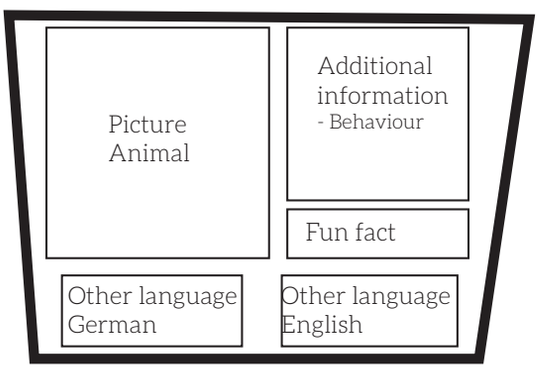


Figure 22 Behaviour information signs at Arnhem zoo , by author

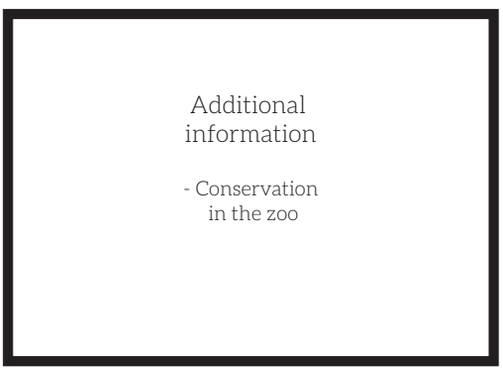


Figure 23 Conservation effort information signs at Arnhem zoo , by author

3.4 Manifestation of objectives in zoo

The current zoo as four main objectives for the institute as well as for society. The main objectives are education, recreation, conservation and research. These objectives nowadays can best be characterised has the following.

3.4.1 Education

The living wildlife collection zoo has unique opportunities to education there visitor about these animals and their natural habitats. This can be done regardless of age or intellectual capacity. Education can be given and received by various methods, as is often also done by the zoo. Zoos deliver passive education to the visitor primarily by signs around the exhibits. Informing the visitor what animal(s) are on this play and some basic information is also normally given, like scientific name, weight, height, diet, gestation period, number of young etc. Often also additional information on the same sign or other signs around the exhibit about more specialised topics such as behaviour, conservation efforts, habitat etc. These kinds of information can also be given in some more interactive methods seen in some zoos, by the use of games or digital panels. Education in this manner really dependents on the visitor and his interest to learn. Zoos use more active methods of education by offering guided tours through the zoo, information stands or keeper talks. These efforts are instigated by the zoo staff and offer often a deeper and personal level of education. Thereby having a higher effect on the zoo visitor, but also being very labour intensive. Zoo often plays also a part in the urban environments educational structure by offering forms of group education. The primary example of this is the programs they organise for school visits be it primary, high school or university. With some zoos also having special teaching facilities for such a group. In recent years zoos have also started offering lectures, although these are often organised mainly for zoo members.

3.4.2 Research

The last main objective of the zoo is research, although of less significant nowadays as it as a century ago zoos still have a unique position within the natural science community. Because they offer to research the ability to study the animals in a controlled environment, closer to home. Study projects are not uncommon and some zoos have strong relationships with universities, however, zoos also do a lot of research themselves into their animals daily to see how they are doing and what could be done to improve their condition. Zoos facilitate research by installing observation platforms or having special exhibits onside although this is very rare. The research done is sometimes also communicated to the visitors or visitors can even participate in studies. This visitor engagement helps to show the visitors the reasons and benefits of holding those animal's captive.

3.4.3 Conservation

In recent decades conservation of species have become the main pinnacle for the existence of zoos and a key objective. Zoos conservation efforts can be divided into two main segments in-situ conservation and ex-situ conservation. In-situ is the conservation efforts being done directly in

nature, often in natural parks. Zoos do this by financing national parks, wildlife protectors, providing knowledge and skills etc. Better know is the ex-situ conservation efforts of the zoo done at the zoo itself. Most well-known is the breeding of endangered species either for forming a reserve population and some time for reintroduction into the wild if that is possible. But also by showing and educating people about the endangered animals and their habitats or fundraising activities etc. they help the preservation of species.

Conservation involves not only captive breeding, but field programs as well. Many zoos participate in rein-introduction programs for endangered and extinct (in the wild) animals.

3.4.4 Recreation

Recreation also is an important and sometimes controversial part of the zoos objectives nowadays. Zoos are by visitors always primarily perceived as recreation attraction and that is also the main reason they visit the zoos, having a nice day out. The zoo can be offer recreation by three main fields. First of their animals, they are the only recreational and cultural institution that holds a collection of exotic wildlife. Coming up close with these real exotic beasts and seeing them behave in their habitats is special and often very much enjoyed the experience for many people. Besides animal zoos often have certain other attraction for their visitor to enjoy. Most prominently is the playground, which is often a very popular spot within the zoo as a large part of the visitors are often (grand) parents visiting with their children. Additionally, other attractions may also be present such as animal shows or even special rides or amusement attractions. Recreation can also be stated by special manners of animal encounters or adventurous paths to view them.

3.5 Future developments related to objectives of the zoo

3.5.1 Conservation will be key

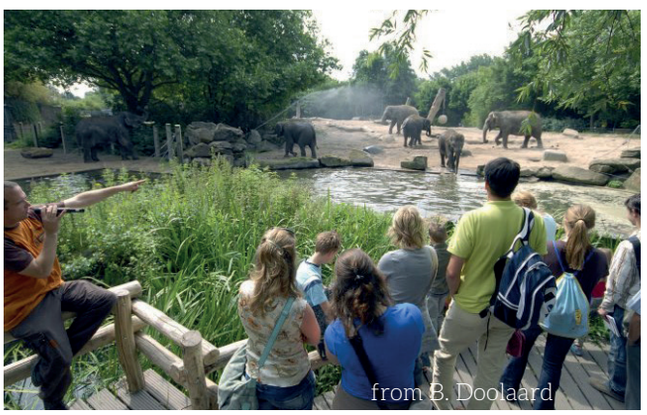
The main objectives of the zoo are currently conservation, education and research. These objectives, will probably be the most important objectives of the zoo in the future. Although their roles might change or become more prominent, especially conservation will increase in importance. Although how this conservation needs to be happen in the future is a discussion. If zoos don't have conservation in the core, they won't survive according to Kevin (Murphy, 2012). According to (Murphy, 2012) the zoos conservation efforts should not be measured in its breeding success, but rather in its ability to its educational potential. Where zoos are more than just arks.

Fiby warns that zoos should watch out for unintentional domestication of wild animals, since they tend to breed the easier and more quiet animals of a species, thereby selection on certain animal trades (Fiby, 2012). But she does value the zoos as a place for back up populations of endangered wildlife, with active meta population management and programs for reintroduction, something Conway agrees on to ensure the genetic diversity (Conway, 2012).

Conway is primarily concerned that zoos give certain species how are not endangered too much space, while animal how do need, but less popular, are under representing. Further he is a strong supporter of introducing a conservation fee at zoo for visitor to pay (Conway, 2012). This fee should then be free for the visitors to decide to which conservation project is should go. But the future zoo could very well link this to one of their own in situ projects.

John Kagan warns that in the future zoo conservation and welfare are not the same and might conflict with each other (Kagan, 2012). Since he believes welfare depends on the personality of the animal, something with our increasing knowledge about animals can increasingly better be anticipated. So dynamic and unpredictable environment filled with choice, smell, sounds etc can be created to allow natural behaviour to occur.

3.6 Aspects Zoo Evaluation Tool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Education:
aspect evaluates how the zoo functions as an education centre for visitors directly as well as its place within the educational landscape of the

- *Passive information:* is the information giving to the visitor without other human interaction, such as signs.

- *Active information:* is human to human education given at the zoo, which has a higher potential of information transfer to visitors.

- *Group education:* leans to how the zoo tries to educate larger 'external' groups of people at their facility how come especially for the educational purposes.

Research:
aspect identifies how the zoo functions as a nature and wildlife research centre and to what extend visitors are engaged with the research.

- *Scientific research* evaluated the zoos engagement and cooperation with the scientific community.

- *Visitor engagement* how visitors are informed about the research done at the zoo and if and how they can participate in research.

- *Research facilities* are a component of the research aspect, since it indicated the ability for scientist to do research at the zoo.

Conservation:
aspects describes how a zoo incorporates nature and wildlife protection and how this is communicated to the visitors and community.

- *Ex-situ programs*, conservation work outside the zoo

- *in-situ programs*, conservation work inside the zoo

Recreation:
aspects focusses on the leisure experience of the zoo and what people can enjoy at the zoo as well as what are the highlight that attracts people to visit the zoo. Some component have been based upon research in chapter four and five.

- *Iconic animals* are of the main attraction of a zoo, these popular species are one of the main sources of enjoyment and satisfaction or the visitors.

- *Collection of animals*, variety and number of animals for visitors to see and enjoy

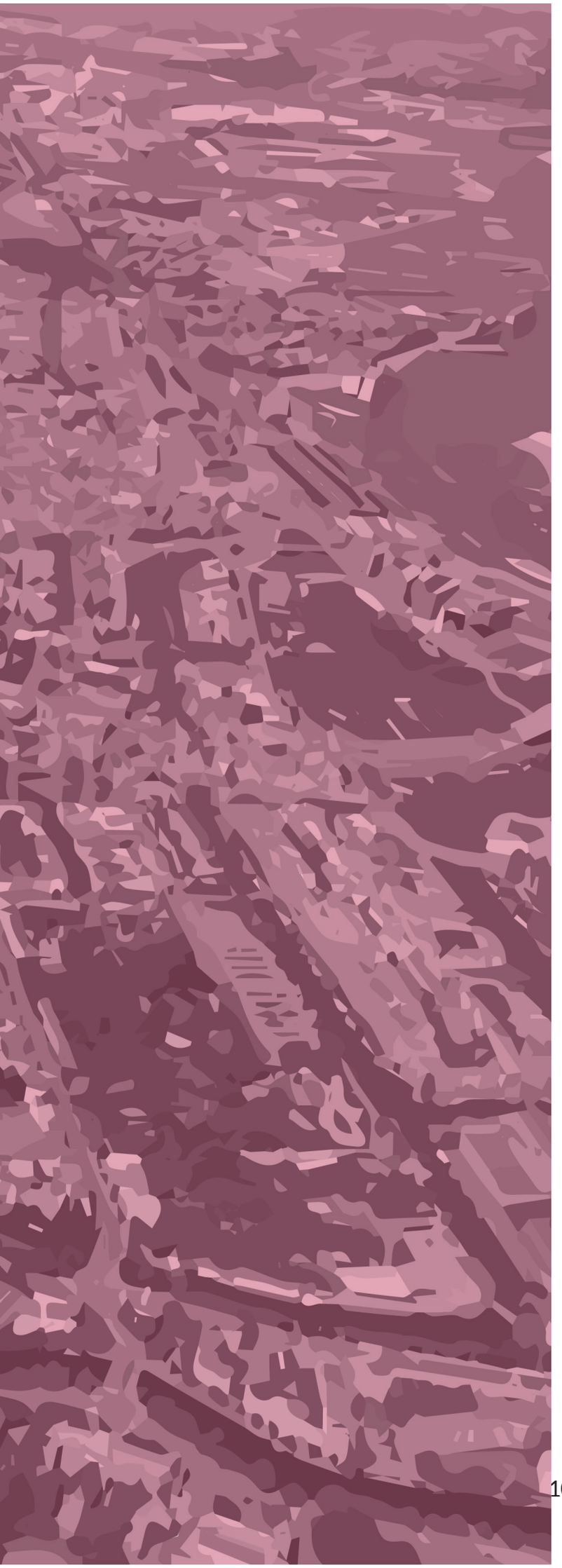
- *Animal shows* which are a more direct form of wildlife recreation.

- *Facilities Visitors:* component identifies the amenities for the zoo visitor, both qualitative as quantitative.

- *Attractions:* besides animal at the zoo, such as a playground, petting zoo or larger attractions.

Chapter 4

Urban Fabic



4. 0 Introduction to the urban fabric

Zoos are an urban institution and unbreakably linked with the urban fabric. By analyzing how the position of the zoo within the urban environment has developed in history and what factors determent this relationship with the urban fabric. The current situation can be evaluated as well as aspects that influence the relationship and connection with the urban environment. The situation of the zoo in the urban fabric and its social spaces will be besides this historical approach also spatially analyzed, primarily by studying the border conditions between zoo and city. This study of the urban environment is in accordance with Coe (2012) approach of developing a future zoo. This chapter connects to the first and second research questions:

1. What are the reasons and methods for the exhibition of exotic wildlife in our western society and how have they developed?

2. How can we describe zoo based on different basic elements and function of the zoo and its urban environment?

This chapter will first categorise the main urban position a zoo has within the urban environment. further it will then discuss how these positions have changed in history corresponding with the social relation with the society and how zoo facilities have mixed with the city or helped urban development. Additionally, the spatial position on a larger and lower scale will be analysed, accessibility of the zoo, permeability of the edge and the type of edge the zoo and urban environment come together.

4.1 Urban positions zoos

Zoos are situated in different places in the urban environment creating different relations with the urban fabric. Although on different spots they are inseparably linked with the urban fabric. Four main positions towards the urban fabric can be described: centre, urban, edge and rural.

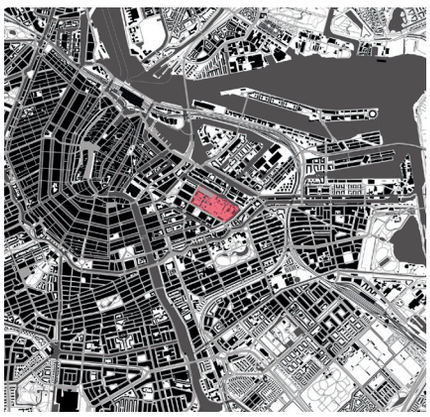
- Centre: Zoo is situated within the urban environment, in or very close to the city centre where also other city functions and facilities are located.

- Urban: Zoo is situated within the urban environment, (partly) enclosed by the city but at some distance from the city centre. But well linked to the urban fabric.

- Edge: Zoo is situated at the edge of the urban environment, partly free from the urban environment and urban fabric.

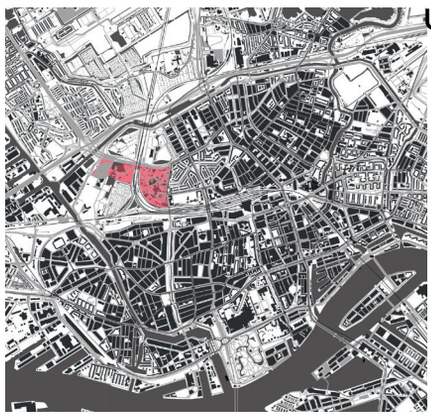
- Rural: Zoo is situated freely from the urban environment, with a (short) distance to the urban fabric, like an island in the landscape.

In further research it is important to see how this urban position of a zoo relates the strength of connection and accessibility between zoo and city. Additionally, the influence of the edge between zoo and city might be the similar between zoos with the same urban position. Likewise, the ability to share and facilitate urban function in the zoo depends on its relation with the urban environment.



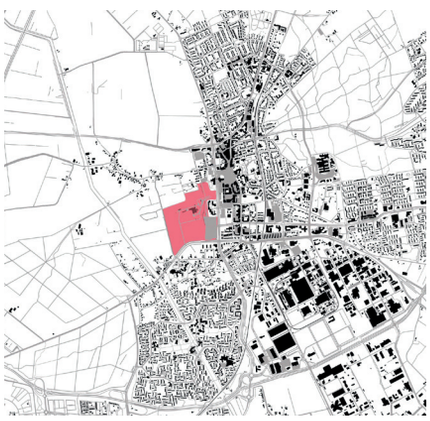
CENTRE

AMSTERDAM



URBAN

ROTTERDAM



URBAN

EMMEN

URBAN

HARDERWIJK

URBAN

ALPHEN A/D RIJN

EDGE

ARNHEM

EDGE

KERKRADE

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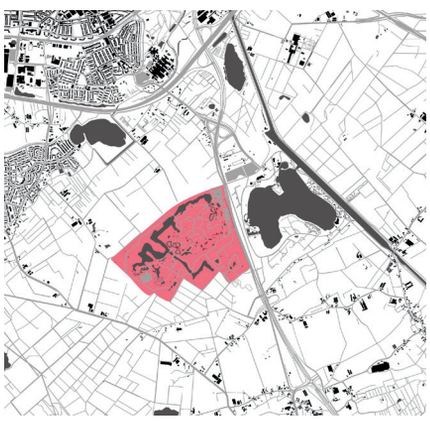
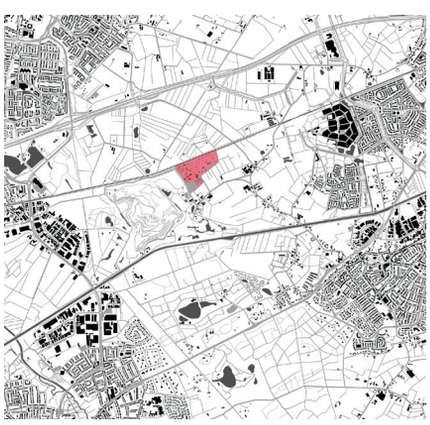


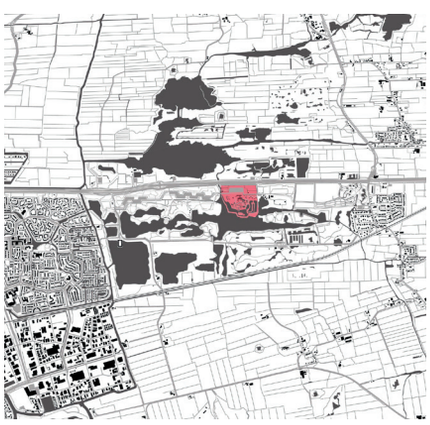
RURAL

TILBURG



RURAL

NUENEN



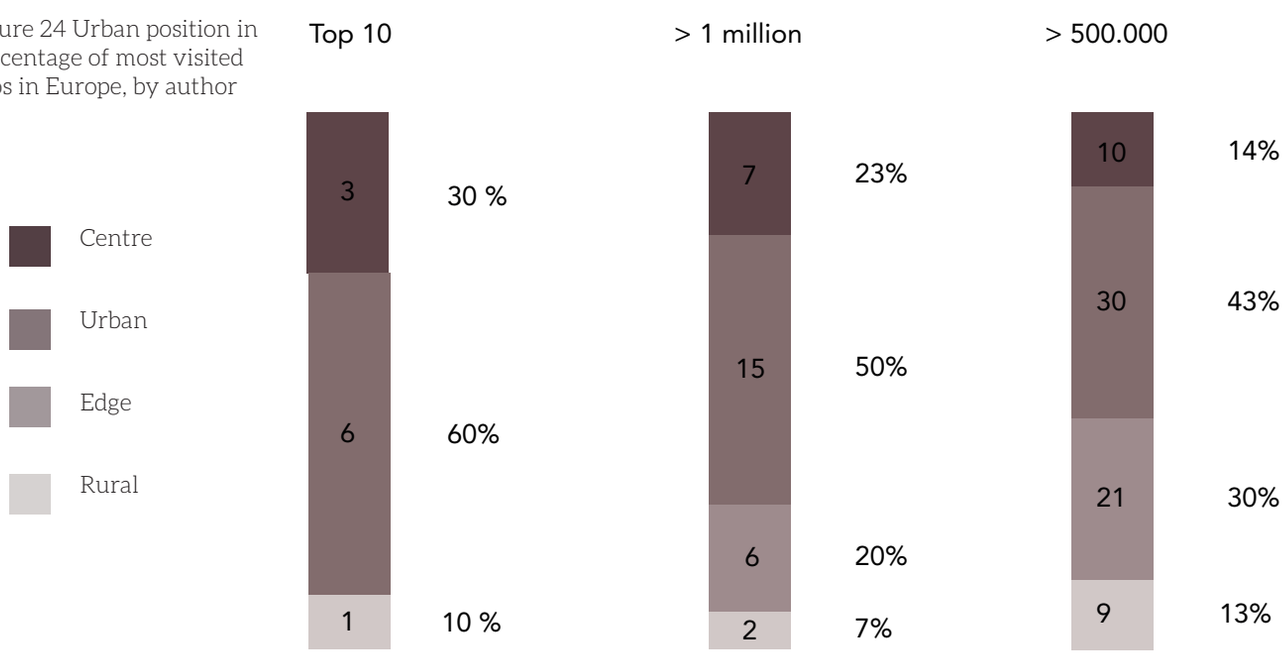
RURAL

LEEUWARDEN

4.2 Urban position matters

The position of the zoo in the urban fabric has influence on the number of visitors that come to the zoo annually. A location closer embedded in the city often leads to higher attendance. Comparing the urban condition with the number of annual visitors shows that a higher urban environment also leads to a higher number of visitors as shown in *Fig 24*. The top 10 most well visited zoos in Europe are all except one in a centre or urban position (90%) with three in a centre position with their urban environment. This percentage drops considering zoos receiving over a million visitors and even more so with zoos above 500.000 visitors. So lesser visited zoos tend to be on less urban locations. The more visitors a zoo receives the higher the potential group of people the zoo can educate and engage in conservation. Also, more visitors increase the economic feasibility of the zoo. The urban position matters to the zoos attendance, but since the zoo is a stationary collection of buildings and exhibits it cannot easily change its position. Therefore transforming the zoo into a 'future' zoo the urban position can depend a lot between different facilities and would be difficult to influence. From a case to case basis the future zoo needs to find manners to enhance its connections with the urban environment and thereby strengthen its urban position. It's could be done by at the accessibility, edge and mixing of functions.

Figure 24 Urban position in percentage of most visited zoos in Europe, by author



4.3 Historic overview of the zoo in the urban fabric

To understand the current position of the within the urban environment and is social, mental and spatial place within the urban environment, there needs to be an understand of how its relationship with the urban environment developed and changed overtime (Coe, 2012). Like in the previous chapter these development and changes will be handled chronologically.

4.3.1 With the elite

During the ancient civilisation as zoos were part of the royal procession of the kings of Sumeria, Babylonia, and Assyria they were part of their royal parks. These royal parks were a combination of proto-menageries, hunting reserves, and garden-park for entertaining guests and personal pleasure. Thereby being part of the palace or estate of the king, primarily located in the rural or at the edge of the urban environment. During the classical period as zoos and wildlife exhibition became a part of recreation for a larger part of the society zoos appeared more in the urban environment.

The Colosseum and other arenas and theatre were these excessive public games took place were prominent facilities within the urban environment often in the centre. Along with these spectacles wildlife exhibition could also still be found at the gardens of estates, villas and palaces of the romans. Which were situated in rural areas as well as more edge or urban places.

Besides being present in the social, spatial and mental urban fabric. Zoos and wildlife exhibition played a role on the city's economy. As the industry exotic wildlife for the public spectacles and private collections created a great variety of professions within the Roman society such dealers, performers, animal slayers (those who fought animals in public games), trainers, keepers, and veterinarians. This made wildlife exhibition besides a social aspect with in society also an important economical one.

Within the medieval period as monarchs, wealthy elite, monasteries owned predominately (exotic) wildlife. Most popular form of (exotic) wildlife exhibition with royals and nobility were game parks, falconries and pleasantries often filled with primarily native wildlife. Often as part of gardens or game parks o, which were large areas of forest with some meadows and other landscaping surrounded by a wooden lattice fence or a stone wall, for example the Berlin Tiergarten which still exist today as a public park. As an institution primarily available for the elite these collections were almost all situated in the rural environment, as it was they're were the castles and estate were situated mainly.

Besides these collection at the estates some (exotic) wildlife was also situated in the city. Either by travelling showmen how travelled from town to town where their they showed their "beasts" for money at fairs. Or by some towns that built deer moats and bear pits. Often these municipal wildlife exhibitions were linked to the coat of arms of the town.

Wildlife exhibitions stayed predominately rural phenomenon during the Renaissance and the Age of Exploration although grew in size, number and importance. First at the Italian, Portuguese, and Spanish courts, but later all over Europe as the wealth increased. Such as with the Princes of Orange maintained menageries at different palaces in Naaldwijk, Het Loo in Apeldoorn and Het Kleine Loo in Voorburg.

As described in the previous chapter Blauwe Jan was an exception in this bringing a stationary menagerie back in to the city of Amsterdam. Planting the seeds for the zoo as a primality urban phenomenon as we know it today. That this happened it probably due to the open and wealthy civil society in the Netherlands. Were the people held the power and not the nobility or the church. Further this collection next to an exhibition also a trading house, which preferred to be close to the harbour of Amsterdam and its trading houses then being situated in the far off on a rural estate. The menagerie of Blauwe Jan gave the people of Amsterdam an extra connection with exotic wildlife while other people only came in contact through traveling menageries at that time.

Exotic wildlife exhibitions were primarily connected to the wealthy and the elite and therefore since until the Renassaince period these were predominantly situated on rural setting wildlife collection were also mostly there.

4.3.2 Birth of the zoological gardens in Europe

Fundamental changes came to pass during the period of enlightenment and industrial revolution in the 18th and 19th century, as mentioned in chapter three. The appearance of the zoological garden in the drastically changed the environment in which wildlife exhibition were held form the previous centuries.

The first new zoos would open on the British Isles correlating with England's rapid development as an industrial nation (Kisling, 2000). This industrial development concentrated the masses in the cities, isolating them from nature. It also concentrated the wealth of the citizens and made colonization of other continents possible. For these reasons, knowledge about exotic wildlife and the collecting of this exotic wildlife occurred more promptly in England during this time. Industrialization also supported a rapid development of education and culture, which fuelled the establishment of scientific societies and thereby the wish to set up exotic wildlife exhibitions.

On continental Europe, socioeconomic development was slower, as the industrial revolution started off a little later (Kisling, 2000). It was 45 years after the founding of the menagerie in Paris that next continental zoo opened in 1838 in Amsterdam. New zoos in continental Europe first developed in the great harbour towns, which were the centres of trade. After Amsterdam zoos opened, Antwerp followed in 1843, Marseille in 1855, and Rotterdam in 1858. The only town far from the sea in which a zoo opened was Berlin in 1844. Of these early zoos, only the one at Marseille no longer exists. These zoos were important cultural institutions at the time they opened taking actively part in the urban life of their cities. At the time, the Netherlands were an important colonial power, and trade

In *Fig 25* the spreading of zoos over Europe in the 19th century is shown. The correlation between industrialization and establishment of zoos can be seen in Great Britain and Germany. Additionally, the importance of trade networks can be seen in the early establishment of zoos in Amsterdam, Rotterdam and Antwerp, while the importance of wealthy and urban elite is Berlin, Madrid and Budapest.

The zoo as a new urban institution was an immediate success, everywhere were a zoo opened the number of memberships increased quickly in the 19th century (Kisling, 2000). Kisling stats that society clubs suited well with the mentality of the bourgeoisie that was looking for a combination of knowledge, charity, and productivities. Zoos offered more than just the ability to stroll in a beautiful garden with the opportunity to view exotic wildlife. The zoo developed a variety of activities and associated institutions, for instance, museum, library, meeting and concert halls or restaurants. Zoo and city life blended together, people in the cities were closure to exotic wildlife than ever before, especially on the few days the zoos opened their doors for ordinary public.

Figure 25 Locations were zoos were founded in Europe

4.3.3 Zoo and urban development

Starting in the early 19th century zoos became an important cultural and scientific institution part of the urban renewal and expansion programs. With the city parks, boulevards and squares they formed the new elements for the city, that not only brought necessary entertainment, but also fresh air and space in the polluted city (Baratay & Hardouin-Fugier, 2003). The development story of the zoo was simultaneous as the story of urbanism at that period (Wirtz, 1997). When a zoo was founded it was a catalyst for the transformation of the surrounding district towards a wealthy residential area of the city or sometimes even founding new high-class neighbourhoods (Baratay & Hardouin-Fugier, 2003). Meanwhile as the wealthy and the elite started to shift towards the cities the rural wildlife collection at the estates quickly disappeared, being replaced by the zoological societies. Therefore these urban elite and the urban development that they brought with them help create fertile ground of establishing a zoo. Strong relationship between urban development and the zoo come to light in the case of the establishment of the Amsterdam Zoo.

4.3.5 Urban development case of Amsterdam

The founding of a zoo in the 19th century and the influences it had on the surrounding district and city is described in 'Kwartiermakers van Amsterdam: Ruimtelijke transformatie onder invloed van stedelijke instellingen, 1580-1880' by Esther (Gramsbergen, 2014). She describes the developments in the Plantage district and how the presence of Natura Artis Magistra or Artis , the zoo of Amsterdam, helped to shape this part of the city.

Inspired by the example of the Zoological Gardens in London, which were established by a private foundation, G. Westerman, and two good friends founded the zoological society Natura Artis Magistra in 1938 in the Plantage district.

Three main objectives of the society were established:

1) Artis has to be a jewel for the city,
2) Artis is a place for increasing knowledge
3) Artis is a place for rest and culture.

The realization of only animal exhibits within a park setting was not enough to accomplice these objectives. With the establishment of a zoological museum, a library and an aquarium building the Amsterdam Zoo gave meaning to her academic ambitions. These buildings are examples of the earliest new building for cultural and scientific research in the Netherlands.

Project developers of Amsterdam also noticed these new institutions that were being established in the Plantage (Gramsbergen, 2014). Trying to capitalize on this they proposed to enhance the infrastructural connection

by building a boulevard linking town hall, the Tripp House, the Park, the Hortus Botanicus and 'busy visited gardens' of Natura Artis Magistra. Expecting that a house on this cultural and scientific route will generate a lot of profit since they would be much sought after.

Gramsbergen (2014) argues that the development of the Plantage district towards the cultural and scientific centre in Amsterdam with wealthy residential complexes the Amsterdam zoo was a key factor. The presence of the zoo played a decisive role in several private initiatives in favour of the Plantage, such as the establishment of the University of Amsterdam and four theatres. With these facilities, the district got metropolitan allure, comparable to new districts in capitals such as Brussels and Paris. The Plantage became a district where modernity was felt by the latest fashions in entertainment, scientific research, and architecture. The Amsterdam zoo delivered as a client of some prominent buildings on the Middenlaan an important contribution to this new architecture. By the Amsterdam Zoo science had found a place in the city.

From an urban perspective, the classical collection buildings of the Amsterdam Zoo are also particular. They stand in a row at the edge of the zoo along Plantage Middenlaan. The pavilions have a double orientation and accessibility, creating an intermediate between city and zoo. Also the pavilions express the importance of the institution zoological society for the city

4.3.6 Influence of transportation infrastructure

As the form the end of the 19th century zoos become more and more about recreation their blended function connected started to fade, become more mono-functional attraction, but still situated close to the urban environment. Being accessible by a strong infrastructure system became of increasing importance to connect the zoo. Connecting well for pedestrian, tram, train and later bus. Places within the urban environment allowed for those connection. Also, the urban environment was helpful for marketing nature as 'exotic' and conceptually distinct from the human experience, within the industrial city (Kisling, 2000).

The introduction of the car and the popularity of this mode of transportation changed the preferred position of the zoo. With the growth in visitor numbers to the zoo by car, the infrastructure that was required to accumulate all these visitors by car couldn't be well managed within the city. Making the zoos in the cities not well accessible. A location on the periphery of the city became predominant, with easy accessibility for cars and buses, enough parking space and close to a highway. But thereby distancing the zoo the urban fabric, acting large recreation centres attached to the city (Hediger, 1977). Severely weakening the integration between zoo and city, especially on edge.

The urban position and therefore relationship has also been influenced by the changing objective, recreation demands and emphasis on animal welfare since that period. These brought new spatially requirements to the zoos. To accumulate these new requirements zoos have been enlarged if possible, or (partly) move to more spacious environments.

4.3.7 Conclusion historic urban fabric development

Overtime the position of wildlife exhibition within the urban environment has changed. Often coinciding with the social presents of exotic wildlife in society. For the most part of history exotic wildlife was confined to the rural environment and estates of the nobility and had therefore a limited social function within the society. This changed dramatically in during the Industrial Revolution. Zoos became important cultural institution and had a vital role in the social life of the (wealthy) urban society at the time. From the 20th century on this social and spatial connection with the urban fabric started to weaken. as zoos became more mono-functional recreation attractants with little other cultural function and the car made again well accessible more edge or rural position favourable for accessibility, although since the car that importance of the spatial position is of lesser importance than the accessibility of that position.

For the future zoo should regaining the social and cultural functions it had in the 19th century, especially centre and urban zoos, to become was again an active part of day-to-day social life in society. Allowing people and wildlife to encounter one-another spontaneously. Accessibility will be more important that the position of the future zoo. Although a stronger integration with the urban fabric is preferred since it can spark integrated between the zoo and city, and thereby increase its social presents. The future zoo will need to be beneficial for social urban and cultural life, otherwise rural or edge position offer more opportunities, since there is more open-space availability for housing exotic wildlife.

. Zoos are still predominately situated within the urban environment, especially the older and well-visited ones. Often well connected to the highway network. In recent years zoos have again added ‘urban’ functions, such as congress facilities, to gain extra revenue. By that getting a spatial foothill back in the urban life. Socially as popular attraction zoos are still we connected and associated with cities and their cultural identity, and trying to strengthen this by organising more and more special events at their parks to attract and entertain visitors. Some centre zoos like in Antwerp and Emmen recently develop lively square at their entrance, making spatial place for the city. Thereby creating a spatial connection with their urban environment.

4.4 Urban fabric development Dutch zoos

Fig 26 shows how the zoos started on the edges of the urban environment and overtime sometimes have (completely) been incorporated in the urban environment by the expanding cities, the Amsterdam Zoo current day situated within the city centre. Also, the case of the Rotterdam *Fig 27* zoo is very interesting since it relocated in 1940. On the former site of the zoo had become so much incorporated into the city and situated next to the main railway lines it was decided to build the new central station on the site of the zoo. The zoo was then moved to another site at the edge of the city where the new neighbourhood of Blijdorp was also developed. To facilitate this movement the architect Ravensteyn designed a completely new and 'modern' zoo on the site. Around the iconic Rivièra-hal and landmark look-out tower, which was demolished in 1972. Overtime again beginning completely surrounded by urban area. In the late 1990 and early 2000's it was able to expand west under the railway lines building a new entrance closer to the highway for better connectivity by car and of course several exhibits most notably the Oceanium. By making this shift the main entrance to the zoo changed from the city towards the highway giving the Rotterdam zoo different relation with the urban environment than previously existed.

Other zoos that moved are the Arnhem Zoo which moved from the village of s-Heerenberg to city Arnhem in 1923, foremost to be more strategic located with more potential visitors and infrastructure and public transport connections. The new site also allowed for the growth of the collection and exhibits. In recent years the zoo of Emmen has also been moved. Visitor attendance had been on the decline for some time and bankruptcy was a real possibility for the zoo. To save the zoo the local government assisted in moving the zoo from the original place next to the city centre surrounded by housing towards a terrain on the edge of the city. With sufficed space for a new zoo and visitor attraction for the city and region as well as providing it with the necessary surrounding open land for future expansion, safeguarding the future of the zoo and tourism economy for the city.

Seemingly contradictory to the trend of zoos moving further out of the urban area is the latest zoo that opened in the Netherlands. In 2005 Kerkrade Zoo opened close to the centre of the city of Kerkrade. Kerkrade Zoo is established on an old outdoor sports field complex with, like Emmen Zoo, help from local government. How to want to enhance the south of Limburg as a bigger tourist destination and used the building of the zoo as one of the ways to establish this goal. Currently regional infrastructure is being redesigning to better connect to the zoo. signally still the influence a zoo can have on urban planning.

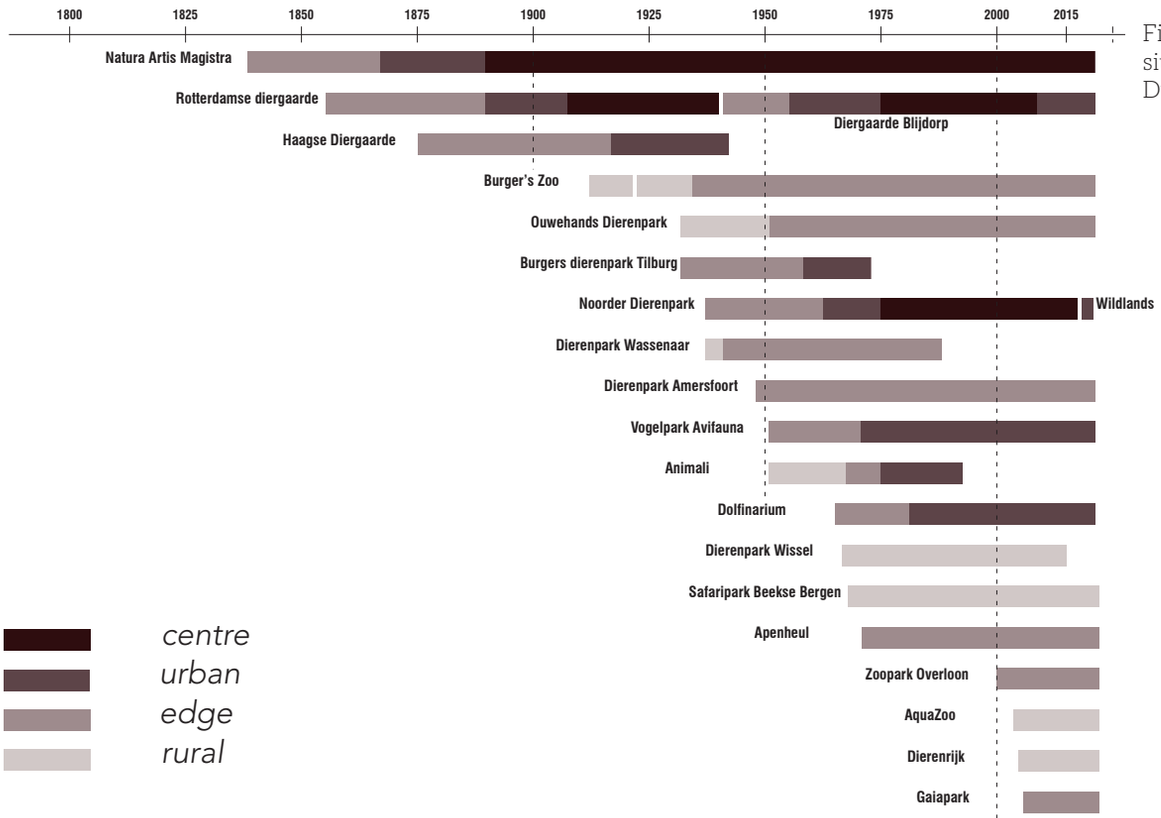
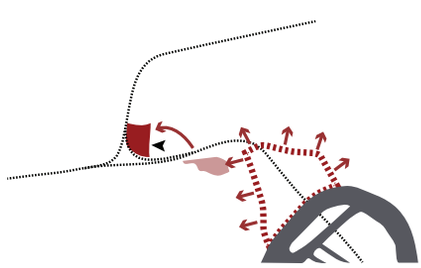


Figure 26 Urban position development Dutch zoos

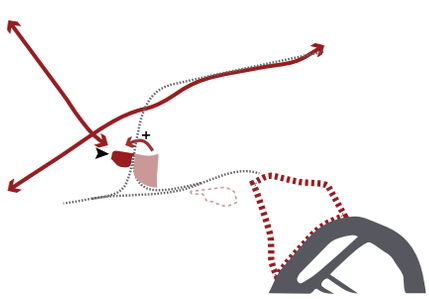
Figure 27 Movement of urban position and relations Rotterdam Zoo

1855

1940



2000



4.5 Accessibility

The location of a zoo is of relevant in attraction visitors. Visitors reach zoos predominantly by car. But depending on the urban position and infrastructure also by walking, cycling, bus, tram and train.

Since most people travel to the zoo by car, a nearby highway exit is preferred to allow especially visitors traveling form longer distances easily and quickly to reach the zoo. Zoos are therefore predominately located close by a highway *Fig 28*. Further the local infrastructure network must be able to cope with the visitors traffic. Besides car infrastructure in the manner of roads, parking places and garages are equality significant. Especially centre zoo have difficulties in creating enough parking spaces in their highly urban fabric.

Accessibility by means of public transport is a lesser used mode of transportation for visiting the zoo. As leisure attractions almost, all zoos are connected to the regional public infrastructure by bus or tram stops. For more urban locations the importance of these form of accessibility increases, since there is often a denser and more frequent network of public transport and accessibility by car tends to be more restricted. Most people travailing to the zoo by public transport tend to be form the region the zoo is based. On a national level zoo tend to be lesser connected to the public traffic infrastructure in the form of railways, although most zoos are in proximity of a railway line *Fig 29*, often intercity station are, particularly for edge and rural zoos, on some distance.

Connections to the pedestrian and cycling infrastructure are mostly beneficial for the local integration of the zoo with the urban fabric. Especially in centre and urban zoos these connection help make the zoo part of the urban fabric and bring people from nearby neighbourhoods to the zoo. These types of visitors tend to the zoo more as a city park to relax in and less as a day-out activity.

To more people life from a short traveling distance from the zoo, the bigger the potential market is of the zoo. To be able to access this visitor potential it is important for zoos the be well connected with different types of infrastructure. Since one mode of transport is faster than the other and one zoo is better accessible then other different potential customer areas can be identified. Many zoos have significant overlap with one another, showcasing the strong competition in the Dutch zoo landscape, where people often have a lot of options to visit. Especially when traveling times exceed 30 minutes.

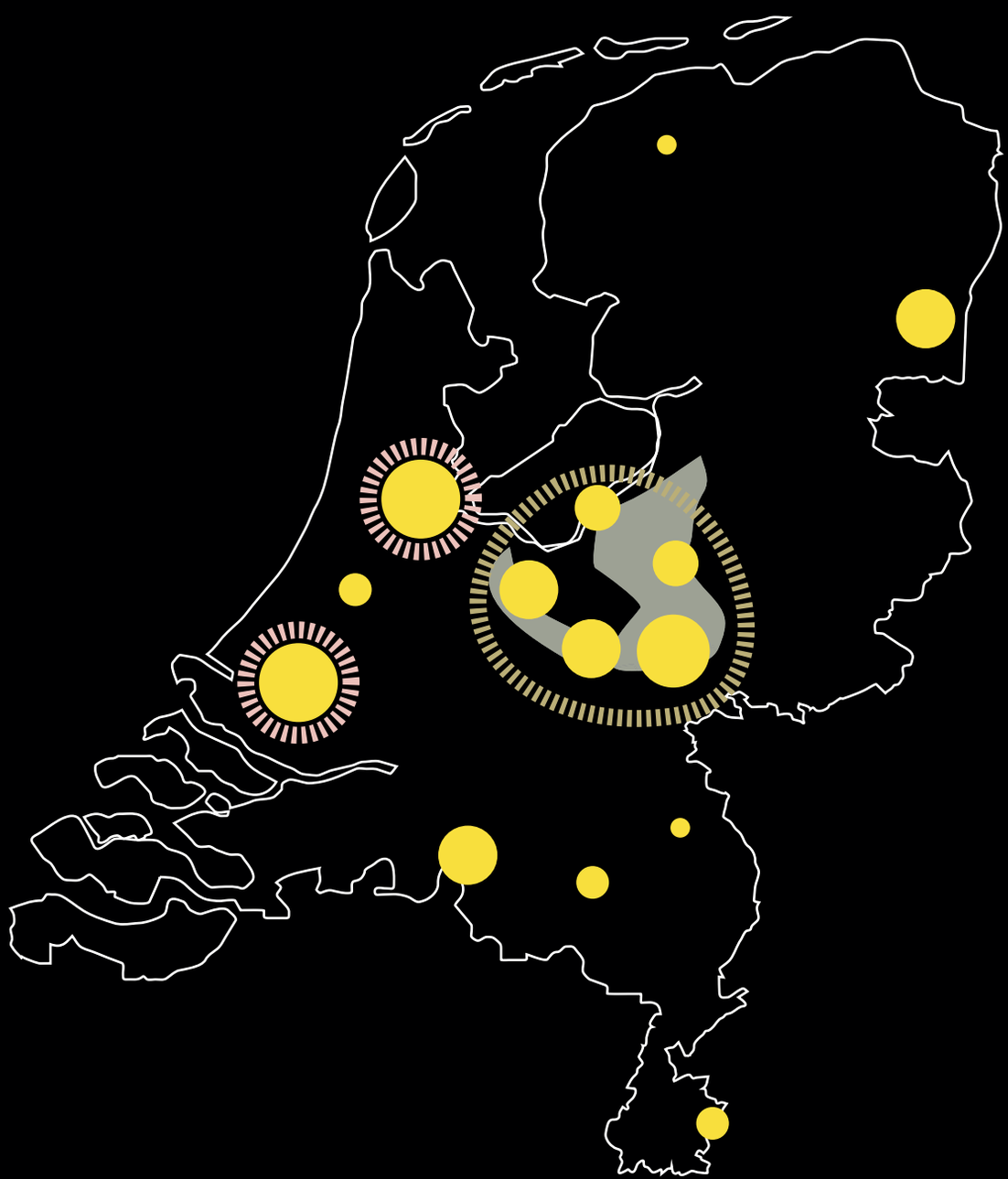
Figure 28 HIghway network and location zoos in the Netherlands

Figure 29 Railroad network and location zoos in the Netherlands

4.6 Zoo cluster

The importance of accessibility can best be describe in the existence of the zoo cluster around the Veluwe. In the dense zoo industry in the Netherlands the largest zoos can be found in the Netherlands biggest cities Amsterdam and Rotterdam. Besides these two big cities the larger zoos are predominately situated around the Veluwe see *Fig 30*. An area with a smaller population then the Randstand. With well visited large zoos in Amersfoort, Apeldoorn, Arnhem, Harderwijk and Rhenen. Together they form a zoos cluster around this large forest recreation area in the Netherlands. The development success of the Veluwe cluster can possibly be found for two reasons. Foremost the Veluwe is centrally located, especially the southwestern part Amersfoort, Rhenen and Arnhem. The accessibility of the area by car between 1 and 1,5 hour gives a high potential clientele, creating a concentration of high zoo accessibility Fig 31 . Secondly, the Veluwe is a popular (domestic) recreation area in the Netherlands for weekend trips or vacations. The natural forest landscape attracts people how to want to escape the often-busy urban environment and relax in nature. These tourists, are likely to also visit a zoo during their vacation.

Figure 30 Zoo cluster around the Veluwe



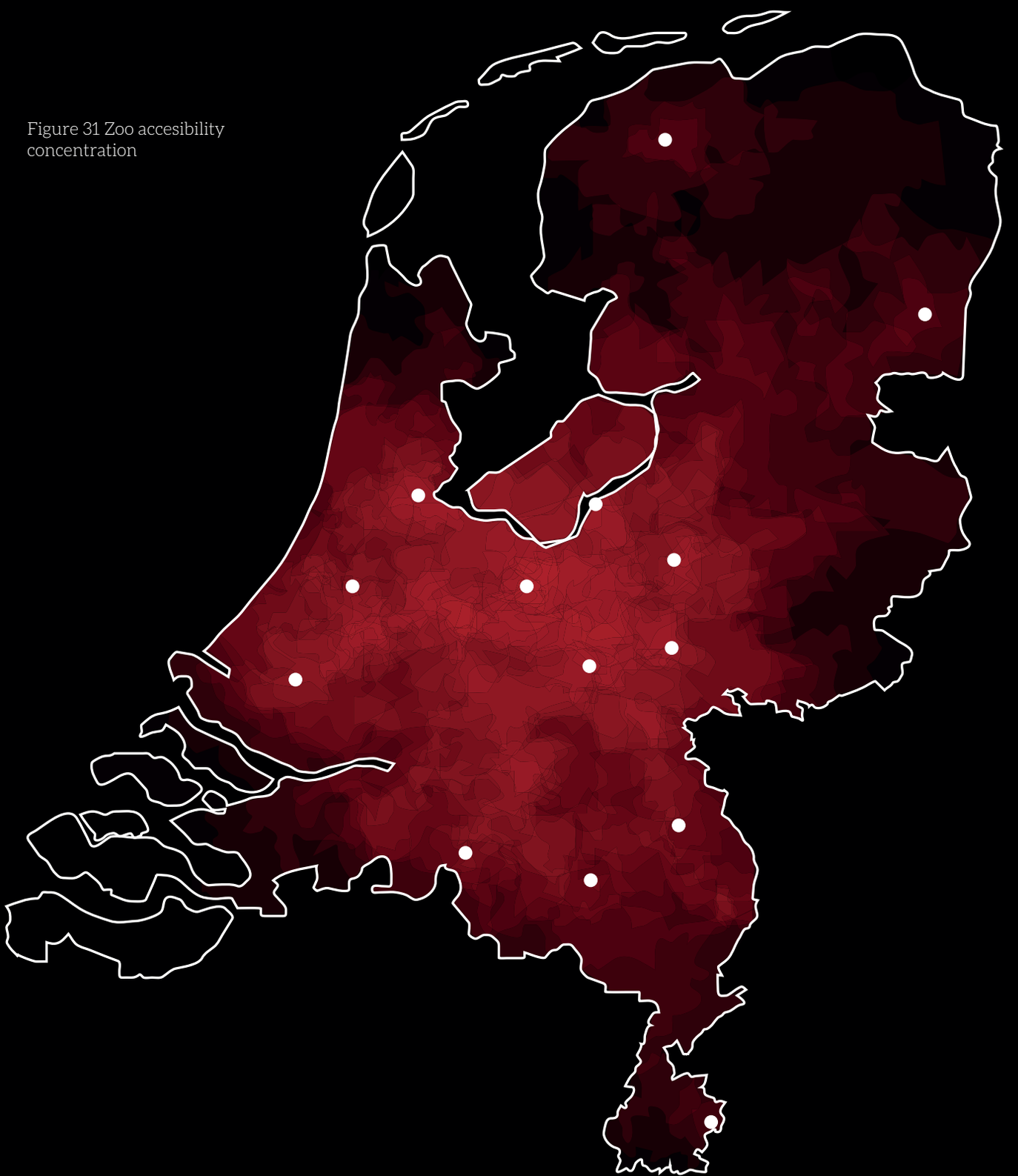
Nuenen Zoo

Arnhem Zoo

Amsterdam
Zoo

Rotterdam Zoo

Figure 31 Zoo accesibility concentration



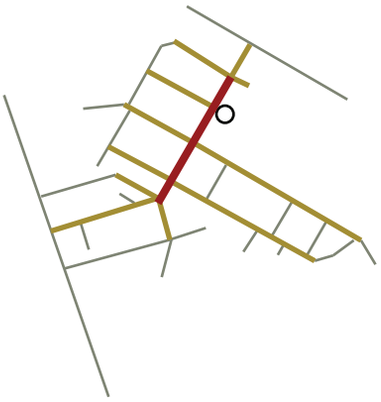
4.7 Local integration

Besides accessibility on a regional and city scale, there is also integration within the locale urban fabrics infrastructure. Which can by analysed by space syntax. Every turn is considered a step and start of new connections. The more connection suggests a higher local integration and thereby probably a stronger link with the surrounding urban fabric. The figures show clearly that the higher the urban environment the stronger the local integration is.

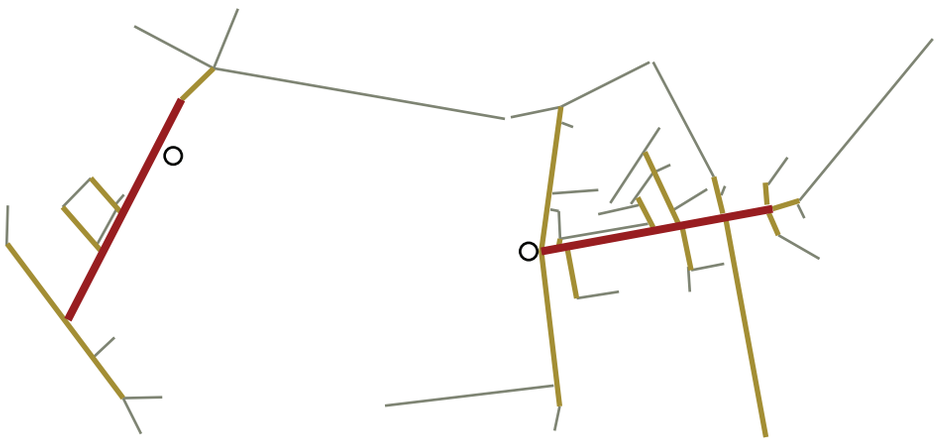
Especially the case of Rotterdam zoo *Fig 32* is interesting since it has two entrances. The old entrance is having a higher integration then the new entrance which is orientated to the highway exit and in a less urban condition. The older entrance is clearly still part of the urban fabric. But to the change in main entrance nowadays receives view visitor, as most come enter the zoo via the new entrance next to the highway exit. Thereby the spatial characteristics of the local integration might still be there but the social component that the visitors bring with them has been weakened.

In the future zoo a strong integration with the local environment is encouraged to facilitates social and spatial links with the surrounding area. Especially centre and urban zoos should fit seamlessly in the local network.

Amsterdam Zoo



Rotterdam Zoo



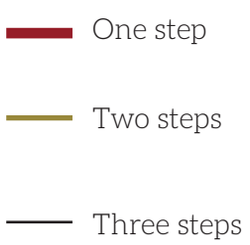
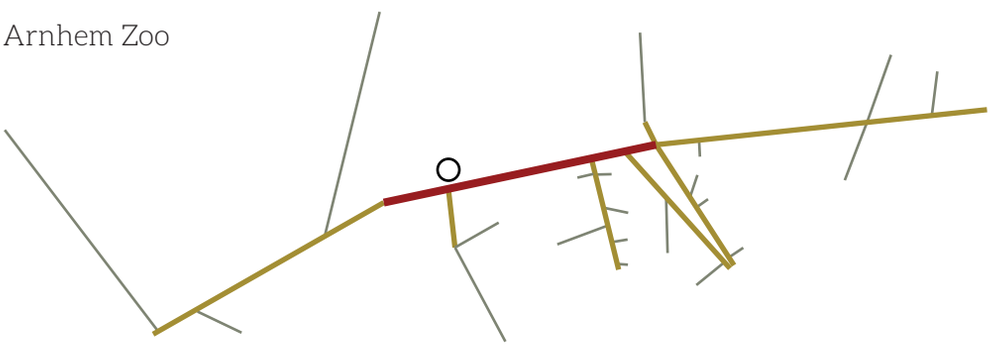
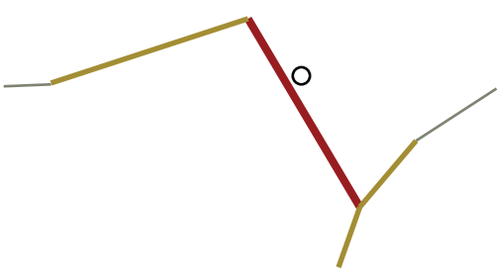


Figure 32 Local integration of zoo in urban fabric

Arnhem Zoo



Nuenen Zoo



4.8 Edge

Since the goal of this research is to develop a method for the zoo within the urban environment it is important to study the connection between zoo and city at the edge were the two meets. The edge is the border were zoo and city meet each other and create interaction with one another. Reviewing how in this edge is physically manifested and to what extend it allows interaction with the surrounding urban environment. The manner in with the edge is formed indicated on what level the two objects want to create a relation and what kind of a relation with each other.

The type of edge between zoos and urban environment shows what possibilities there are to access the edge and thereby blur the edge between zoo and urban environment. By blurring making it possible to integrate the two, and expend spatially, mentally and socially the zoo and city in one another.

Th blurring of edges is also closely linked with the penetrability of the edge. What are the primary visual links between the zoo and the urban environment. Can someone from the outside see and experience what is happening on the inside, enhancing the connection between the two.

The edge of the zoo can also spatially blur and expend by making use of its green characteristics. Creating an interact with local biodiversity or being node in the green network of the city.

4.9 Type of border

Seven types of border edges around zoos can be identified *Fig 33*.

The wall, is when there is no interaction possible since the zoo and urban environment are separated from each other. This can be done by either a green 'wall' of vegetation or a stone wall, sometimes in the form of a building.

Sneak peeks do offer can offer a interesting manner of connection. By overring a short or partial view of what is inside the zoo, it allows to tease passing by public. Sneak peeks can be direct when a fence is partially opened or more indirect, when there is a connection open connection over a longer distance, for instance water or from above as in the care of the railway tracks next ti the zoo in Rotterdam.

Line of sight axes are a very strong connection to the urban environment, only this phenomenon rarely occurs in zoos. By making as strong visual line into the urban fabric it can create a relationship over long distances. Line of sights predominately occur at older zoo, where the old society building has been strategically placed. Showing the importance of that cultural facilities in the city at that time. Other lines of sight such as in Rotterdam could have a more potential then they current hold, due to maltreatment.

The landmark offers a visual connection over the spatial bored of the zoo, mostly because of a higher altitude, acting as a lighthouse. This effect occurs most in higher urban environment, were they are also the most effective.

Windows are a very interesting edge phenomenon. They can happen in the wall itself or in the wall of the building. Creating a direct framed connection between urban street life and the zoo. this type of edge is also very rare, especially if we consider the amount of zoo edge that is a wall. This edge type only occurs and probably works well in a centre or high urban position for the necessary street life. By framing the view what a spectator sees can be controlled, something that could be used in the advance or be a disadvantage when the view is poorly.

Squares offer a public place on the edge often at the entrance of the zoo. making space for urban life to mix with a trip to the zoo and creating space for events. High quality squares are increasing in use and occur primarily in the centre an urban position.

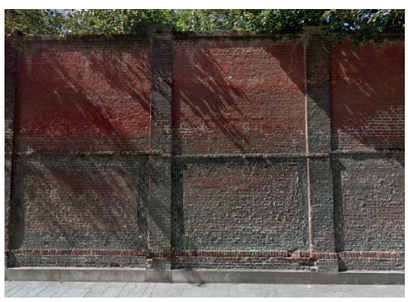
Exhibit edge are the most direct edge type between zoo and urban life. The exhibit is part of the edge or is completely separated in some rare cases. It offers urban life a free of chares wildlife experience in the urban environment and can thereby link strongly to urban life.

Most common edge type is the wall. Rural, edge and urban zoos are almost always surrounded by this type of border *Fig 34*. Indication that zoos almost always make no connection with the surrounding landscape. Centre and some urban zoos have a greater variety of borders. Although no of the types is really dominated with these zoos. The square and exhibit type of border encourage the most the blurring between the zoo and the city and create the highest accessibility.

For the future zoo there lies great opportunity to diversifying the border and creating a stronger bond with the surrounding environment. accessibility of the edge needs to be implemented to create blurring. That is not to say that there should be any wall any more, but smarter more integrated types of closing of need to be revised.

Figure 33 Types of border edges

DIERGAARDE BLIJDORP



ANTWERPEN ZOO

WALL

ARTIS

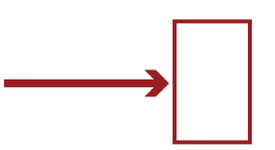
ARTIS

SNEAK PEEK

DIERGAARDE BLIJDORP

FRANKFURT ZOO

LINE OF SIGHT



BLIJDORP

TIVOLI

LANDMARK

WINDOW

ANTWERPEN ZOO

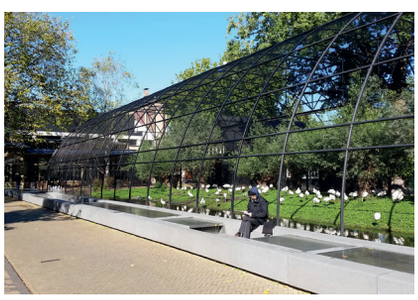
FRANKFURT ZOO

SQUARE

ARTIS

ANTWERPEN ZOO

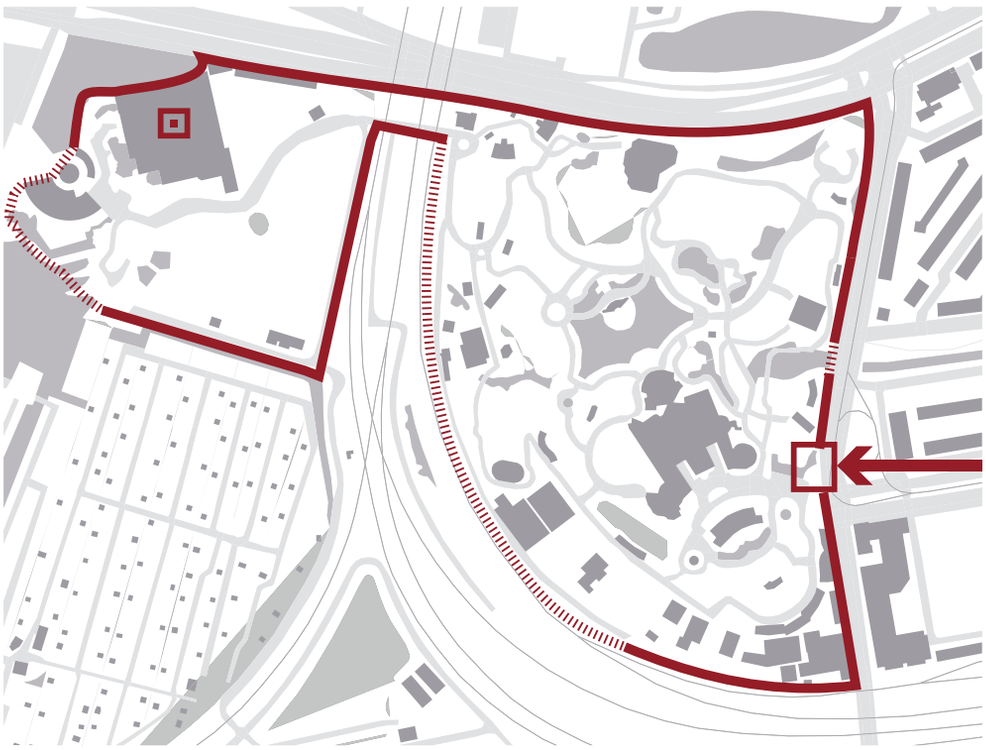
EXHIBIT



ARTIS

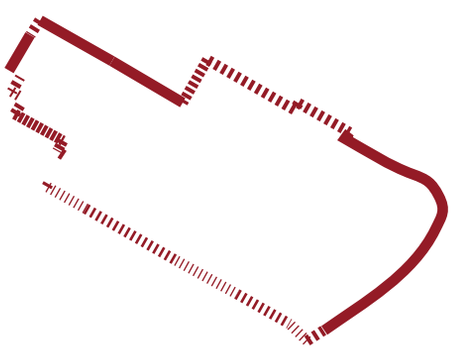
COPENHAGEN ZOO

Figure 34 Types of border edges differnt zoos

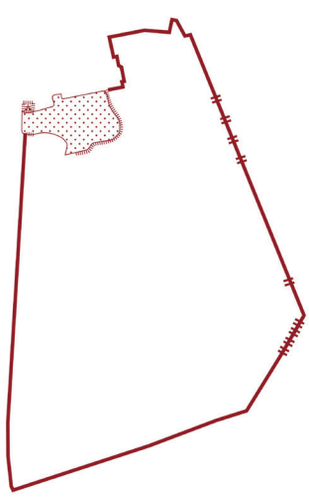


Rotterdam Zoo

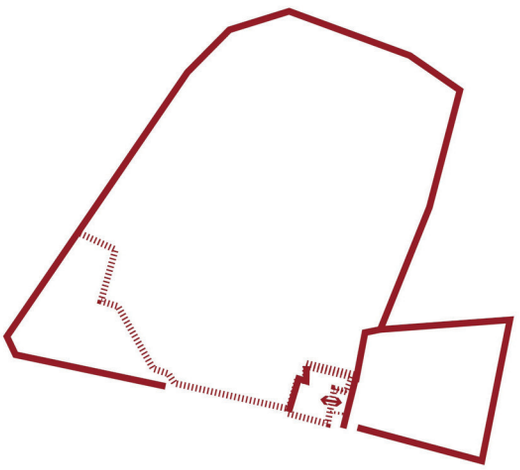
Amsterdam Zoo



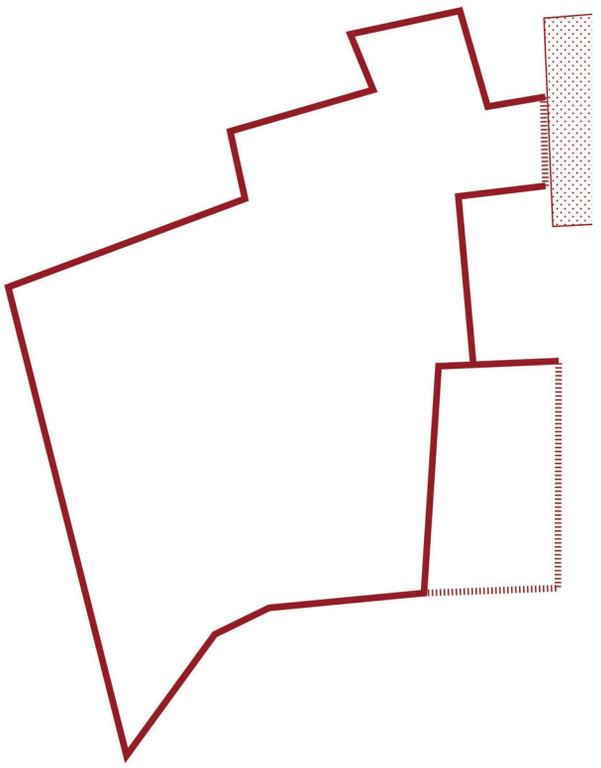
Antwerp Zoo



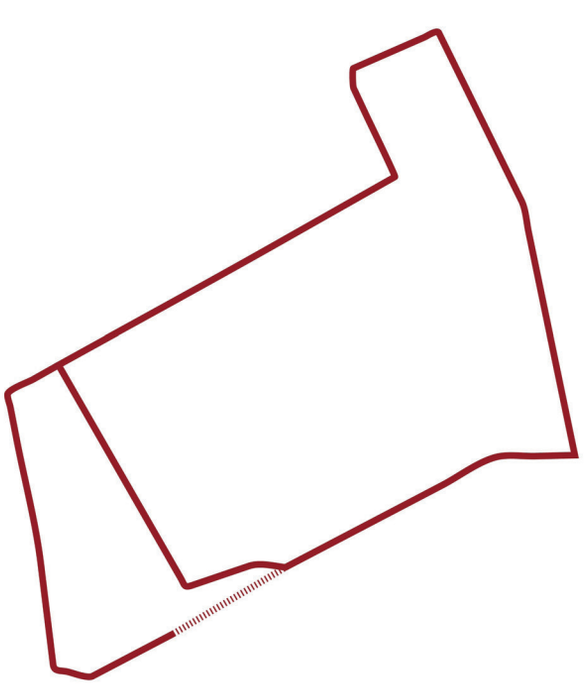
Rhenen Zoo



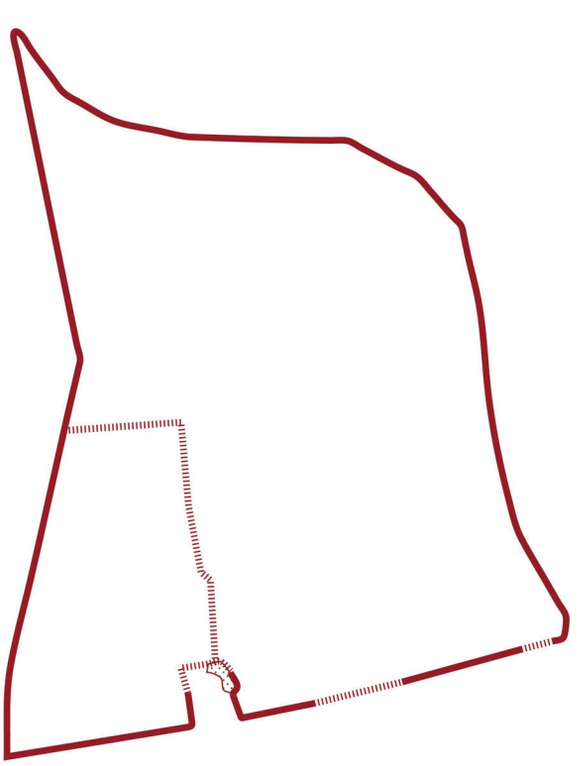
Emmen Zoo



Kerkrade Zoo



Arnhem Zoo



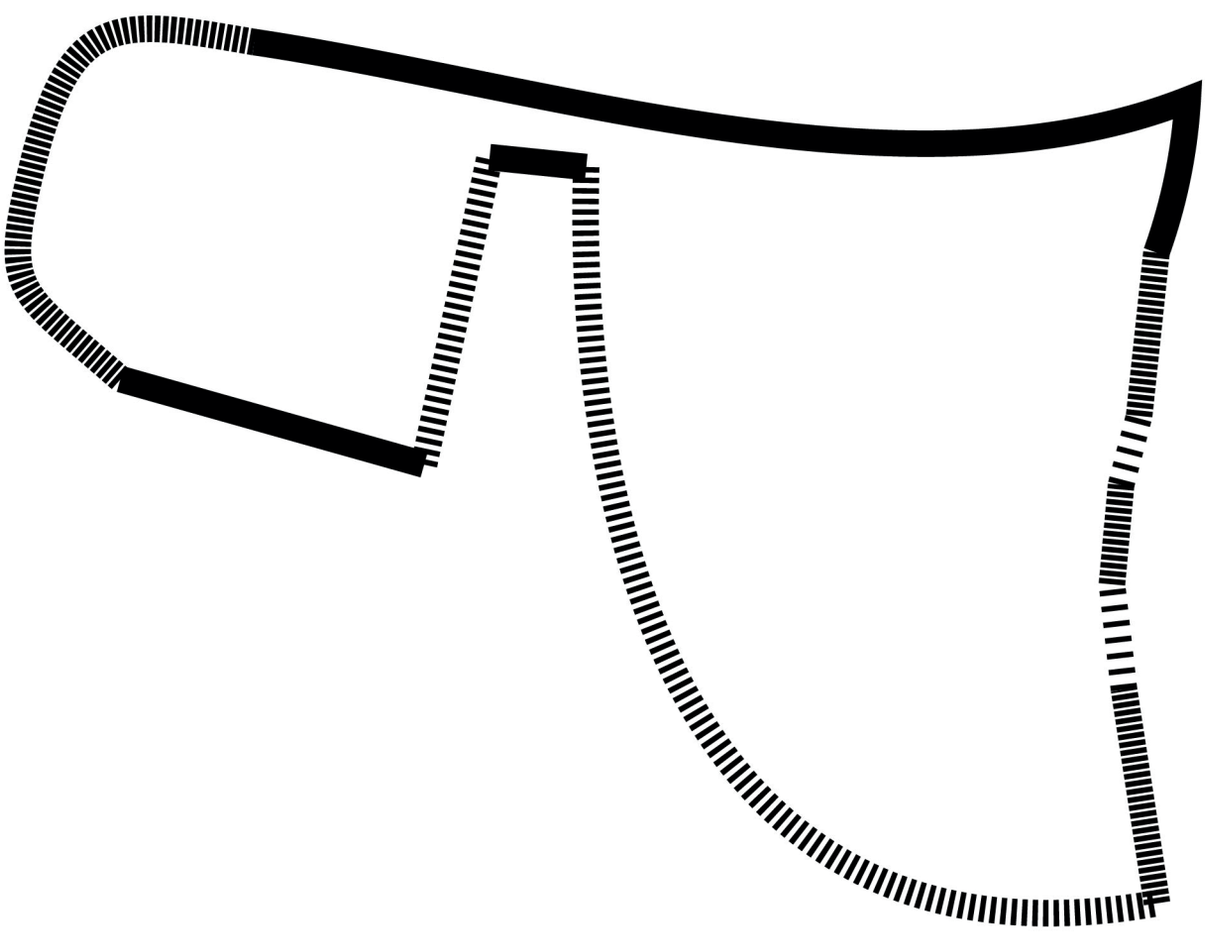
4.10 Permeability Edge

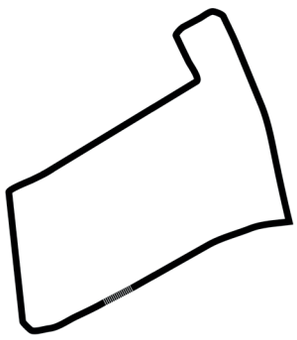
Most of the edge of the zoos are not permeable *Fig 35*. Blocking visual or other connections with urban environment. The special urban institution that the zoo is with its unique ability to connect the urban environment with exotic wildlife and biodiversity can therefore hardly be established. This is especially the case with rural or edge zoos, which have the least permeability. The limited permeability is primarily due to the fact that zoos tend to located their private or service functions on the edges of their territory. Amsterdam zoo interestingly the centre positioned zoo has the most permeability. In this high urban condition also the most integration can thereby be established. Although this is an exception and is the zoos permeability in general more related with a gated community or a prison.

The future zoo need to strive to a higher permeability then currently is the case. Creating connections with the surrounding urban environment and landscape. Allowing for more integration between urban life and zoo life. Being more permeable will also help shack off the illusion zoos being a prison since the prison wall will be more blurred and harder to spot.

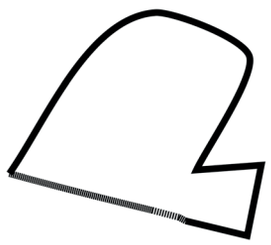
Figure 35 Permeability of the edge of different zoos

Rotterdam Zoo

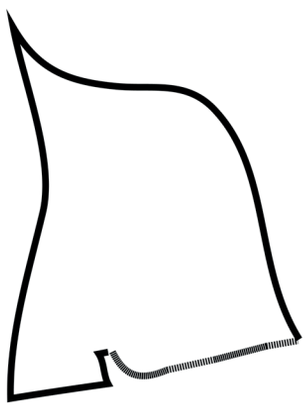




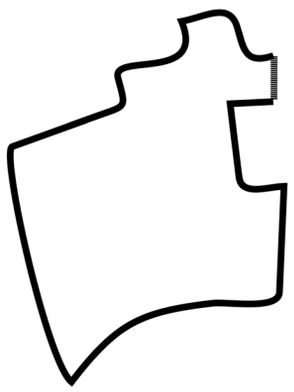
Kerkrade Zoo



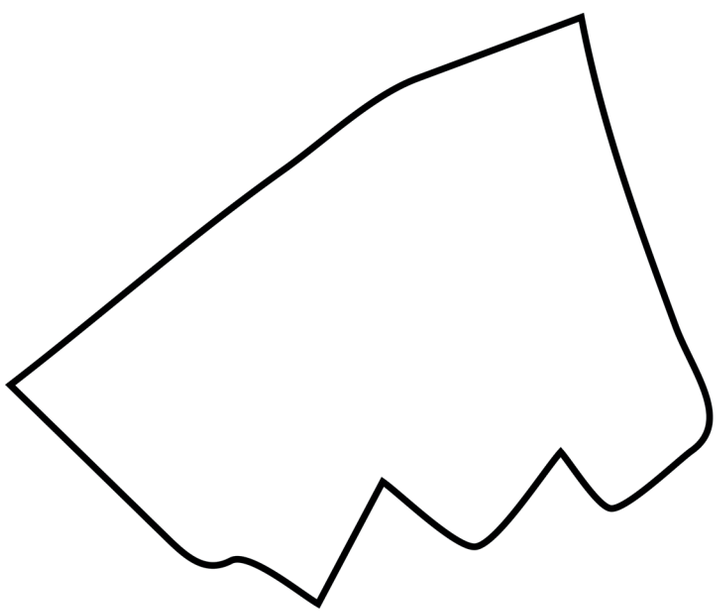
Rhenen Zoo



Arnhem Zoo



Emmen Zoo



Tilburg Zoo

4.11. Green Structure

The zoo is a green urban element and often part of the cities green infrastructure network. especially with urban and centre zoos. brings biodiversity in the city. zoo is also often closely a large body of green of part of a larger body of green. Green is park or could be park. Place for relaxing. opportunity for integration in human green setting with the wildlife. Future zoo should be part of the urban green infrastructure and act as much as possible and preferable as a public green park hosting local biodiversity.

4.12 Mixed functions

An enjoyable visit to the zoo is also influenced by the facilities a zoo has to offer. There are basic facilities such as food & drink and a shop *Fig 36* . Often the food & drink and shops are also of economic importance, as they generate a lot of extra revenue for the zoo. For children and in some extend also their parent playground are likewise a essential facilities. Children are the most driving force for going to a zoo and satisfying their play needs is essential, as they do not like to only passively look and animals, but wand to run, climb, swing and explore.

Beside the basic facilities zoo can also offer more special or extra facilities instigate by their special human wildlife relationship. The zoo can either make the function more interesting or offer strengthening of the zoo objectives. This function can and could also cross-link connection with the urban life. This kind of facilities and functions include conference rooms, planetariums, natural history museums, lecture rooms or hotel facilities. Often these functions could also be usable or are used without visiting the zoo. We could classify them as facilities that preform an urban function within the zoo. This kind of function mixing offers an extra score of revenues for zoos and creates integration with the urban life and urban fabric. Since the zoo is often a unique location for hosting events.
For facilities them doesn't seem to be a zoo blue print. Although their always tend to be a shop close to the entrance/ exit.

In the 19th century as previously mentioned the mixing of functions between zoo and city has very high. Nowadays there is some function mixing, but this is much weaker. Also, the mixing only happens when the zoo is open and often cannot be used when the zoo is closed.

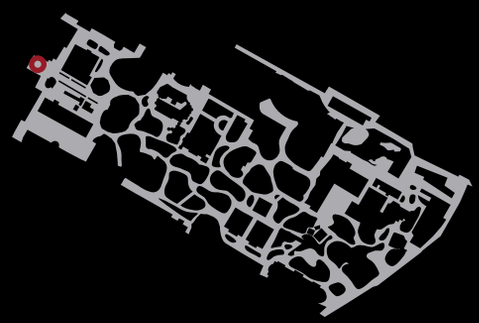
Openings hours can vary from different but most zoos open form 10-18 hrs. Locking themselves for the next day. Thereby also often locking themselves off from the urban life. As often seen, the urban facilities are inside the zoo and cannot be used at the locked moments.

The Future zoo in the urban environment has to mix functions with the urban environment, preferably functions that also benefit the objectives of the zoo. especially for economic feasibility this is important as well as social relevance. Offering special encounters between human and animal. Also, urban functions such as housing shouldn't be of the table. Centre and urban zoos have already some of these types of urban functions within their facilities. Bringing these facilities towards he edges of the zoo could help for blurring the border and also be accessible to the city without visiting the zoo. Mixed urban functions offer a many chances for blurring the two worlds.

Figure 36 Facilities at the zoo

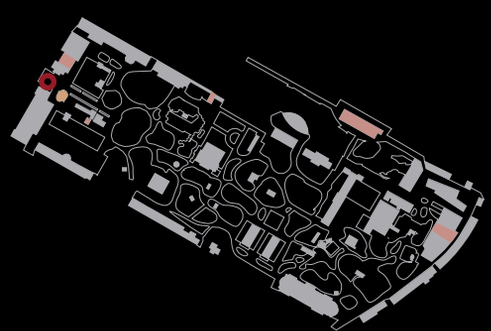
Artis

Path



entrance

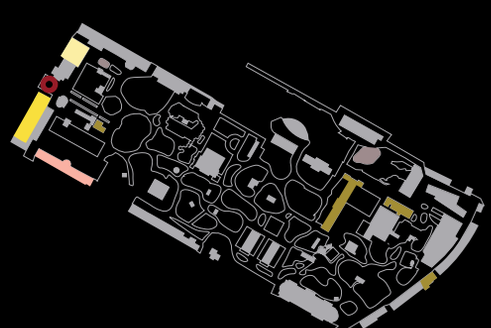
Basic facilities



food

shop

Special facilities



education

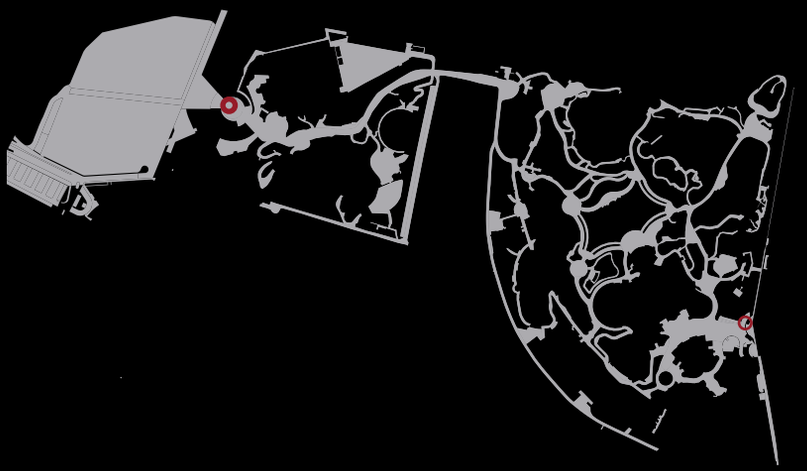
museum

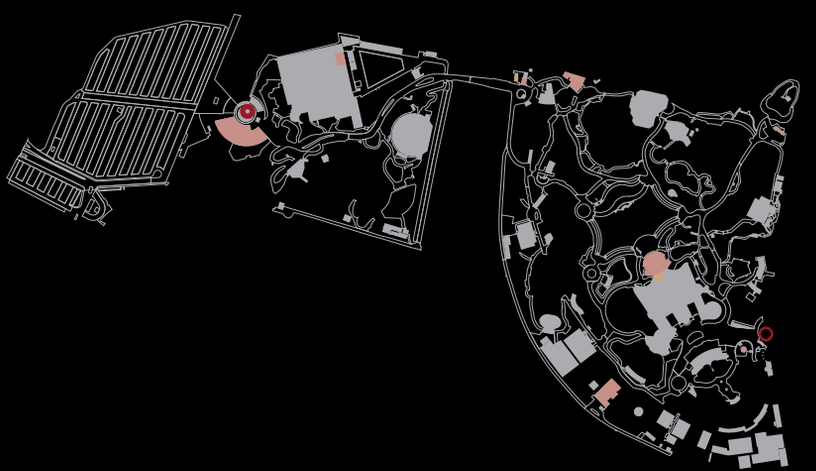
planetarium

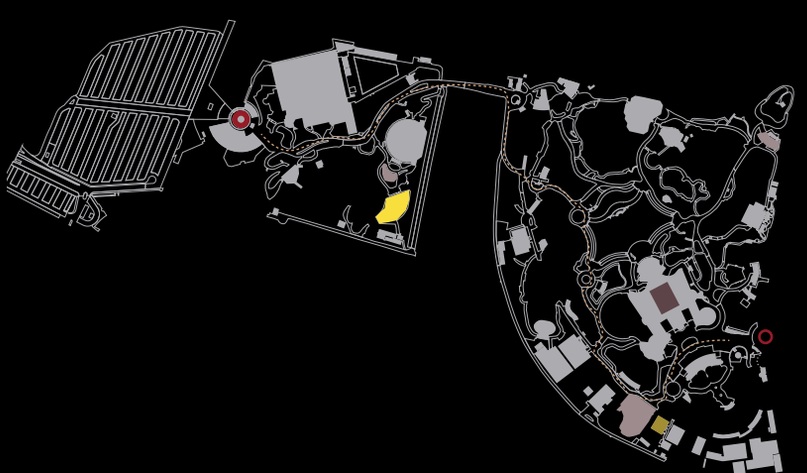
congress

playground

Diergaarde
Blijdorp







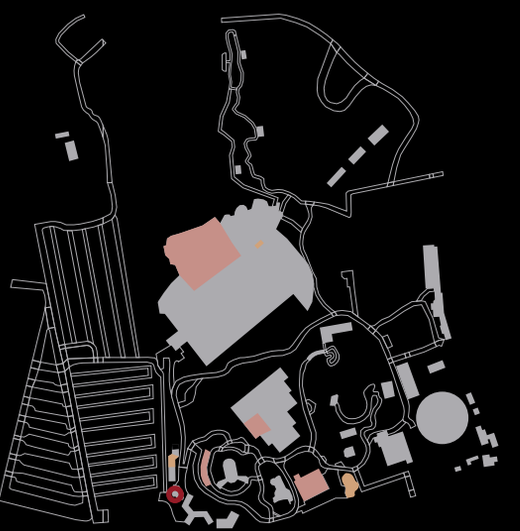
education

animal
theater

playground

indoor
playground

Burgers Zoo



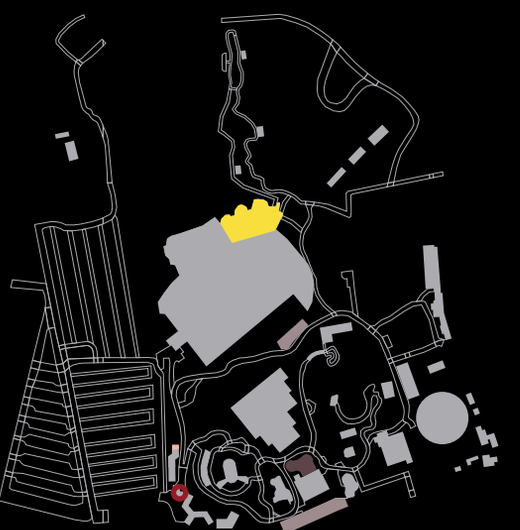


photo booth

congress

playground

indoor
playground

animal
theater

4. 13 Future developments urban fabric

The urban fabric and environment are constantly changing. The future zoo will have to adapt, adjust or make use of these changes. The following trends have been identified as threats or opportunities for the zoo and its place within the urban fabric.

4.13.1 Tourism and economy

Tourism and the recreation industry is increasingly becoming important for cities all over Europe. The increase in tourism and recreation also leads for more demand for recreational attraction in such a city. Zoo are often cultural recreation centres with a great appeal. The high number of visitors they can become vital part of some cities recreation economy or could be a boost for cities or regions were the recreational economy and tourism is lacking behind or could replace other industries.

4.13.2 Quality of life

In stressful busy urban environment there is an increasing demand for relaxation and nature. Quality of life in many cities is often improved when there is a lot of green relaxation space available. The future zoo can and should facilitate this need for green relation space. Since the zoo in essence a park is with some animals. Thereby heightening the quality of life within the urban environment.

4.13.3 Urban heat island

Urban centres are increasingly affected by the urban heat island. Because of climate change it is only becoming more pressing issues for the liveability of certain parts of our cities. To cope with this heat additional and strengthening of green and blue structures is necessary within our urban environment. especially older zoos form green island within a densely build urban environment. they are green lungs giving the city air to breath. The future zoo could be an interesting element to make our cities greener fun and create special places.

4.13.4 Biodiversity

Urban nature is critical for connecting half of the world's people with the natural environment. Connecting city dwellers with their local nature and watersheds is critical not only for building support for the conservation and ecological restoration and stewardship of biodiversity at home. Psychological benefits of exposure to urban green space increases with greater biodiversity. Zoos are in their core a place for biodiversity and could help cities to attract more flora and fauna to the urban environment.

4.13.5 Integration of people

people are more and more living disconnected from each other and other social groups within our society. these tendencies of segregation are very damaging for a cities social structure. People need places in the city where they can come together and meet each other. Zoos as a place for all people can function as such a place.

4.13.6 Food

in our urban centres there is, because of sustainability concern, an increasing movement towards local food production. People want to know where the food comes from, have it fresh and sometimes even participated in the making of the food. Zoos often hold besides their animal collection and a plant collection being also botanical gardens. Linking this botanical garden function with the trend of urban farming gives very interesting opportunities.

4.13.7 Entertainment

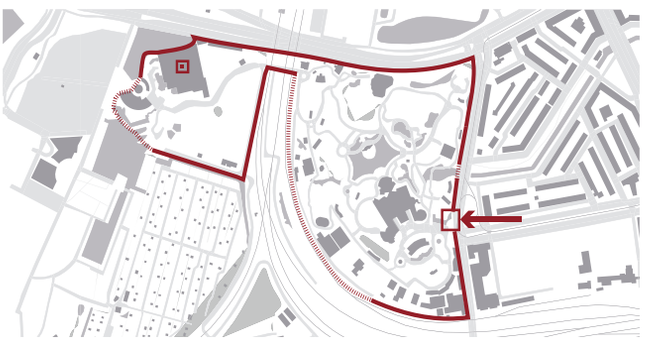
besides entertainment in the form of disneyfication of are society and zoos. There is an increasing tendency of zoo visitor that want to view the animals up close or even touch them. Moreover, animal shows with birds and sealions are popular attractions with zoo visitors. How this close interaction and show are conceivable with animal welfare needs is a difficult topic. the educational value of such experiences is very high, but the animals are trained unnatural behaviour. Furthermore, people often can't be trusted with up close encounters with animals without a zookeeper present. Feeding, chasing or other forms of mistreating the animals, deliberate or not are sadly come place. The future zoo will probably have increasing up close animal encounters, especially if zoos move towards an unzoo concept. The trick will be how to balance this human accessibility with an animal ability to live without distortion.

4.13.8 Economic

The competition between zoos and other recreation attraction is likely only going to increase in the future, making it harder for them to earn the necessary income to accomplish their goals. Therefore, as Fraser indicates zoos will need to find more revenue stream besides their gate revenue stream. Innovative business models and urban functions need to be combined animal exhibition to find extra income and could mean new connection between human – animal interaction.

4.14 Aspects for Zoo evaluation tool

The urban fabric in the ZET shows how zoo and urban environment are related to each other. The zoo is an urban institution and part of the urban realm it needs to be indicated how it plays a part in this realm and is part of people's experience while not directly visiting the zoo.



The edge:

aspects evaluate how the zoo and the city have different connections on a local scale and indicate how the zoo is preserved for the outside.

- *Permeability*: indicates the ease in which the surrounding urban environment can part experience the zoo and its wildlife without entering. It indicates the blurring between exotic wildlife and human life. In the same manner,

- *public accessibility*: component shows how the zoo and city flow at the border and how parts of the zoo are accessible and experience by public urban space.

- *Green structure*: identifies at the zoo on a larger scale and how it operates in cities green structure. Is it part of an integrated network both for people and nature and does it attract also local flora and fauna.

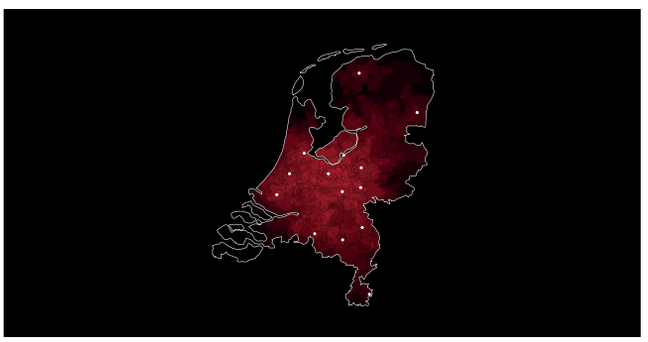
Mixed function:

aspects evaluates how well zoo and city can benefit from each other and operate comparably. Cross-over encourage citizens engagement and could offer unique experiences to the urban dwellers.

- *Urban function:* shows how good different function of the city are placed in or at the edge of the zoo and vice versa.

- *Opening hours:* evaluates if the zoo is part of urban life with different times of visit possibilities or only an institution primarily standing on its own.

- *Urban connection:* identifies the connection between the zoo and the city centre, encouraged double visits and identity.



Accessibility:

infrastructure connections are vital for a zoo to be able to receive visitors.

- *Local integration:* classifies how well the zoo is integrating and part of the local urban fabric. Higher integration often indicates a strong urban connect creating an identity as well as attraction a lot of people from the local community, for often shorter trips.

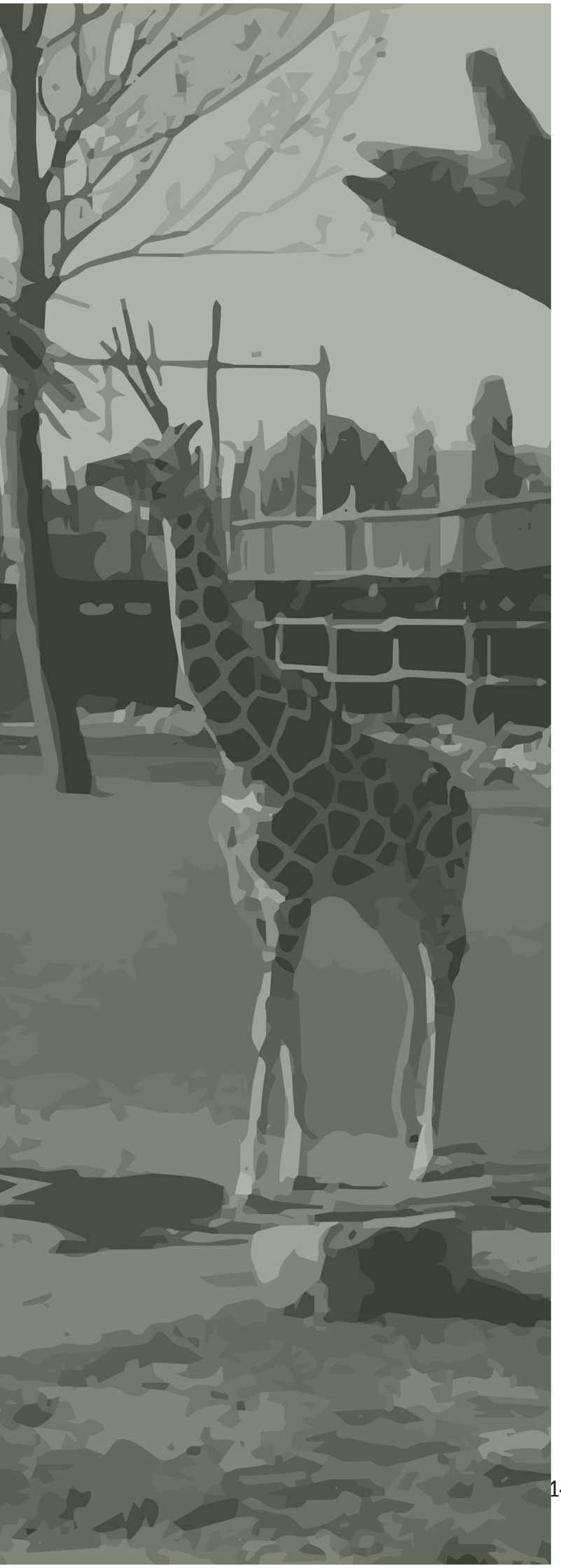
- *Car Infrastructure:* is the most important mode of transport for guest how to visit a zoo. Being well connected to the car infrastructure is therefore of great importance, in this thesis this will be measured by the driving time form the highway exit to the zoo.

- *Public transport:* the travelling time to the nearest intercity train station has been chosen as a measuring point for this connection. As intercity station often is the location where the local public transport network connects to regional and national public transport network.

- *Market potential Netherlands:* the infrastructure accessibility must also lead to a sustainable market of costumers for the zoo to become feasible. In this research, this will be measured by the number of potential visitors live within one hour by car from the zoo.

Chapter 5

Lay-out



5.0 Introduction

Last main topic in the analysis stage is the lay-out. This chapter describes the methods for exhibition, exhibition styles, ordering of exhibits and other characteristics. Connecting mainly to the first research questions and partially the second:

1. What are the reasons and methods for the exhibition of exotic wildlife in our western society and how have they developed?

2. How can we describe zoo based on different basic elements and function of the zoo and its urban environment?

The spatial methods of how to exhibit wildlife has changed significant. Due to changing zoo objectives, requirements and knowledge, form animal, zoo staff, visitor and society (J. Coe, 2012). In developing the ZET and establishing guidelines for the future zoo understanding of these methods of exhibition can help to establish ideas of how the lay-out of the future zoo could appear.

This chapter will discuss the first methods of exhibition and exhibition styles, also highlighting relevant layout developments. Also, choice of animals, people space among other topics will be highlighted.

5.1 relationship between lay-out and animal welfare and visitor experience

The lay-out of the zoo is an indicator for the performance of the zoo. How space is arranged for animals and visitors is very influential on the experience of both.

The methods used for exhibition of wildlife gives great insides in the welfare of those animals being held in captivity. As animal welfare is one of the prime issues the contemporary zoo is facing, studying the development of methods of exhibition and exhibition styles can help to formulate what the lay-out of the future zoo should be from the animal's point of view and experience. In what manner different exhibition methods provide a natural place to roam for the animals with enough enrichment opportunities will determent the choice for a future method of wildlife exhibition.

Methods and styles of exhibitions as well as the ordering of the zoo influence the experience zoo visitors have, when visiting the zoo and how objectives of the zoo can be achieved. Especially visitor objectives towards recreation and education can be influential by the spatial arrangement and design the visitor encounters, when visiting a zoo and different exhibits in a zoo.

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Methods and styles of exhibitions as well as the layout of the zoo also greatly influence the experience zoo visitors have, when visiting the zoo and how objectives of the zoo can be achieved. Especially visitor objectives towards recreation and education can be influential by the spatial arrangement and design the visitor encounters, when visiting a zoo and different exhibits in a zoo.

5.2 Methods of exhibition

The zoo represents a special form of cultivated coexistence between human and wildlife. Animals are not kept primarily as livestock, in the sense that direct economic benefits are to be drawn from this coexistence. Moreover, the zoo is devoted to research, the preservation of animal species and furthermore, breeding programmes which allow the release of endangered species into their original habitats. To that extent it has strayed from its original function to provide 'gardens geared to the general public with enclosures and animal's houses for keeping and presenting, predominantly exotic, wildlife' (Meuser, 2017).

The architectural history of zoos reflects western humanity's relationship with animals. Christian values, academic emancipation and political power are key factors in this. Developments always crystallised in the form and reform of architecture. In common with the general notion of appealing architecture, humanity's relationship with architecture and animals also changed. Therefore, the respective understanding of what an architecture or exhibition method accepted by society, and thus considered appropriate, constitutes for zoos was permanently subject of change. The zoo evolved from a collection of living trophies and a museum with live exhibits to an amusement park with a moral duty. to date 3 methods and five style generations of zoo building may be identified which are based on a temporal chronology and illustrate the ever-changing perception held by humans regarding wildlife, form a mere showpiece to a entity with rights (Meuser, 2017).

The Australian landscape architect and zoo designer Jon Coe describes three different approaches of animal exhibition methods until now. He has helped to develop and extend some innovative wildlife exhibition ideas such as the immersion design, activity-based, and rotational design are some of his field. Coe promotes design exhibits that are built around specific animal behaviour with goal of giving the animal as much novelties and choice as possible, thereby creating a highly enrich environment for the animals benefiting their welfare. Jon Coe has identified three manners of wildlife exhibition through history *Fig 37*.

- Caged barrier
- Naturalistic exhibit
- Immersion exhibit

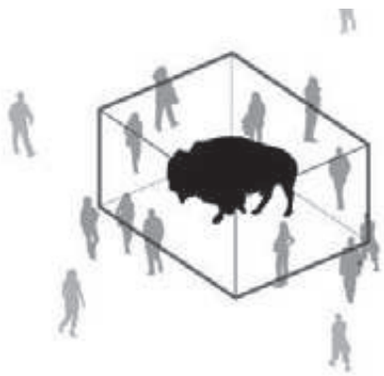
These three methods correspond with other researches, such as Natascha Meuser. She also categorises three exhibition methods, cage, free-system, and territories. Which have similar characteristics. Meuser also identifies five architectural zoo styles generations.

1. Exhibition structures in colonial style
2. Barless structures amid a Panoramic Landscape
3. Formalism and Functionalism
4. The landscaping of buildings and the enclosure of nature
5. Branding through large -scale construction

The individual periods of time reflect political, zoological design aspects. Although the first three generations of zoo architecture may be clearly assigned to the fields of politics (1: Buildings in Colonial style), zoology (2:

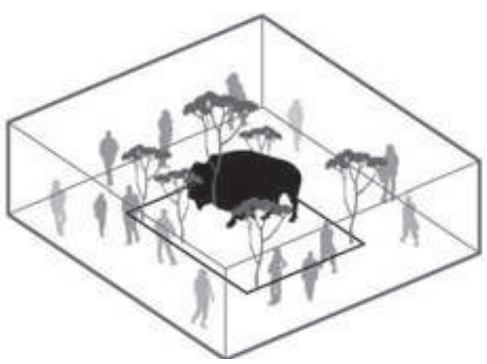
Barless structures) and design (3: Functionalist buildings of the modern time), politics and seeing are intertwined in the fourth generation (4: Land Recultivation and Landscaping). In contrast, the fifth and thus youngest generation combines the aspects of design and zoology (5: Branding through large -scale construction (Meuser, 2017). It is risky to refer to a historic evolution of exhibition methods and building styles and it appearance. Nonetheless, this historical overview allows for an understanding of the development of building forms and spatial concepts present today. it illustrated how modern the structures in zoos were during their receptive periods.

Figure 37 Methods of wild-life exhibition, by Chutcha-wanjumrut



Human- Wildlife relation: -

Animal welfare: -



Naturalistic Barrier

Human- Wildlife relation: +

Animal welfare: +

Immersion Exhibit

Human- Wildlife relation: ++

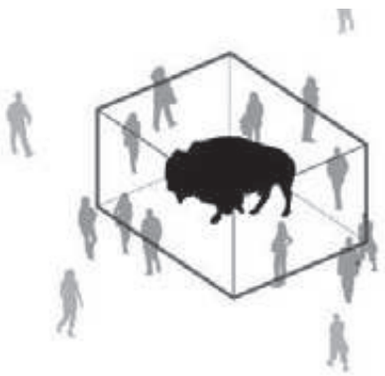
Animal welfare: ++

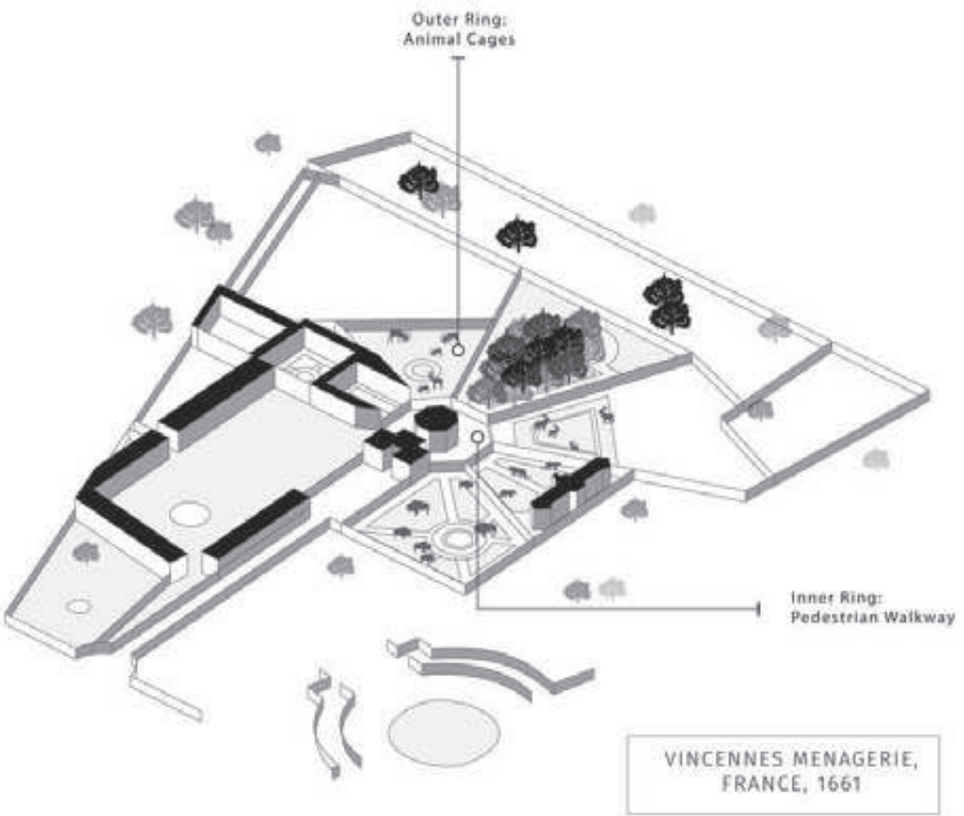
5.3 Caged barrier

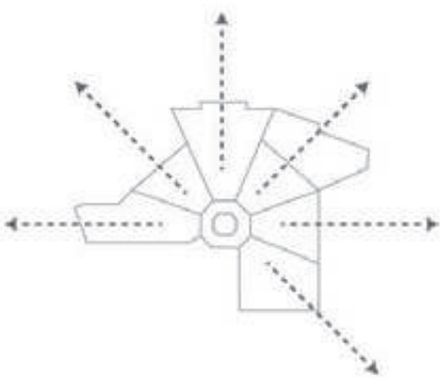
First method of wildlife exhibition is the caged barrier. The animals were kept form the viewer by making use of string fences and bars, with clear and strong distance between animal and people. This method of exhibiting is by Coe called caged barrier (JC Coe, 1992). Caged barrier is the most classical way on animal exhibition and has been through most of history be the predominating way of exhibiting exotic wildlife. Most important factor for these exhibits was to cage the animal so it could not escape, often done with wooden or iron bars. Exhibits were small and clean and with little elements in them so the animal could best be viewed and studied by the public.

Zoos also build designated houses to show their taxonomic collections and designations such as 'carnivore house' 'reptile house' 'aviary 'are directly compatible with museum terms as 'hall of birds' 'hall of mammals'' 'hall of dinosaurs'(J. C. Coe, 1986). Nowadays remains of this static way of exhibition can still be found although most of these kinds of exhibits have been demolished or renovated.

In the zoos of the nineteenth century this way of keeping animals developed in Europe in sometimes almost palace style or exotic building, colonial style, showcasing the rich splendour to the zoo as institution as well as entertaining the visitor and giving them the illusion of faraway lands in their city through this 'fake' exotic architecture, which often had very little in common with the vernacular architecture of the regions the presented animals came from.







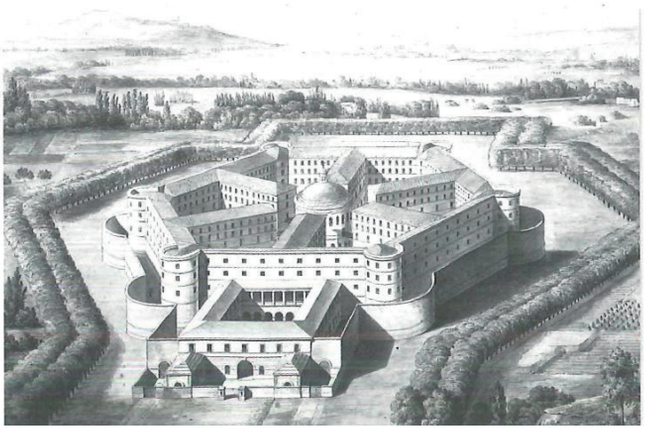
SOURCE: T. CHUTCHAWANJUMUT

5.3.1 from the paradise garden to the panopticon

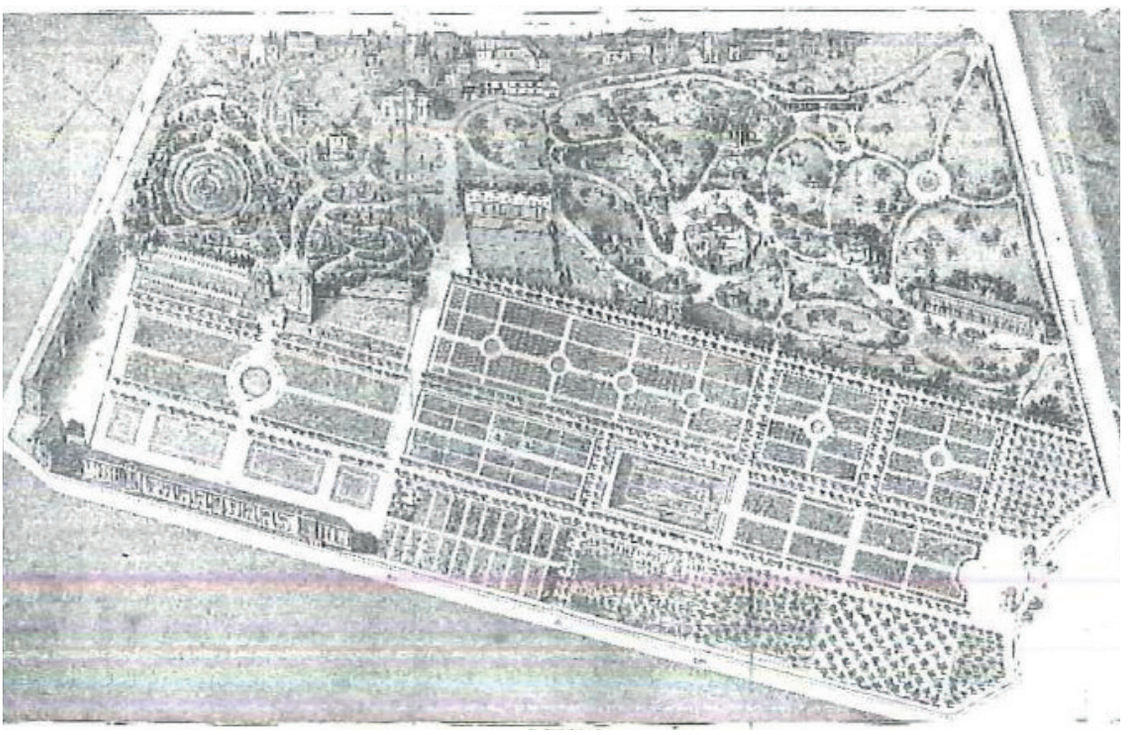
Not until the renaissance was any manner of architecture associated with the zoo. From the renaissance onwards, zoo architecture starts to takes up essential aspects of the garden- and landscape architecture and presents the animals in the pavilions in the landscape garden. Primarily influenced by French landscape gardening. With clear rational symmetric layouts preferred. Often with a central viewing point to easily oversee all the animals in procession.

The menagerie at the palaces of Versailles and Schönbrunn had one of the most important exotic wildlife exhibitions (Kisling, 2000). Both menageries are also well known for their architecture, both established to the ideal plan of what a menagerie should look like. The prominent feature of the classic menageries at that time was the circular layout. In the centre of the menagerie stood a beautiful pavilion. Around this pavilion was a walking path and outside this path were the enclosures and cages of various exotic wildlife. Each enclosure had a house or stable at the far end for the animals and was bounded on three sides with walls. There were bars only in the direction of the pavilion. Mammals lived in cages, while birds lived in aviaries near the entrance or along the side of an enclosure. Visitors could sit in the pavilion and watch all the animals just by looking around, portraying the dominion of the monarch over nature. This also by showcasing the domination of man over the wild. Architecture was entirely centred around the human experience, with little concern to the animal needs.

Menagerie for Versailles, the central pavilion giving a clear and direct overview on all the animals displayed.
source A. Pèrelie



The central monitoring building of the prison allows the have a good overview of all the prisoners,
source L. Lebas



Map of the Menagerie du Jardin des Plantes in Paris in 1845. Contrasting landscape styles between the older botanical garden and the new zoo.
source P. Boiterd

5.3.2 Colonial Style

These exhibition structures in colonial style are the first generation of zoo architecture according to Natascha (Meuser, 2017). It is marked by a heterogeneous architectural vocabulary and colonial influences. Large-scale constructions for exotic wildlife, which had been imported foreign countries as living trophies, provide the architectural backdrop for these 'exhibits'. It is also striking to note the stylistic links between zoo buildings and contemporary archaeological research on the sites of ancient civilisations (Meuser, 2017).

The Antwerp zoo has played an important role within the field of zoo architecture by developing the colonial style of zoo building (Kisling, 2000). The most important example building of this style in the Antwerp Zoo is the Egyptian temple for elephants, giraffes, and zebras, built in 1856. The architect, Charles Servais, used the Egyptian style for all kinds of African animals. Properly because almost all exotic wildlife from Africa to Europe came via Egypt. Unable to simulate the ecological environment, the architect chose to use a cultural theme. He, no doubt, thought of Egypt as representing Africa. Servais built the Egyptian temple with as much scientific accuracy as possible. At the time of its opening, the building was already very impressive. Many other zoo after would imitated the Antwerp colonial style here after in constructing buildings at their own zoological gardens. Usually before a new zoo was built, the director, or members of the society or company, would visit other zoos and examine the suitability of the facilities, resulting in a strong similarity among European zoo buildings.

With the use of these colonial architectural style, within the English landscape style gardens, created a special atmosphere. A visit to the zoo was a total experience of another world completely different from the normal urban life, which was more and more characterised by polluting caused by industrial city.

In this period, biology was developing quickly, as were all the sciences. An important branch was the description of species, taxonomy. Zoos developed as living museums of taxonomy, with houses that had long rows of cages, each with a different taxonomic group thereby starting to order and layout their gardens as such. Zoos build designated houses to show their taxonomic collections and designations such as 'carnivore house' 'reptile house' 'aviary 'are directly compatible with museum terms as 'hall of birds' 'hall of mammals'' 'hall of dinosaurs'(J. C. Coe, 1986). It was of scientific importance and social prestige for a zoo to have the most various and large species exhibition in the zoo, to showcase all the natural world had to offer. Sometimes two or more animals were housed in the same cage, but zoos did not necessarily try to breed them. They were museums, but were showing them alive. This strong emphasis also influenced zoo building and lay out styles which became increasingly dominant until beginning of the twentieth century.

Monumental and decorative mosque like elephant house in the Budapest zoo.
Source: Stars&lights

Iconic Egyption temple building for larger African mammals at the Antwerp zoo.
Source: G. de Kikker

5.4 Naturalistic barrier

Second method for wildlife exhibition is the naturalistic barrier. The concepts of the romantic age and enlightenment let to the idealisation of the wilderness which was fundamental for the eventual development of the naturalistic barrier. The concept of natural habitat exhibits for zoo animals probably was first proposed in 1801 by the French count of Lacepede. He stated that the ideal zoological garden 'is not an accumulation of buildings or birdcages or cages with bars, but it constitutes a true scenery (Charles Coe, 1986)'.

Around the turn of the twentieth century public interest changed as did natural science which began to focus more on ethology and ecology. Books, pictures, and the media increased the public's knowledge about foreign countries and wildlife. The public wanted more than just large numbers of species in long rows of similar cages. Neither the exotic buildings, which gave an interesting frame of reference to the systematic collection, nor the newer systematic buildings could fulfil the new expectations of the visitors. The next major change in zoos did not develop at one of the well-established zoos. It was a private individual, an animal dealer, who developed and realized the new ideas, Carl Hagenbeck.

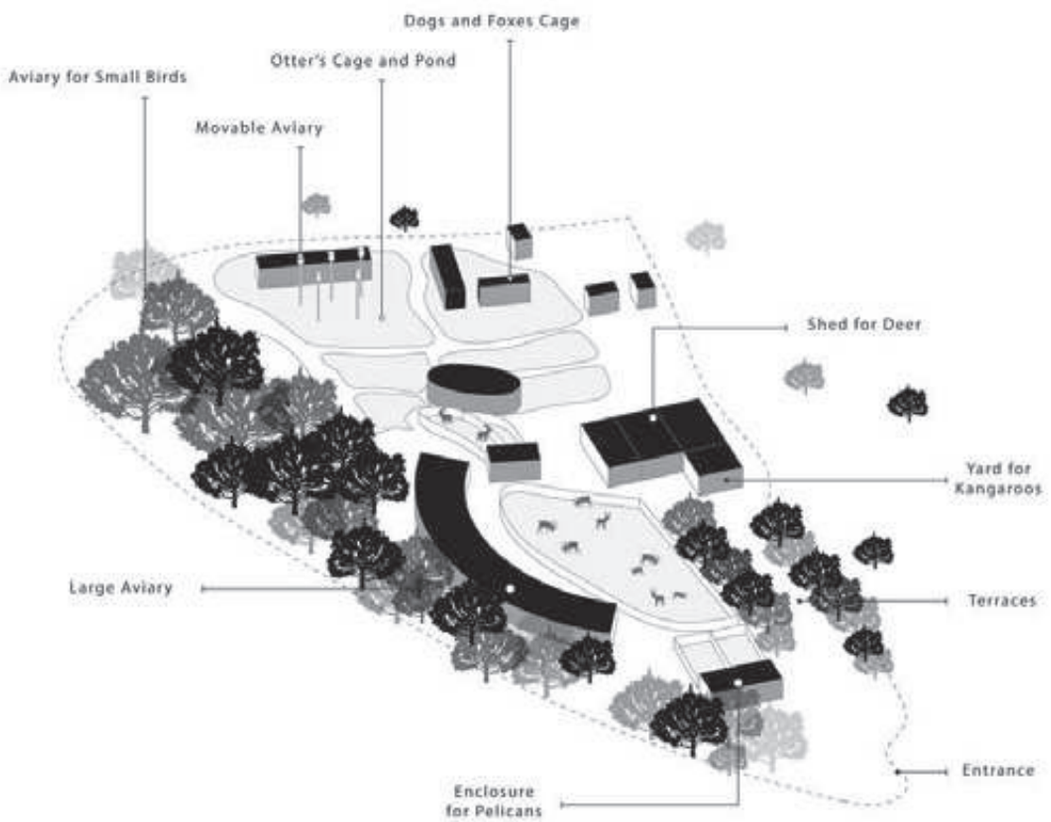
The concept of naturalistic barrier was first realised by Carl Hagenbeck in 1907 with the opening of his Tierpark in Hamburg. He created outdoor panoramas of towering landscapes reminiscent of the European painters several centuries before. The traditional fences and bars where replaced by (dry) moats or disguised as rock formations. Thereby bringing human and animals visually closer together. Ordering animals according to the geographical location and in larger groups of different species if possible.

Not everyone was immediately enthusiastic about this new naturalistic method of wildlife exhibition. The director of the New York zoological society, Hornaday, didn't like this new way of exhibition wildlife at all. He felt this moated exhibit put the animals too far away from the public. Nevertheless, the influence of the Hagenbeck style catches on and was immediately popular and continued to spread all over zoos (Coe, 1986).

Within the naturalistic barrier method two types of exhibition can be formulated. The natural Panoramic landscape style and the Formalism and Functionalism style.

Source: T. Chutchawanjumut

GARDENS OF THE ZOOLOGICAL SOCIETY,
LONDON, UK 1826



4.3.1 Natural Panoramic landscape

The Naturalistic barrier method of exhibiting wildlife can be separated in two types of architectural style. The original natural panoramic landscapes instigated by Hagenbeck. And the modern, abstract version instigated by modernism.

This Natural Panorama zoo design is the second generation of zoo architecture identified by (Meuser, 2017). According to her it Hagenbecks manner of bar less structures ad amid panoramic landscapes that first broke with the existing pavilion like animals enclosures and liberated these to form an autonomous architectural landscape. Animals were no longer separated from spectators but, as it were, visually freed from their cages and presented on a 'natural stage'.

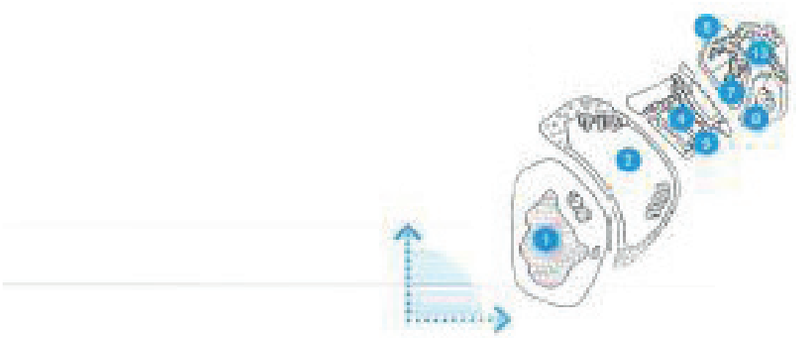
In the 1890s Hagenbeck developed the Panorama, an exhibit type in which different species from the same ecological environment were seemingly put together. The different enclosures were divided with moats not visible to the public, and the successive enclosures were higher than the one in front. The exhibits were landscaped with plants and artificial rocks. This gave the public the impression they were seeing the animals together in one natural habitat. First tried out at world exhibitions and fairs, Hagenbeck developed his thinking in a new zoo concept.

When Carl Hagenbeck's Tierpark opened at Stellingen (near Hamburg) in 1907, it was a shock to the zoo community. The Hagenbeck style or Natural Panorama for the exhibition of wildlife broken every rule of wildlife exhibition previously seen in zoos. The use of the Panorama as the design principle for the zoo landscape was totally unheard off. For a change, the individual animal or species was not the focus of the exhibit, but rather it was the composition of the natural landscape with large groups of animals. For example, the African Panorama, the foreground had ducks and flamingos; behind them were large plains with zebras, antelope, and ostrich; behind them were lions and vultures at the foot of an artificial mountain, on which were ibex or Barbary sheep.

The natural panoramas of Hagenbeck were widely copied all over the zoo industry. For instance by Johan Burgers how established Burgers Zoo in the early 20th century on the principles Hagenbeck had introduced, with naturalistic exhibits the first in the Netherlands. Even copies were copied until all but the most superficial similarities were often lost. The clever overlapping of sightlines, sequel experience or the sympathetic recreation of rock forms was lost(J. C. Coe, 1986), for only concrete rocks with moats.

Panoramas at the Tierpark Hagenbeck. To the left is the Eismeer panorama and to the right the African panorama

Source: Tierpark Hagenbeck



Drawing on the workings of the African panorama. Visitor routes and border walls have been hide from view

Source: Tierpark Hagenbeck

5.4.2 Formalism and Functionalism

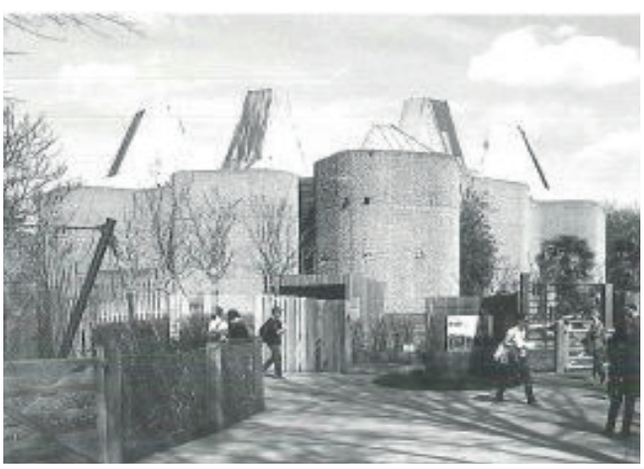
The movement towards modernism in art and architecture has had also a profound effect on exhibition design, since most exhibits where always designed by architects the architectural style of a time period can finds its way within zoo exhibits. In art, modernism turned its back on realistic and representational painting and sculpture in favour of greater and greater degrees of abstraction (J. C. Coe, 1986). Modernism influenced the zoo exhibition design intensively such as the Snowdon aviary (with its tensile structure) and the penguin exhibit (with its double helical ramps) or at the former polar bear exhibit in the Amsterdam Zoo. They took their forms from some abstract characteristic of the animals displayed but, like many exhibits of their type, were more successful as sculpture than as habitat, and totally dominated their small occupants (J. C. Coe, 1986). Modernist outdoor zoo enclosures often maintained the Hagenbeck concept of moating and walled exhibits. But, the emphasis was on simplification, abstraction and universal application (J. C. Coe, 1986). Elsewhere the architects abandoned 'rockwork' altogether and natural landscape occurred in favour of smooth concrete or masonry walls of geometric shape, which felt to be mote 'honest' and economical(J. C. Coe, 1986)

The modernist view that the all problems would be solved by increasingly sophisticated application of technology presupposed that clinic-like habitats were the answer to increasing survival and reproductive rates among zoo animals. The tile-lined room with a glass front and stainless steel furnishings became the norm for most of the larger zoo animals (J. C. Coe, 1986).

The formalism and functionalism approach in wildlife exhibition is indicated as third generation by (Meuser, 2017). The shift away from landscaping is characterised by formalism, the rejection of exotic ornamentation and a minimalistic approach in architectural vocabulary.

Gorilla House London

Source: Riba



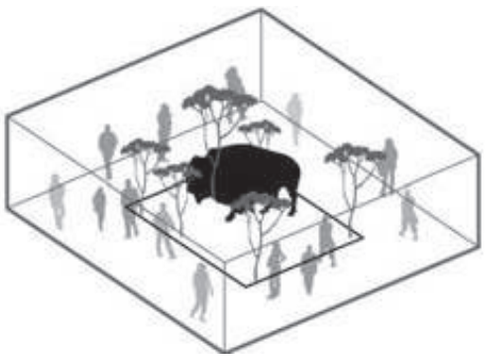
The Elephant building of the London Zoo shows a modernistic approach towards natural forms
Source: London Zoo

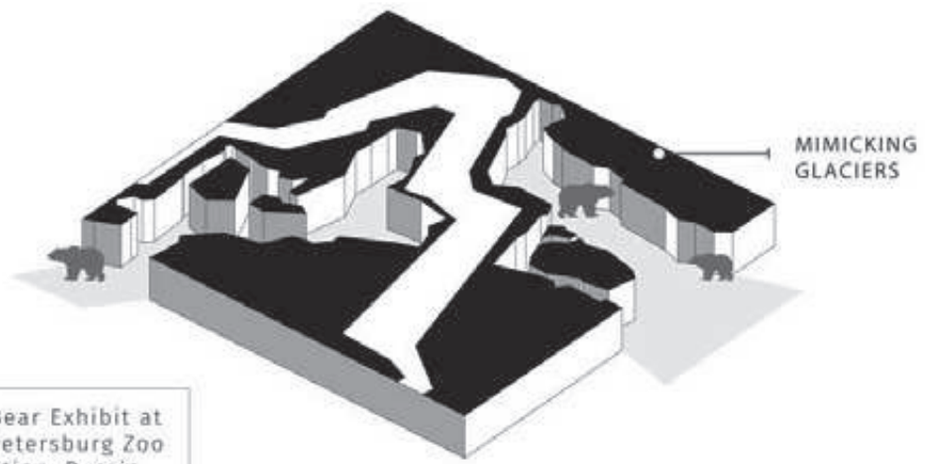
5.5 Immersion exhibit

Lastly the immersion exhibition method of design theory is a substantial advancement on the natural barrier method. It is strongly influenced the landscape immersion or natural habitat approach, particularly in terms of creating dramatic vistas and overlapping sightlines. 'landscape immersion' theory and design was pioneered at woodland park zoo in the USA in 1975. It tries to engage the visitor into an emotional response. High levels of emotional connection lead to high motivation to learn about the subject and to act to protect and advance the subject's interests. Furthermore, the immersion theory holds that humans in subordinate position to animals and landscapes are predisposed to learn from them, while those in a superior position tend to want to dominate the subject (Jon C Coe & Mendez, 2005). The immersion approach, more than natural barrier method, allows the viewer to become physically and psychologically immersed in the re-created habitat of the animals displayed. A zoo horticulture moved from its previous role of providing ornament to become the central context, creating a 'landscape with animals'. Applying to both the emotion and intellect of the visitor (Jon Charles Coe, 1986). The immersion approach assumes that's science indeed knows relatively little and attempts to re-create a close simulation of the animal's indigenous landscape. Thereby it hopes to meet animals needs which are not yet even know to exist (Jon Charles Coe, 1986).

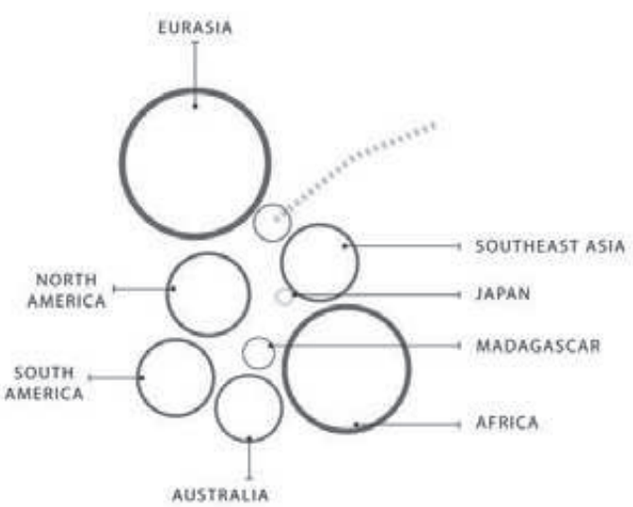
It's much easier apply this immersion approach on large natural habitat exhibit outdoors than indoors, where the presence of surrounding architectural envelope is very difficult to obscure (Jon Charles Coe, 1986). All good immersion exhibits fit seamlessly with the site and utilize important sit features ad more distant 'borrowed landscape' backdrops (Jon C Coe & Mendez, 2005). Telling a story about the natural world the exhibited animal come from. Ordering is there by done geographically or climatically. Associated exhibitions styles are Renaturization or Iconic large-scale buildings.

Source: T. Chutchawanjumut



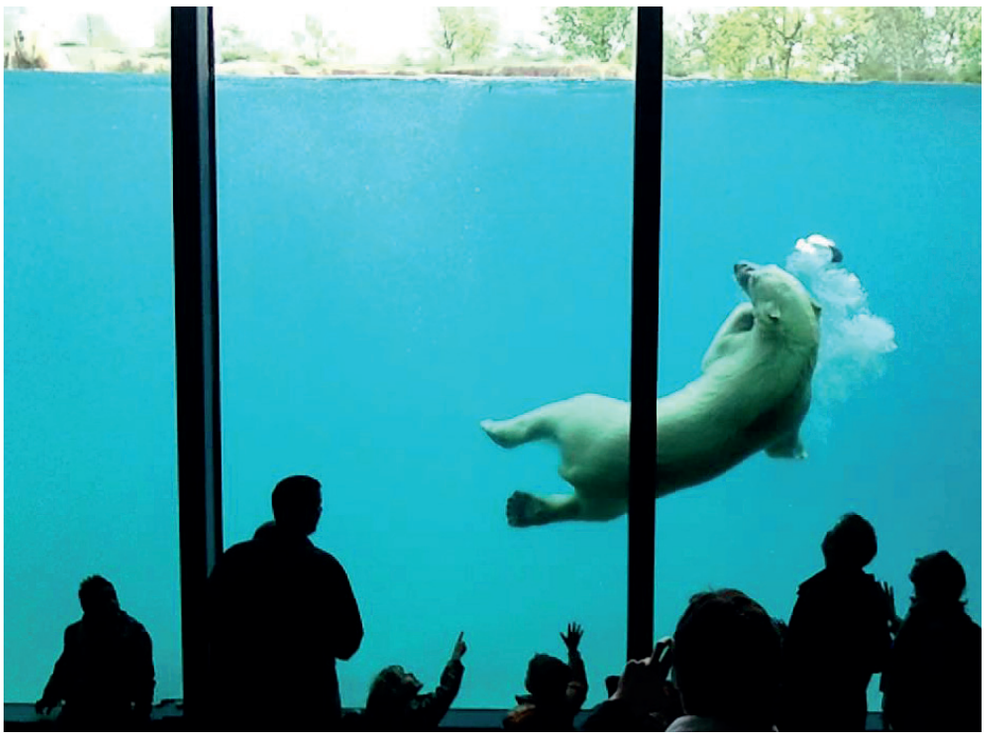


Polar Bear Exhibit at
Saint Petersburg Zoo
Renovation, Russia



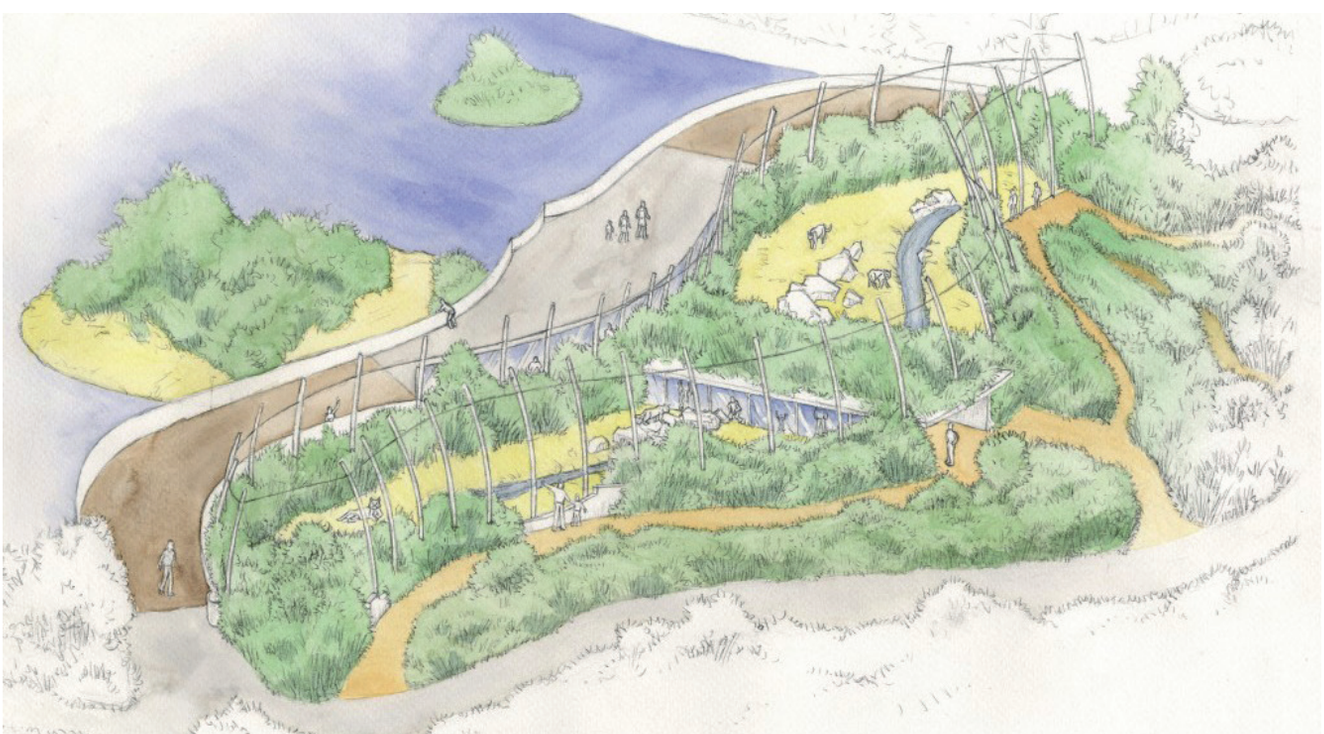
5.5.1 Renaturization

In the period after 1970 (Meuser, 2017) categorizes two generation s(fourth and fifth) of zoo architecture. The fourth generation of is characterized by the landscaping of buildings and the encloses with nature. Meuser indicates that with the emancipation of zoology in the second half of the twentieth century, architecture too set out to embody a conscious orientation towards mature. As of the 1970's, the landscaping of architecture on the one hand and the methodical enclosure of nature on the other are common features among fourth generation zoos. Architecture disappears to a certain extent from the zoo. Landscaping architectural elements are increasingly prevalent. This development can in part be attributed to the club of Rome and the awareness of more resource-saving approach to nature which came more active.



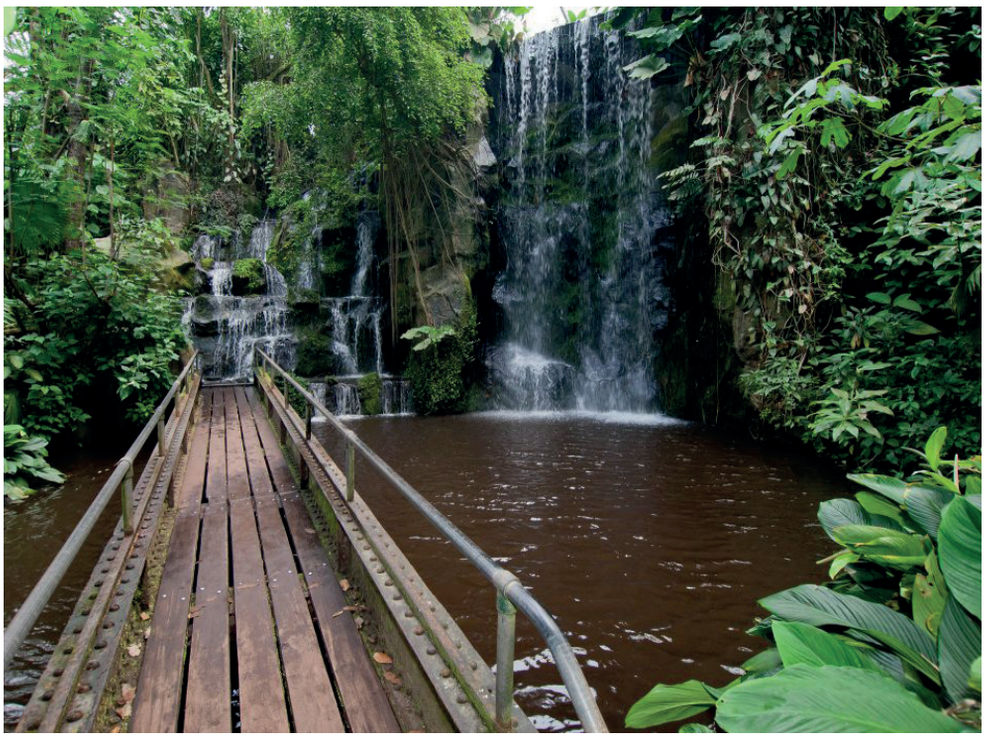
Visitors watching a icebear swim underwater at the Rotterdam zoo
Source: Rotterdam zoo

Design drawing of the Tiger exhibit at the Rotterdam Zoo, the vegetation in and around the exhibit creates the illusion of being one and invites the visitor in the 'jungle'
Source: L. Zuydgeest



5.5.2 Iconic large-scale buildings

The fifth generation is identified by the branding of the zo though iconic large-scale constructions. The trend towards the so-called adventure zoo asserted itself at the beginning of the 1990's. Since then, many traditional facilities have been remodelled upon this basis. Thematic architecture and story-telling play a significant role in today's adventure zoos Meuser states. On the other hand, several iconic buildings which turns divert attention from the animals have been emerged in zoos.



Indoor rainforest at Burgers Bush un the Arnhem Zoo
Source: unitedeconomy

Afrykarium-Oceanarium in the Wroclaw Zoo
Source: visitwroclaw

5.6 Conclusion exhibition methods and styles.

The three main methods of exhibition, cage, naturalistic barrier and immersion, all have different human-animal relation. Where by a caged exhibit there is the strongest barrier between the two and with immersion the least. Further the immersion method of exhibitions proves to be the best current method of exhibition from the animal's welfare point of view.

In the overall development form exhibition method from caged to immersion the changes in our society towards animal welfare and their wish in enhancing animals' welfare can be seen. As exhibits have moved to becoming increasingly mirroring the natural environment of the animal in question, by means of landscaping, multi species and vegetation. Thereby constantly answering questions in the ethical debate surrounding wildlife captivity.

For the future zoo the method of exhibition should be immerse, but a method even more closely related to the natural environment would be preferred. Therefore exhibits should consist of multiple species, minimizing the wild and creating enrichment opportunists for the animals. The idea of single per species exhibit should be abandoned for a more integral approach of exhibition, like safari parks but then within the urban context. Bringing different animals living together and on a larger and more free area within the confinements of the future zoo.

Also with future methods of exhibition more notice should be given to indoor facilities for animals. Some climates are not well suited for animal's species all time of the year. At those moments the indoor facilities should be at the same standards as the outdoor facilities for both animals and visitors.

The style of exhibitions has developed coincidently with the methods of exhibition. First very human centred and oriented towards the building. Later on, increasingly influenced by the natural environment of animals. In recent years buildings and architecture has increasing been important for zoos but not over shadowing the animals.

Exhibition styles are primary experienced by the visitor and can help transform the visitor to a natural envier or nation of the animal by landscaping or vernacular architecture. This theming of the landscape brings the animals in a theatre to be showcased to a naturalistic theatre, to be showed to the public. Mimicking these natural landscapes and sometimes architecture helps to achieve the zoos objectives.

As exhibitions styles increase the recreation of the visitor by immersing them in a other world experience. Creating natural worlds also benefits the educational abilities a zoo can offer and helps with the conservation by creation better environments for the animals to live in. Creating more engagement from visitors with the animals as well as animals who show natural behaviour, helping the breeding of those (endangered) animals.

The futures methods of exhibition and style of exhibition should be based

on the immerse experiences. Thereby creating the best conditions for animal's welfare and objective realization. Although the future zoo must find a manner in which the critique that visitors don't see any animals with this kind of exhibition can be counter acted. And animals van be seen and discovers in the most naturally like environment as possible.

5.7 Size zoos

Wildlife exhibition require space for the animals to roam, staff to take care of the animal and of course space for the visitors and visitor facilities. Depending on the type of animal and the way of the exhibition this call for a certain amount of space. In the *Fig 38*, shows that the size of the zoo tells little the urban position of the zoo. Likewise, it is seeming that most zoos have built up most parts of their land, on average around 74% of the available land has been publicly used by the zoo and is visible for the visitors. Although the post-war zoos, with the exception of Arnhem Zoo, tend to be a slightly more build-up. Stating that animals can better be held outside the city since there is more space for them is currently untrue. From the animal welfare point of view the size of the zoo doesn't manner, the size of the exhibit is important. As it allows the animal space to explore and live in.

Size does indicate a special form of exploring wildlife. The Tilburg Zoo the largest zoo in the Netherlands. Uses cars and buses to view the wildlife, which requires a lot of space and coincidentally offers the animals a lot of space to roam through

In the future, these concern minds lead to larger exhibits for wildlife and the question then will be which zoos have the available space to expand their exhibits without having to remove much or their current exhibits and animals. From this point is view the Arnhem Zoo and Emmen Zoo sustained to developments in that direction with both have over 40% of their area free for building-up on. And then again rural and edge zoos might find easier space to expand in the landscape.

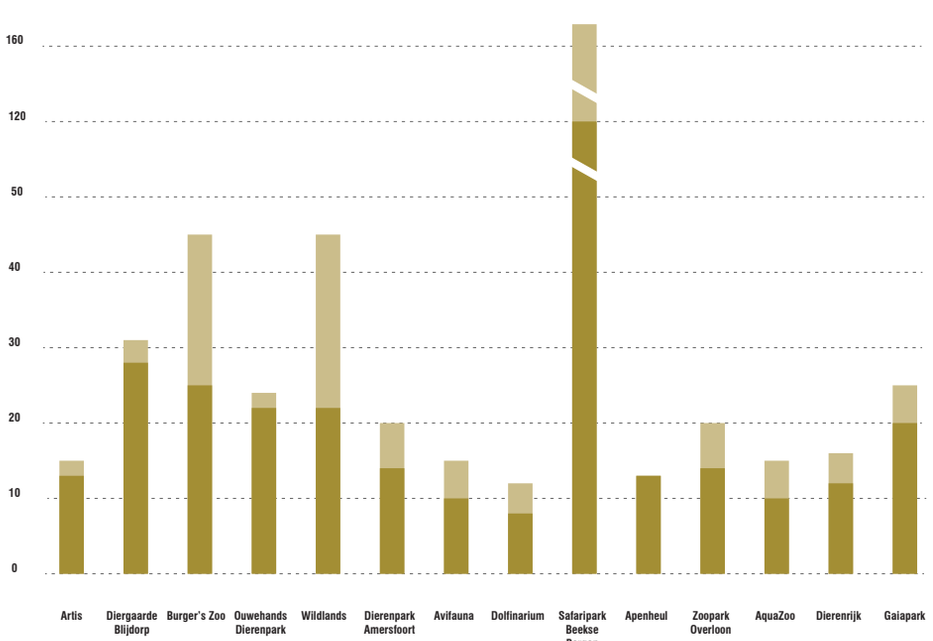


Figure 38 Available land zoo and land in use

5.8 Ordering of exhibits

Most zoos still use some of the characteristics of the English landscape style with curving paths and natural scenery. Within the scenery decor's they may have organised their wildlife in five different approaches.

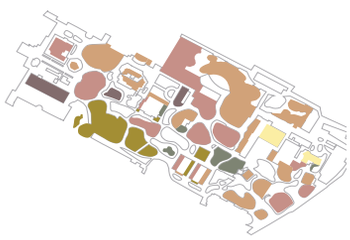
1. Random
2. Taxonomic
3. Geographic
4. Climate
5. Ecosystem

First approach is random, where there is no clear relation between one exhibit and the next this is nowadays the most common practice in the Netherlands. Sometimes small clustering around certain exhibits can appear but the approach is often not stressed out over the entire zoo. Secondly, they may have a taxonomic approach, this was very popular in the nineteenth-century zoo but is nowadays hardly ever seen. As zoos where tried to have the most complete collection of natural wildlife to study, animals were order by their species in ape houses, birdhouse, reptile house etc.. Ordering can also be done by geography location the wildlife originates from, mostly based upon continental Rotterdam Zoo *Fig 39* and Kerkrade Zoo make use of this way of an exhibition. Or on similar manner the climate the wildlife comes from such as rainforest, savanna, polar etc, Emmen Zoo is an example of this. Lastly, there is the combination of the previous two organisation on the ecosystem where both geography and climate of a specific place are chosen, the Arnhem Zoo primarily uses this concept in their Bush, Desert, Mangrove, Ocean etc.

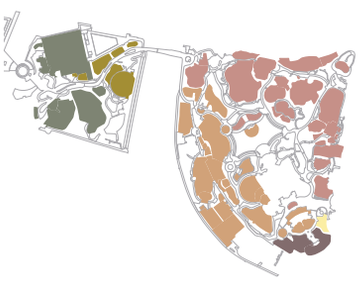
The approach of ordering of exhibits can also help in achieving objectives. Expect for random all methods for lay-out ordering of wildlife in a zoo enhance the capability for education. For the future zoo the best method of organizational layout is the inspiration of the ecosystem. Since it can offer the most enhancement in objectives especially for education an conservation can well be explained using this manner. Because the immersions that can be created can most closely mimic the natural world and tell thereby the fullest story.

Figure 39 zoo exhibit ordering by geography

Amsterdam Zoo



Rotterdam Zoo



Arnhem Zoo

Nuenen Zoo

5.9 Land Use

One interesting element to reckon with is that even in the modern zoo space is still dominantly human oriented and much of the land is allocated to them Figure X. In the ideal 'wild' situation almost all space in the zoo is allocated for the benefit of the animals. In some (older) zoos scenery landscape have been part of the early design and are now part of the cultural heritage of the zoo, but more often humans just tend to get a lot of space.

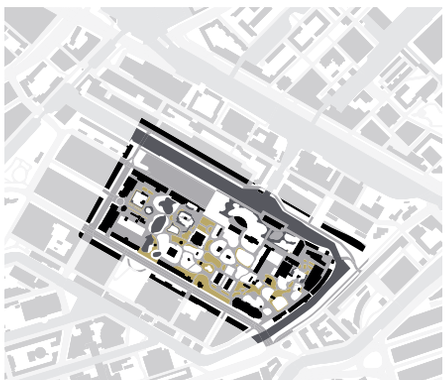
Further influence on why exhibits aren't a high percentage of the land use is the fact that the minimal advised requirement for a lot of species aren't very high. Depending on the species, zoo and age of the exhibit zoos build various sizes of enclosures. But often the enclosures are not much higher than the minimal requirements.

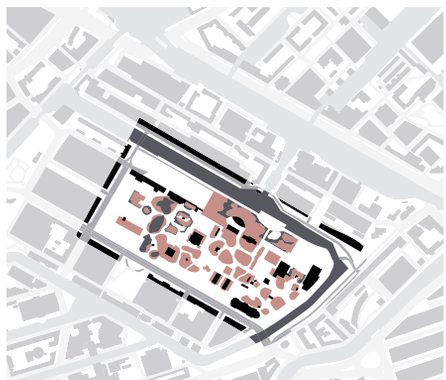
In the future zoo, because of animal welfare the arrangement of land use should predominately be beneficial for the animals. The future zoo must therefore allocate more space to animals instead of humans then as currently is the case. And make strive to make the exhibits much larger then minimal advised would be.

Figure 40 Land use

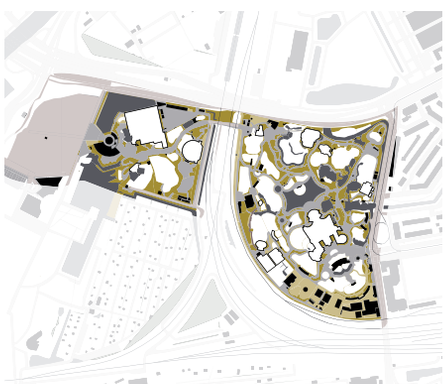
people space

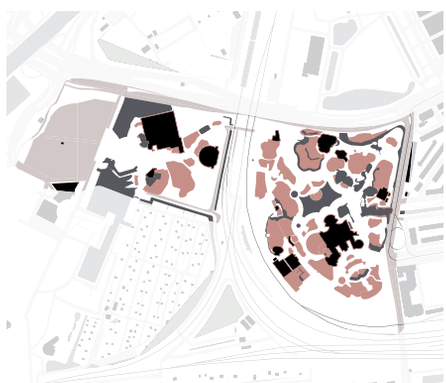
animal space



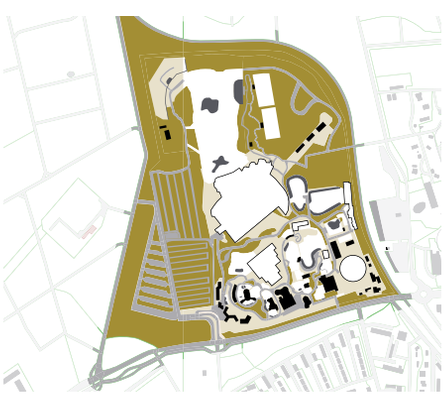


Amsterdam Zoo

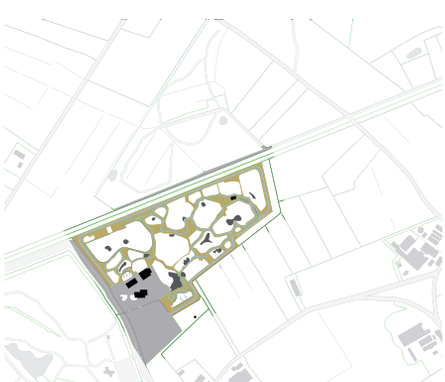




Rotterdam Zoo



Arnhem Zoo



Nuenen Zoo

5.10 Animals

Exhibition exotic wildlife is the main characteristic of the zoo. But what animals to exhibit and how many species and the total number of animals, depends on and varies from zoo to zoo. This variation is caused by historical development, finances, space for housing animals and choices by the management of the zoo.

Not every animal is as popular or well-known as the other. Therefore Sheridan has classified a number of species as iconic zoo animals *Fig 41* that people love to see and to some extend also expect to see when visiting a zoo. Iconic species are not all exceptionally rare in zoos or the natural wild, although species that are rare to see in zoos can attract certainly extra visitors. Although most of the mega fauna are iconic species.

Since visitors like the them, and expect to see them, it is important for zoos to have a certain number of iconic animal's species in their facilities to attract visitors. Sheridan also states, having these animals is not enough, the manner in which they are, shows also and enhances the experience to the visitor and the recreational value of the animals.

Besides holding Iconic species, zoos also hold a large variety of other animal's species. often less well known by the public that equally or more important for conversational purpose or education opportunities to tell about the natural world. As people visit zoo to see animals the recreational value is key. Visitors want to see a great variety of species when visiting the zoo, to little species and visitors will not be satisfied. Although there is no ideal number of species for a zoo.

The number of species often also coincides with the total number of animals in a zoo. Visitor experience is enhanced as they can see many animals, especially icon ones. Great hurt or colonies of integration and socially animals are very much appreciated by visitors. Like with the number of species there is no minimal sum or ideal number. It is more important how the visitor experiences the number of seen animals.

Multiple animals within one enclosure is very beneficial for the animals, zoo and visitor and is increasingly implemented. Multi-species exhibits benefit because of the greater enrichment of the animal by interacting with each other. For the zoo to get better and fulfil its objectives. And for the visitors because they enjoy the interaction between the different animals. Making them more active usually and thereby more interesting to watch.

The future zoo needs to exhibit a larger variety of species in multi-species exhibits with also a certain number of iconic animals to please the visitors.

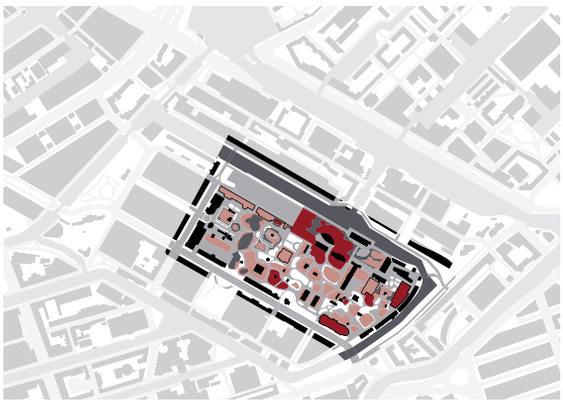
Figure 41 Iconic animals according to A. Sheridan

Iconic animals often get a large portion of the space in the zoo allocated to them Fig 42. Showing their iconicness and importance to the zoo. As well as the act that these animals are usually larger than the average zoo animal.

The place of the iconic species doesn't seem to be orientated towards the busiest or most well-connected parts of the zoo Fig 43 Indicting that the position in the zoo doesn't really matter. But also indicating that they can be used to attract visitors to certain corners of the zoo.

The position of iconic animals doesn't really matter that much, as long as each area of the zoo has at least one iconic animal. Zoo can attract visitors to that part of the zoo, spreading the visitors. In the future zoo, each zone should at least have one iconic animal to attract visitors to that area of the zoo.

Figure 42 top animals location in zoo



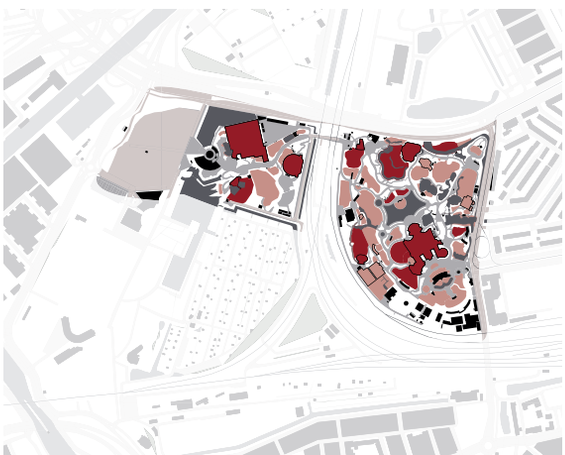
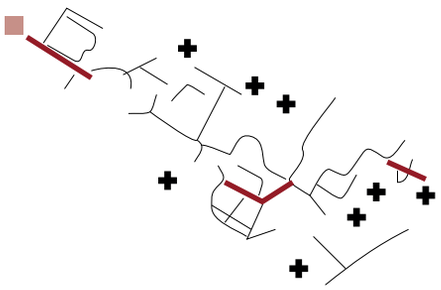
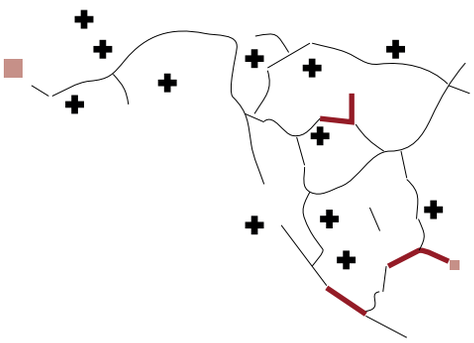


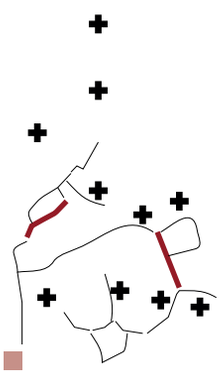
Figure 43 iconic animals location zoo flow



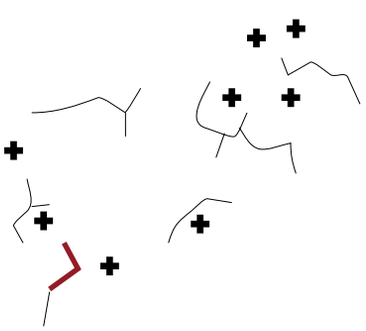
Amsterdam Zoo



Rotterdam Zoo



Arnhem Zoo



Nuenen Zoo

5.11 Future developments related to the lay-out

5.11.1 Collection of species

On what kind of animals, the future zoo should hold are very different options. In recent decades the variety of species, especially bigger animals, has shrunken. Allowing more space for the remaining species or to make space for endangered animals in breeding programs. On the other hand, zoos in recent decades do have put more emphasis on the more charismatic species or cute species that attract visitors the most. Taking the preference of the public into account is according to Fiby something zoos cannot avoid as one of their criteria for selecting species in their collection (Fiby, 2012).

Well Murphy advocates that future collection should consist om many different big and smaller species (Murphy, 2012). John Hancock argues that zoos should mainly focus on smaller (local) species in close relation with local communities strongly linked to conservation (Hancocks, 2012). Hancocks argues that local smaller species are easier and cheaper for zoos to hold and collection should not have large animas that need to be kept inside for long periods of time when it is winter.

Jeffrey Bonner warn that most of the collection of animals in zoos are currently not (genetically) sustainable (Bonner, 2012). Therefore, zoos maybe have very little choice in what animals to hold in their facilities since some species at current breeding rate will go extinct within the zoo community. Them for-breeding purpose of breeding centres should not only be aimed at establishing population for reintroduction but at first for a sustainable population within captivity.

5.11.2 Nature as norm

People want to experience more and more real things. In this manner it can be expected that exhibits will also try to mimic more and more the wild nature. With real natural elements and nature is the norm as Hancock envisions. John Fraser call for putting all focus of the future exhibit upon the animal a real natural surroundings, with attention to (human) architecture limited (Fraser, 2012). For the design of the future animal exhibit Hancock formulated nine rules (Hancocks, 2012):

1 Zoos should hire local designers and landscapers for better links with real environment. Encourage them to question the zoo goals and assumptions about design let them come with new solutions.

2 ecologist and geologist at the hard of the design team

3 seek every opportunity to show sustainability and welfare

4 appoint an animal representative for the exhibit design, preferred outside

5 give animals opportunity to really explore and forage, with real natural elements. If zoo animals are killing trees in the exhibit, plant more trees

6 accumulated a visual library of natural artists and conditions that can sure are archetype

7 let people explore the zoo, don't directly tell them what they will

see were. No expectations, like on a safari in the wild

8 make use huge biome landscape and let people explore

9 question every design and decision on how this is helping to enhance the research, conservation and education and glorifying about biodiversity.

5.11.3 Rotation exhibition

Because of animal welfare concerns and the enrichment opportunities it provides rotation exhibition a trend, currently very limited, that in the future might become a predominant form of wildlife exhibition.
As animals soon become habituated to their exhibit with resulting decreases in animal activity and visual interest for then public, they as simply bored and don't find enough enrichment within their exhibits. Activity based design merges immersion displays with behaviour management to increase novelty and species-typical activities. For instance by the use of animal rotation exhibition, which increase healthy animals activities and visitor interest (J. Coe, 2004).

Animals rotation is an integrated management and facility design strategy which allows animals to move sequentially between two or more interconnected displays off-display areas for temporising of increasing available space and behaviour opportunities for animals (J. Coe, 2004). Forms of rotation include the single individual, single species group, multi-species individuals and multiple species groups. In a traditional zoo, a displayed a given animals or group may live its entire life in one exhibit. In rotation display, the animal may spend the morning in one enclosure and afternoon in a second enclosure. It's a 'time share' arrangement between different animals. Moving animals among the different exhibits affected activity levels and/or space utilization in all animals in the activity-based management system (J. Coe, 2004).

Professor Hediger (1950) described a typical territory of wild animals and being made up of a variety of special used areas interconnected by regally used pathways. The animal may need access to each of the special places but it does not need access to all the areas at the same time. No zoo is large enough to give each animal enough space and environmental complexity to approach a natural condition, but perhaps we can greatly increase both space and complexity for out animals by devising a managed 'time share 'concept to make the most of the space we do have (J. Coe, 2004).

Also, the visitor experience can be very much improved by animal rotation. Not knowing which animals will be seen next adds excitement and anticipation for the zoo visitor, as it would during a wake in the national park of natural bush and making a trip to the zoo more of a safari experience (J. Coe, 2004).

One of the negative aspects of animal rotation is the extra requirements that come with building the exhibits. In every exhibit containment barriers are sized to contain the most powerful or agile animal. In rotation exhibits barriers must be sized for the most demanding species in the rotation. this makes these ways of exhibition more expensive than the building of

independent displays of similar sized species. The cost of additional gates ad return chutes must also be considered (J. Coe, 2004).

5.11.4 Unzoo

Beside rotation exhibition Coe proposes a new form of exhibition, the unzoo (J. C. Coe & Mendez, 2005). Currently zoos could be defined as: a park displaying live animals from different parts of the world. Kept in cages or enclosures for people to come and see, and where they are bred and studied by scientists (J. C. Coe & Mendez, 2005). The Unzoo wants to change this in: a place where the public learns about wild animals, plants and ecosystems through interaction with an immersion in original or recreated natural habitats (J. C. Coe & Mendez, 2005). Wildlife in the exhibits is attracted to more in the visitors view rather then that they are confined and exposed to the visitor's view 24/7.

Old cages have been replaced with open 'bare less' grottos, which in turn are being replaced by 'immersion' exhibits with hidden barriers. Isolated enclosures are being linked to form networks of 'rotation 'displays. The unzoo will greatly reduce the reliance on physical barrier between people and animals. and preferably encage the people not the animals (J. C. Coe & Mendez, 2005). Striving to enjoy with a as real and close up experience as possible since 'one can judge the effectiveness of an exhibit by the pulse rate of the zoo-goer" (J. C. Coe & Mendez, 2005)
Exhibits design should have the following bas principles (J. C. Coe & Mendez, 2005)

- Nature is the model; copy nature, not other zoos
- If we want teach respect for nature, we must present nature respectfully
- Demonstrate landscape as appropriate habitat and ecosystem
- Immerse visitors in the simulated or restored natural landscape dominated by animals, without distracting view of large crowds, barriers, support structure or inappropriate objects.

In this walk-through exhibit should be the immersion experience that takes visitors into the habitat of the animals and form a still largely untapped potential (J. C. Coe & Mendez, 2005). In the Dutch zoo context, we can envision the Burgers Bush, Desert or Mangrove in this unzoo matter, only preferability even bigger with also the ability of larger animals to start roam around. By containing many species within a single perimeter, they put people inside the fence. Large drive-through open-range safari parks operated on the same principal, people are more confined than animals (J. C. Coe & Mendez, 2005).

Traditional tools like local guides or binoculars are somethings necessary in the unzoo these will be indispensable. Even supplemented by night vision, radio telemetry, embedded transponders and global positioning satellites. Expending the senses during a zoo visit (J. C. Coe & Mendez, 2005).

Extended day programs, with abilities to of seeing active animals in the evening and night and waking to the early sounds of nature can form

lifelong memories (J. C. Coe & Mendez, 2005). After hours uses can also benefit larger higher attendance unzoos. The Singapore night safari demonstrates some of this potential of the night time zoo experience already (J. C. Coe & Mendez, 2005)

When zoos and wildlife sanctuaries seek to diminish the physical and perceptual barriers between their guest and nature, they must return to their wilderness roots (J. C. Coe & Mendez, 2005).

- Recall direct experience of nature in its many forms
- Design exhibits as interconnected experience, not as objects
- Stimulate human emotions end embed meanings
- Provide memorable, personal encounters with other species without the unnecessary sentiment of artifice

5.11.5 Other exhibition trend

In recent years, also other trend in zoo layout and wildlife exhibition can be observed. Though this is a general over view in most Dutch zoos in one form or another these developments are visible

- Increasing in immersion design exhibits

- Cultural resonance
    - Immersion including vernacular architecture and cultural environment in zoo exhibits. First introduced by Carl Hagenbeck in 1907 and was revived in the 1980s. it adds an important human dimension to immersion design tremendously increasing education opportunities and values. Especially the last decade this has become much more popular.

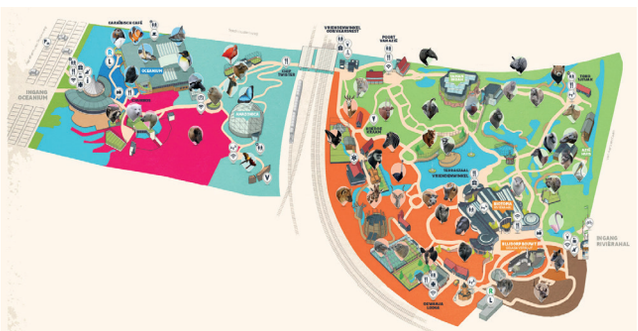
- Theme and storyline
    - Overall thematic organization of zoos developed by carl Hagenbeck. Storyline, narratives which add interest and continuity to groups of displays, emerged from simple storytelling and theatrical venues. Both themes and storylines had major impact on zoo display through their dramatic use at for instance Disney's Animal Kingdom in Florida. The use of themes and storylines, like cultural resonance, have added more depth to the concept of immersion design in recent years

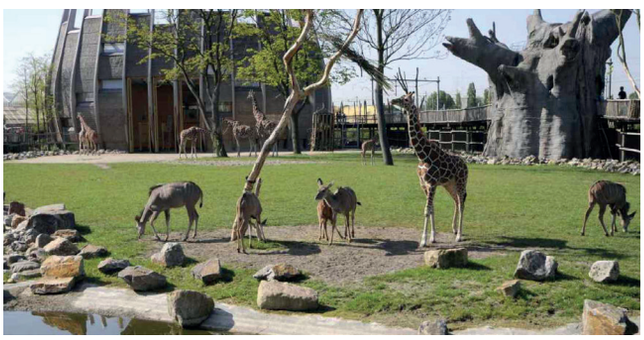
- Activity-based design
    - Activity-based design emphasizes behavioural management as advocated by Hediger in the 1950's. this concept was updated in the 1980s to integrate the fields of behaviour enrichment, animal training, husbandry and design. Improved animal activity and fitness levels result in more active and interesting animal displays

- Affiliative design
    - This trend which increase affiliative behaviour and reduces aggression in social species, including people, gives a much better message about animals and their place in nature. Bringing people and animals with more interaction together.

Aspects for the Zoo Evaluation Tool

The Lay-out relate to both the animals as well as visitors. The lay-out should be evaluated on different scales as basis for aspects, Macro, Meso and Micro.





Macro:

Macrois the largest scale identifying the lay-out of the entire zoo.

- Ordering exhibits: of a zoo shows to what extent they want to transform the visitors to a different world when visiting the zoo.

- Land use: component indicates where in a zoo the spatial focus lays, animals or humans.

- Exploring Wildlife: shows how people move around the zoo and to what extent is an adventures experience were different human-animal interaction are encouraged.

- Biozone iconic animals: certain popular species of animals can draw visitors to a area of the zoo or exhibit, combining with other less popular animals they can encourage a richer zoo experience an overview of a native habitat.

Meso:

Meso is the medium scale, relation to a smaller subgroup of exhibits. Components are

- Exhibition Method: show is relation mental, social and spatial relation towards wildlife, were less obstruction (for the animal) creates a higher level of experience and engagement educational and conservational by the visitor.

- Climate facilities animals: focusses on how the animal can perform natural behaviour if the climate outside is not suitable for them (at that time of year).

- Exhibit space: determents the area in which an animal can freely more and preform natural behaviour, it is hard to determine how much space an animal needs, since it will always be a fraction of the land it would occupy in the wild. For the ZET the German official space requirements will form as basis for evaluation.

Micro:

MIcro is the smallest scale focusing on the animal or personal experience of the exhibit

- Enrichments: focusses on the possibilities to preform natural behaviour in the exhibit, is the animal able to climb, dig, swim, run, hide etc. And to what extend is it able to have choice and novelty in its experiences.

- Multi-species: shows if in the exhibits multiple species are positioned together, creating a higher level of attraction as well as opening enrichment possibilities for the animal and give a better show off an animal's native habitat. Extra credits are given to more unusual and daring combinations.

Synthesis

Chapter 6

Zoo Evaluation Tool

6.1 Introduction

In the previous chapters different elements of the zoo and the future concerning the zoo have been analysed. In this chapter the analysed material will be integrated to create a tool to evaluate zoos. Zoos are as previously mentioned very different and are also very complex systems were a lot of aspects come together and influence each other. Still there remains a need for simplifying then so they can be evaluated, categorised and compared.

The ZET makes it possible to make a quick scan of the zoo, using different parameters which analyse certain key aspects of a zoo, receiving either a high or low value on each of the aspects. By using this tool, identification can then be made what the strengths and weaknesses of the zoo are and where focus is being put on. With this thesis, the ZET will be used to make an overview of a zoo, of the zoo and indicated places were improvements can be made to better facilitate its objectives, spatial layout or urban connection.

Further, the previous analysis and future trends study aims at establishing a method for sustainable exotic wildlife exhibition in the future within the urban environment. Guidelines therefore are established. Together with requirements and opportunists they form the base rules that future zoo needs to at hear to. These guidelines will be incorporated into the ZET to indicate how the future zoo should perform in the different aspects and components. Thereby conclusion can be drawn how the current zoo relates to the future zoo and what a zoo needs to transform or change into a future zoo.

6.2 Parameters Zoo Tool

The ZET consists three main segments which correspond with the main facets of the zoo: objectives, urban fabric, lay-out. Relating to the mental, social and spatail elements of space. The different aspects of the zoo are categorised according to these main segments. Combined they can together they can a statement about how a zoo is performing on one of those segments. Each of the aspects of the zoo can be divided into different components. In the following *Fig 44* the different aspects and components of the ZET have been combined into a scheme with parameter for the different qualification for performance.

Figure 44 Parameter scheme of the Zoo Evaluation Tool

	Main Topic	*Aspect*	*Components*	*no value/ not important*
Mental	A. Objective	**1. Education**	Passive information	Basic information
			Active information	No information given
			Group Education	No information given
		2. Research	Scientific research	No research done
			Visitor Engagement research	No engagement
			Research Facilities	No adjustments made
		3. Conservation	Ex-situ Conservation	no conservation programs or studbooks
			In-situ Conservation	No in-situ conservation programs
		4. Recreation	Iconic Animals	No iconic animals
			Collection of animals	Less the 50 different species by zootierliste
			Animal Shows	No shows
			Facilities Visitors	Basics, small restaurant/food stand, shop
			Attractions	no recreational opportunities

6.3 Use of the parameters

For each of the components, parameters have been made to what extent they perform within that component. Only for filling the basic necessities or also dong extra effort in that field. Together the components evaluated how the zoo preforms in a certain aspect and thereby segment of the research. If not all of the component parameters within a segment were filled to the same extent the average of the filled in components was taken to determent how well the parameters of the aspect performed.

With according to the ZET scheme, a number of Dutch zoos have been evaluated on the different aspects and components.

	low value/ minimal effort	*medium value/ extra effort*	*high value/ future zoo effort*
	basic info extended	LV + separate additional information (biotope, conservation measures, etc.)	MV + interactive methods, video, personalised
	guide tours on order	LV + regally stands or keeper talks	MV + interactive live animal educational interaction
	School visits	LV + special classrooms and internal lectures	HV + publicly available lectures
	Student projects	LV + Close corporation with higher education	MV + research station/laboratory on site
	Visitor is informed about research done at the zoo	LV + visitor can participate in research projects	MV + zoo has research programs on local biodiversity outside the zoo
	Observation possibilities and elements can be placed	LV + spaces made available to do research	MV + exhibits especially made for doing scientific research
s or	participating in conservation programs	LV + clear visitor communication about conservation status and conservation efforts	MV + large scale breeding and reintroduction programs
	Financially supports in-situ conservation programs	LV + active involvement in multiple in-situ projects collection adjusted to conservation work	MV + meta-population management on various locations
	Sheridan below 50	Sheridan 50-100	Sheridan 100+
ies	50-200	200-400 (+ special small animal facilities like aquaria, amphibia, insect)	MV + >400+ microtopia
	Keeper presentation	One show	Multiple shows
ood	Basics, food stands, restaurant, shops	LV + large Restaurants, multiple shops, (train) ride to different parts of the zoo, visitor photograph	High quality restaurants,
	playground	indoor playground or petting zo ect.	large attractions/ theme rides

	Main Topic	Aspect	Components	no value/ not important
Social	B. Urban Fabric	**5. Edge**	Permeability	closed off
			Public Accessibility	No accessible parts
			Green Structure	no vegetation
		6. Mixed functions	Urban Functions	no other functions
			Openings Hours	Partly closed during the year
			Urban Connection	no connection to city centre / rural
		7. Accessibility	Local Integration	no integration with local infrastructure
			Car Infrastructure	Highway accessibility within 15+ min
			Public Transport	Intercity station within >30 min + and no bus/tram links
			Market Potential Netherlands	< 2.500.000
Spatial	C. Lay-out			
		8. Macro	Ordering Exhibits	Taxonomic
			Land Use	>60% space is human oriented
			Exploring Wildlife	walking
			Biozone Iconic Animals	No iconic species present in exhibit/biozone
		9. Meso	Exhibition Method	Cage Barrier
			Climate Facilities Animals	collection or exhibition not adjusted to local climate poor indoor facilities
			Exhibition Space	insufficient space according to minimal requirements
		10. Micro	Enrichment	No enrichment
			Multi Species	no multi species exhibits

	low value/ minimal effort	*medium value/ extra effort*	*high value/ future zoo effort*
	limited permeability	some permittable edge sections	Fully transparent
	public square entrance	+ border exhibits, public space surrounding the zoo	+ zoo exhibits/functions are islands in public space
	local green	functions as green corridor	creates new / connects biotopes
	basic function only useable during zoo opening hours (congress centre, restaurant, etc)	LV + different function able to be used combined and separated (hotel, museum, cinema etc.)	rich crossover in function also on typically aligned with wildlife recreation (sporting, culture, offices, housing etc.)
ear	Normal opening hours	+ zoo and urban facilities have separate opening hours	+ different opening hours for different parts of the zoo, adjusted to the functions, time of year, special exhibits (night safari) > 24/7 mentality
tre	only on transportation level / edge	comparing on different spatial level (projects/marketing) multiple visit encouraged / urban	part of urban and city centre fabric / centre
	poorly connected to local infrastructure	adjusted to local infrastructure corridors	creates new/ special space within local infrastructure connecting to multiple spaces
hin	15 min	10 min	5 min
30 nks	Intercity station within 30 min + bus/tram links	Intercity station within 15 min + bus/tram links	Intercity station within >15 min + bus/tram links
	2.500.000 - 5.000.000	5.000.000 - 7.500.000	7.500.000+
	Random/ themed area	Highly themed/ continental/ climate	Ecosystem/biozones
	Space is more than 60% human oriented	40% human oriented space	20% space is human oriented
	Walking + special small walk tracks	+ walk-in exhibits	+ rides to explore exhibits
in	Some exhibits/biozones with iconic animal	One iconic animal per biozone/exhibit	Multiple iconic animals
	Naturalistic barrier	Immersion exhibit	Unzoo
ot	Limited climate adjusted meets for species or indoor facilities viewable for public	Climate adjusted or besides outdoor exhibit indoor is at least 0.5 of outdoor	Climate adjusted or indoor facilities have same quality and space as outdoor facilities
ng	only minimal requirements German standards	Minimal x2	Minimal x4
	Enrichment elements and ability to perform natural behaviour	LV + interaction with other animals (if possible)	MV + Rotation exhibits (novelty/choice)
	some basic species combinations	multi species exhibits	ecosystems

Edu Education

- Pas Passive information
- Act Active information
- GE Group Education

Con Conservation

- Ex Ex-situ conservation
- In In-situ conservation

Res Research

- SR Scientific Research
- VE Vistor Engagement research
- RF Research Facilities

Rec Recreation

- IA Iconic Animals
- CA Collection of Animals
- AS Animal Shows
- FV Facilities Visitors
- Atc Attractions

Edg Edge

- Per Permeability
- PA Public Accesibility
- GS Green Structure

MF Mixed Function

- UF Urban Functions
- OH Openings Hours
- UC Urban Connection

Acc Accesibility

- LI Local Integration
- CI Car Infrastructure
- PT Public Transport
- MP Market Potential Netherlands

Mac Macro

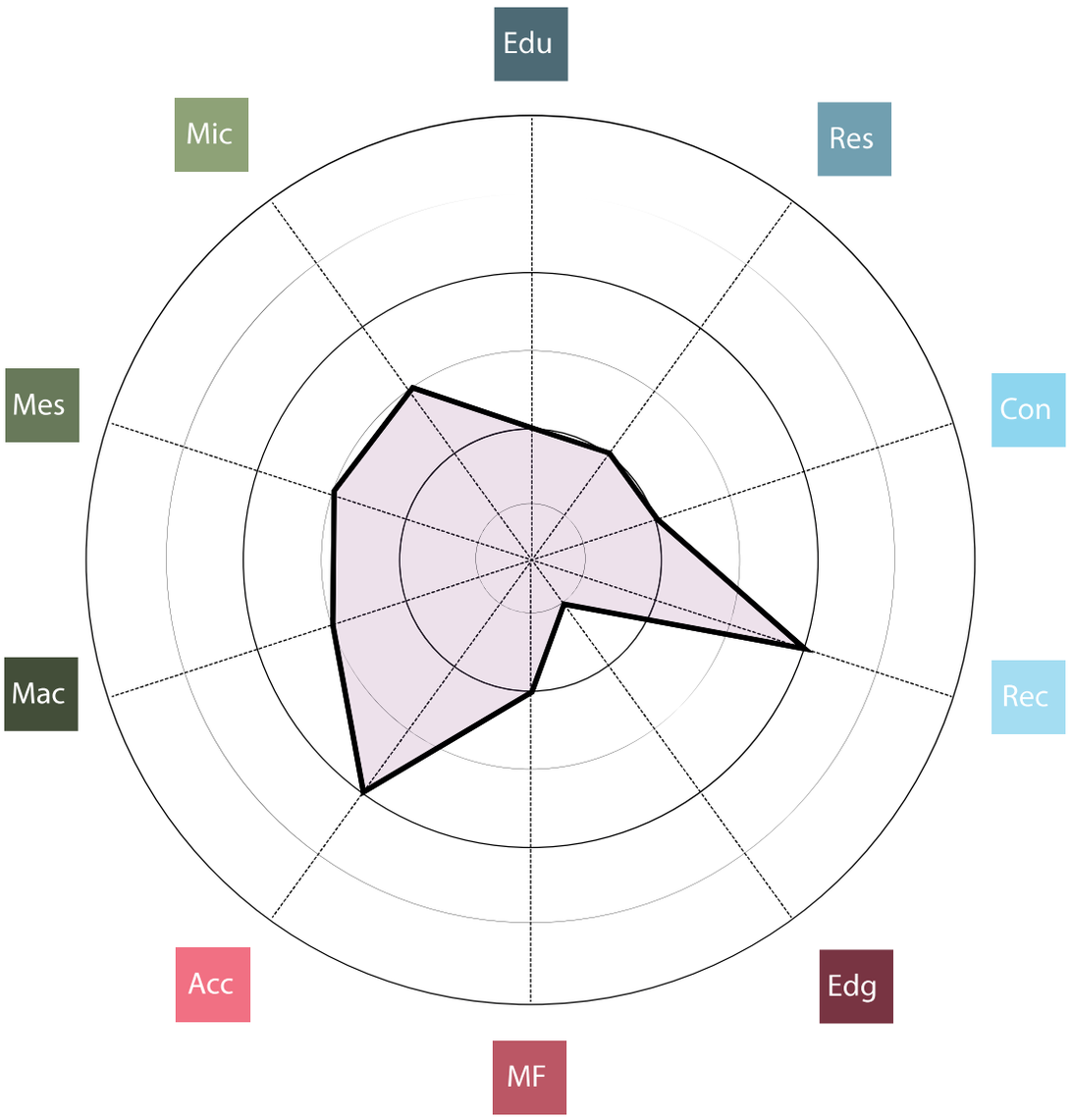
- OE Ordening Exhibits
- LU Land Use
- EW Exploring Wildlife
- BIA Biozone Iconic Animals

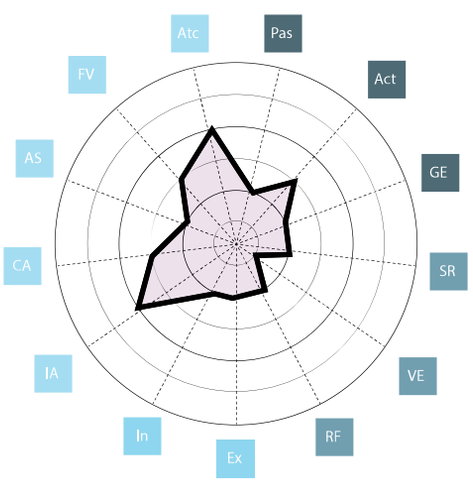
Mes Meso

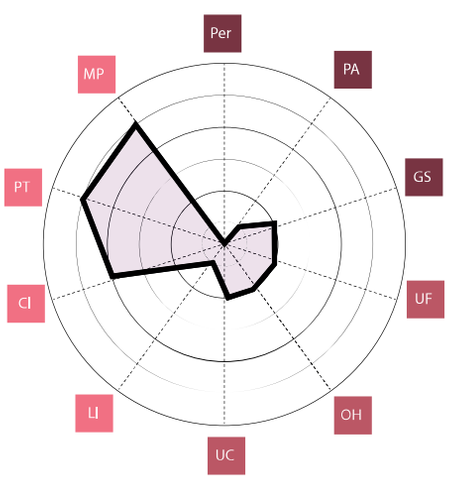
- EM Exhibition Method
- CFA Climate Facilities Animals
- EP Exhibit Space

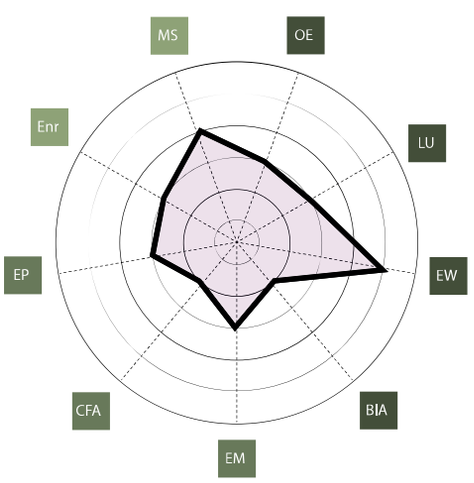
Mic Micro

- Enr Enrichment
- MS Multi Species

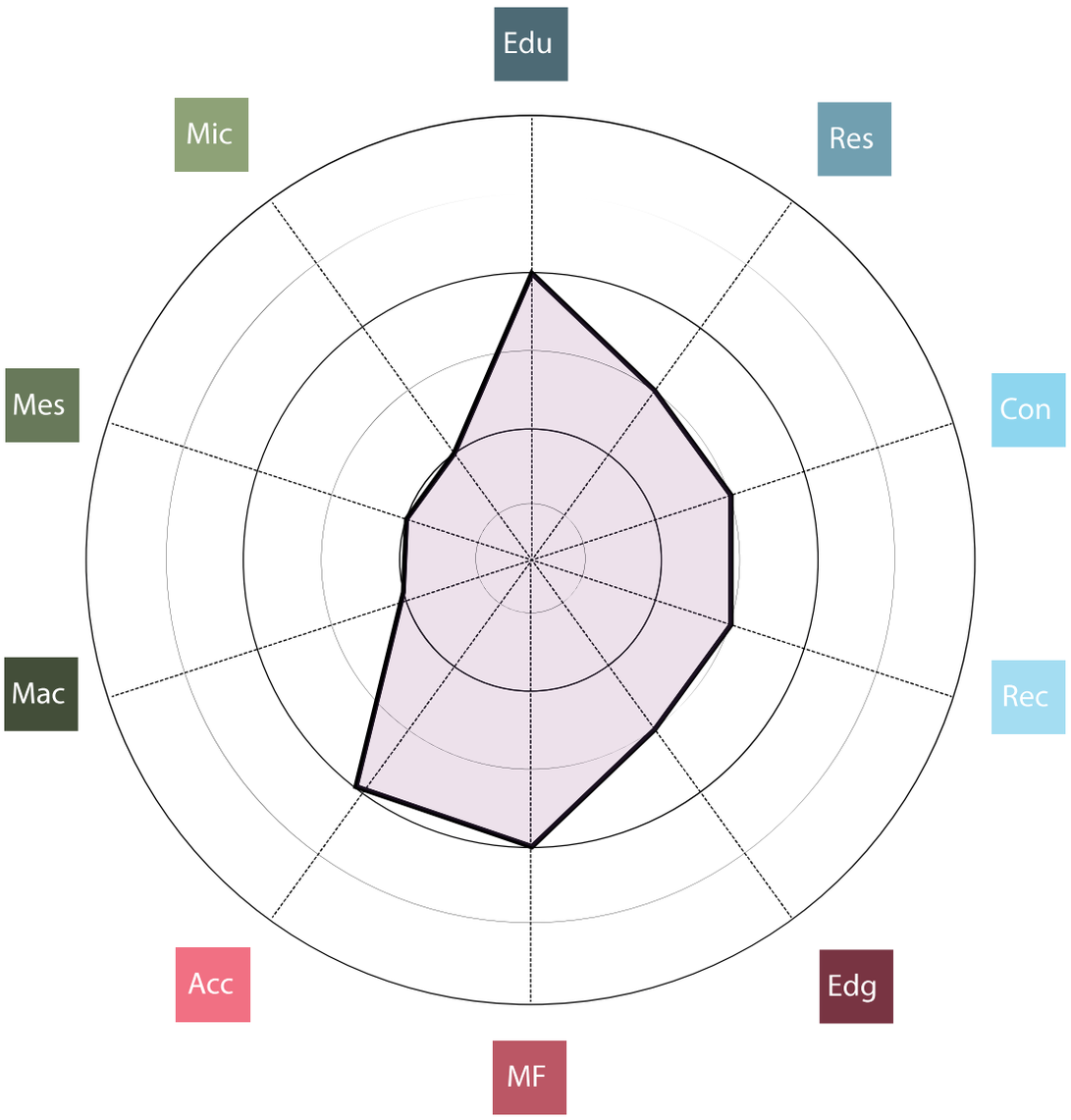


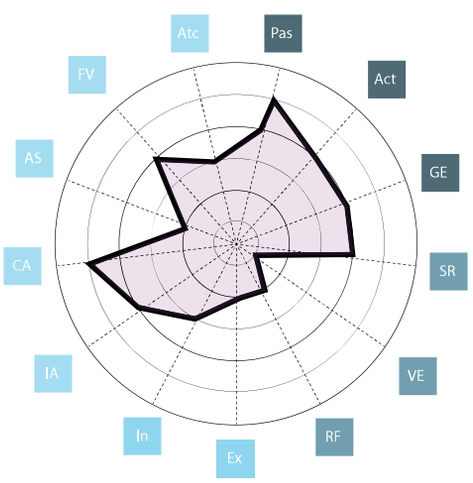


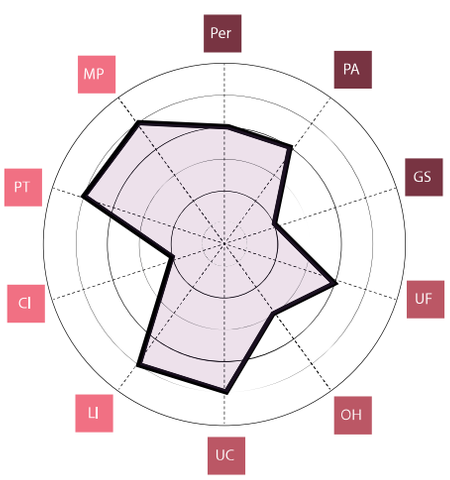


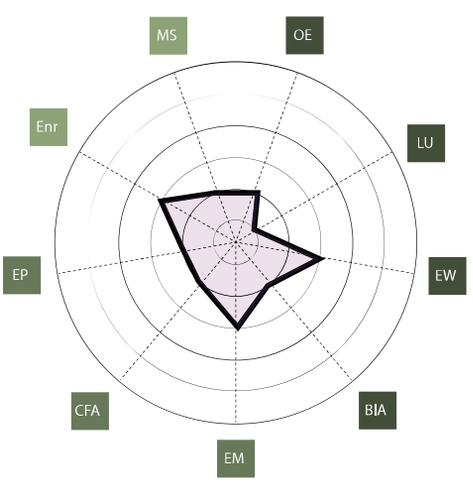


Amersfoort Zoo









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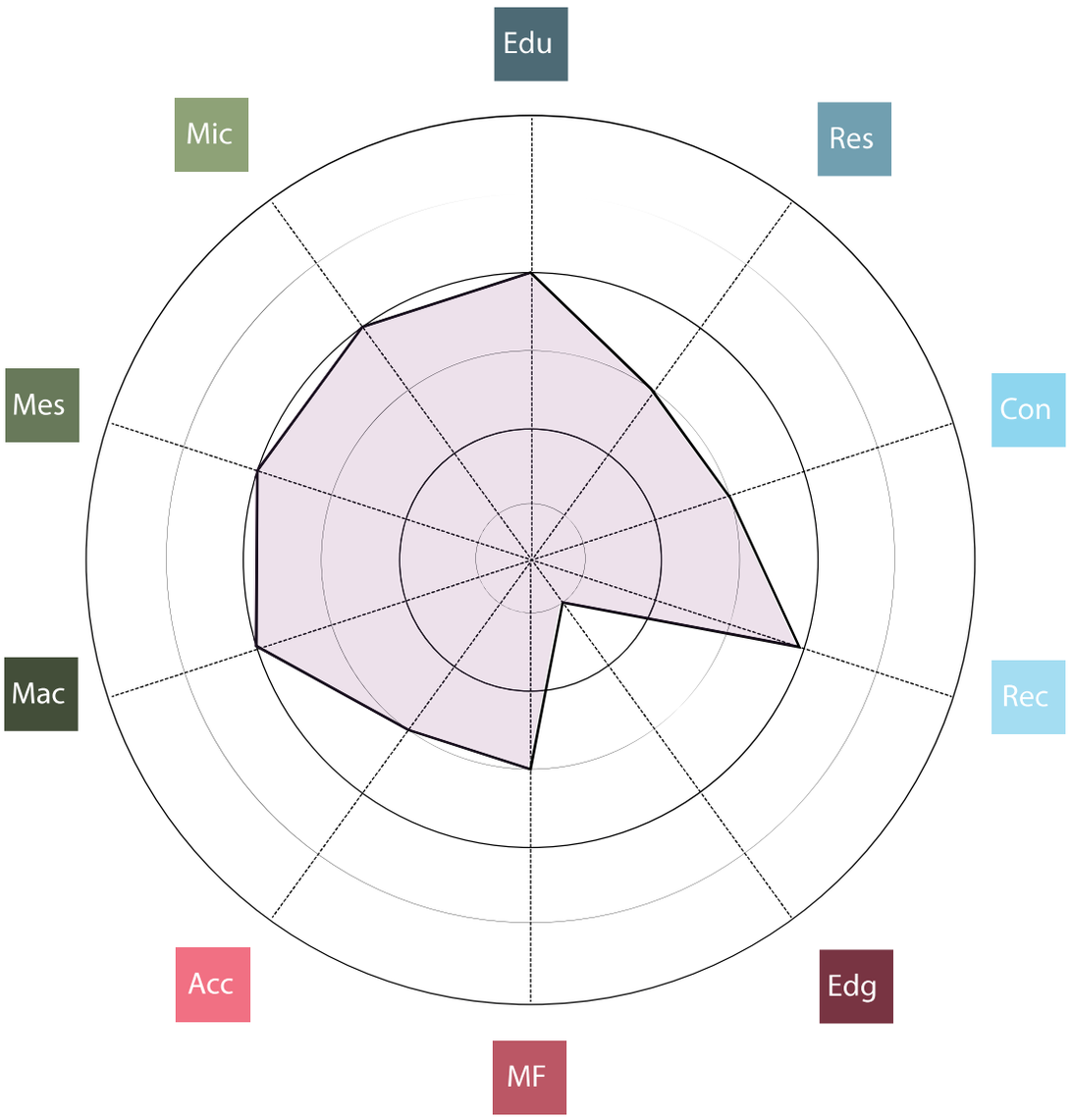
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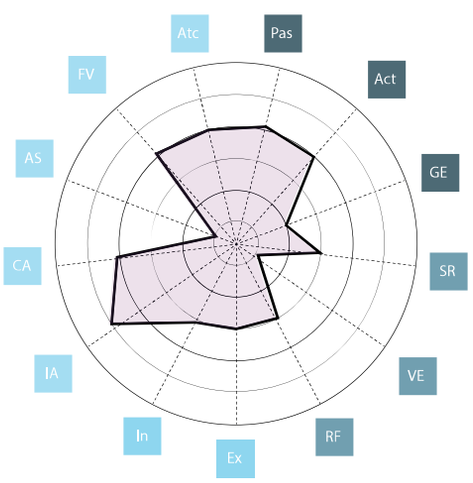
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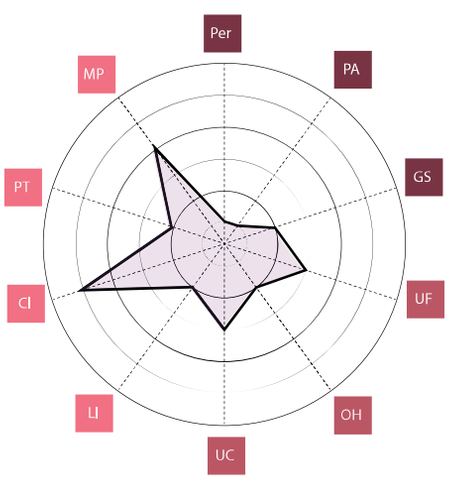
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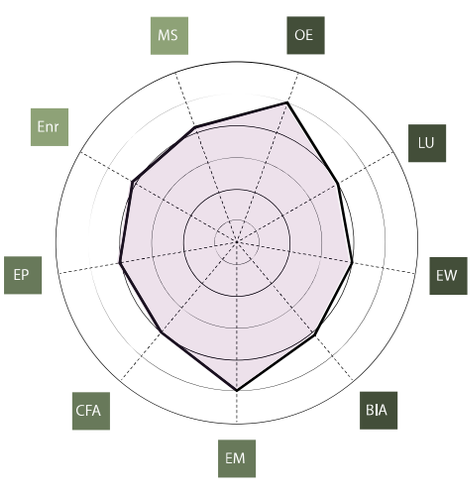
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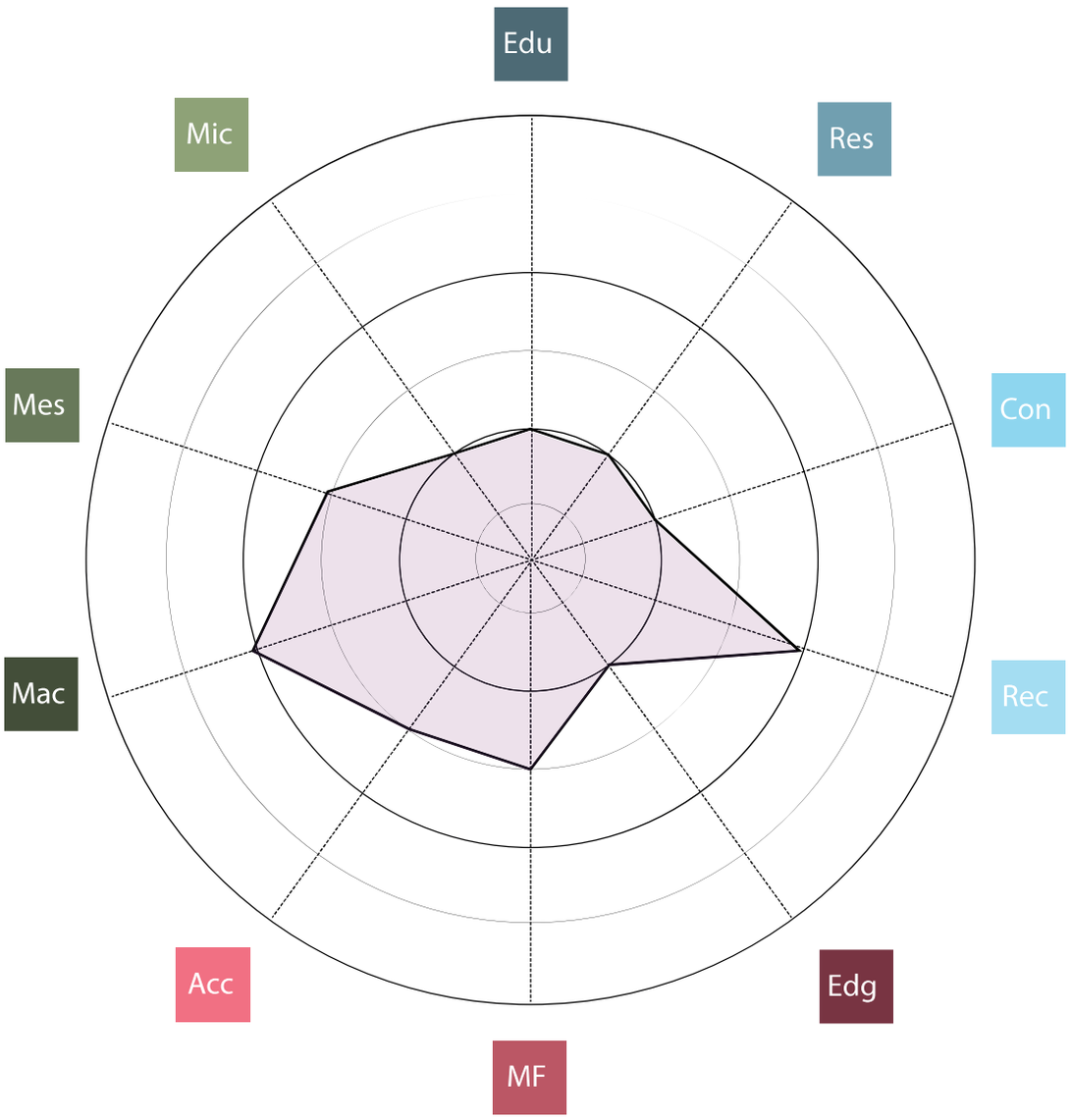
Arnhem Zoo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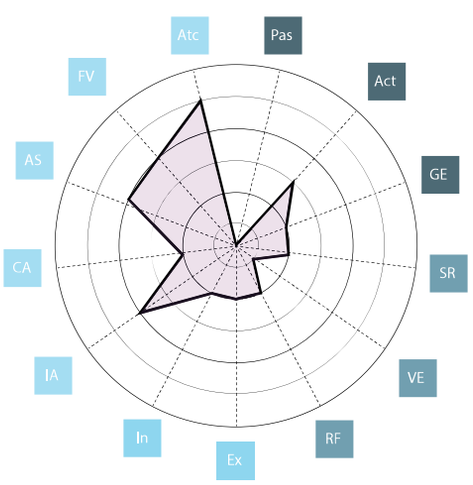
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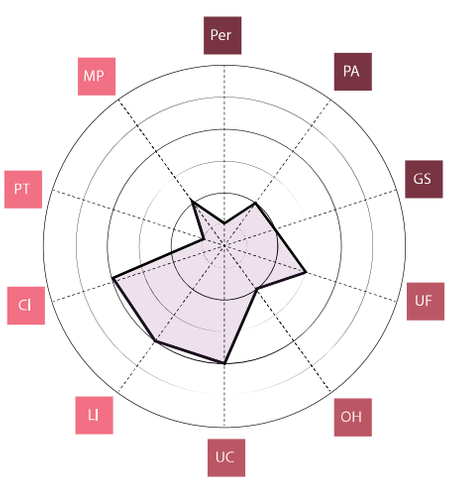
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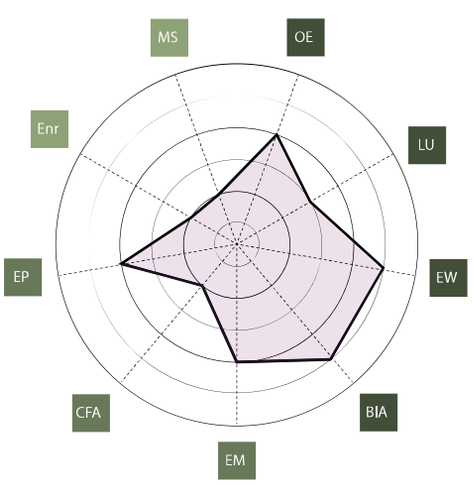
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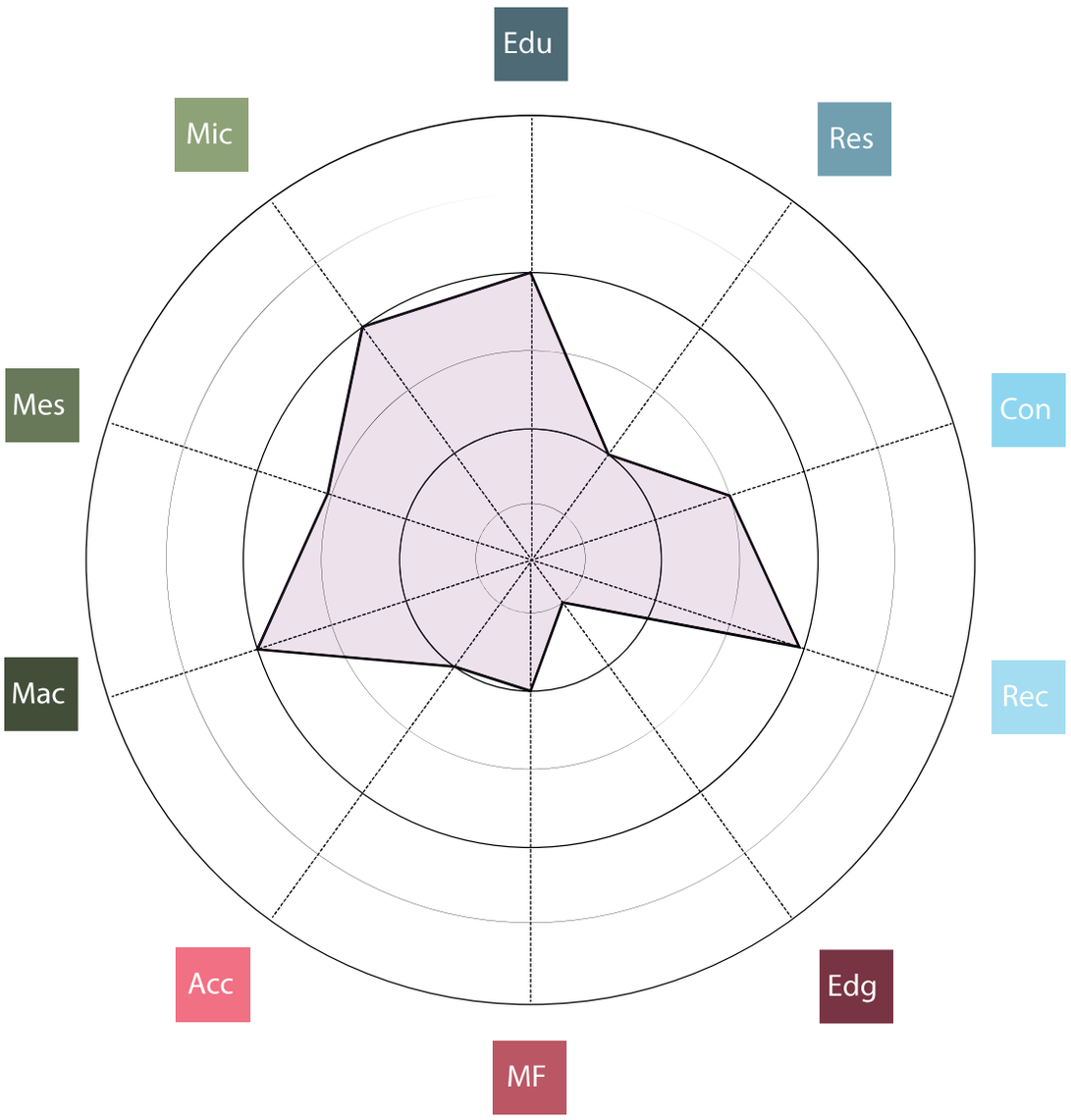
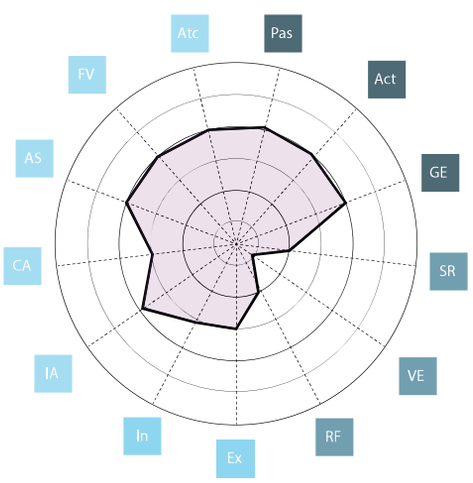
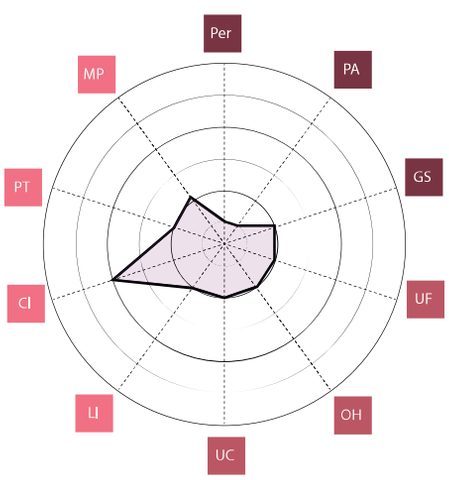
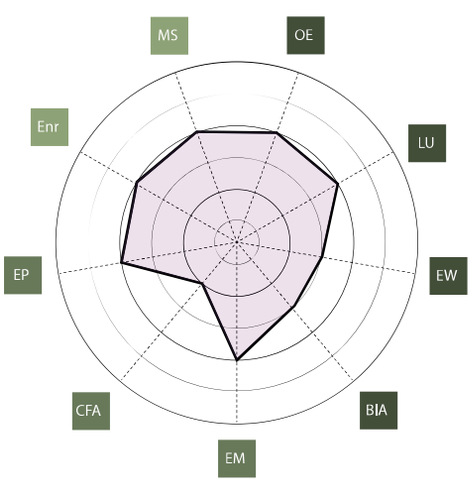
Emmen Zoo









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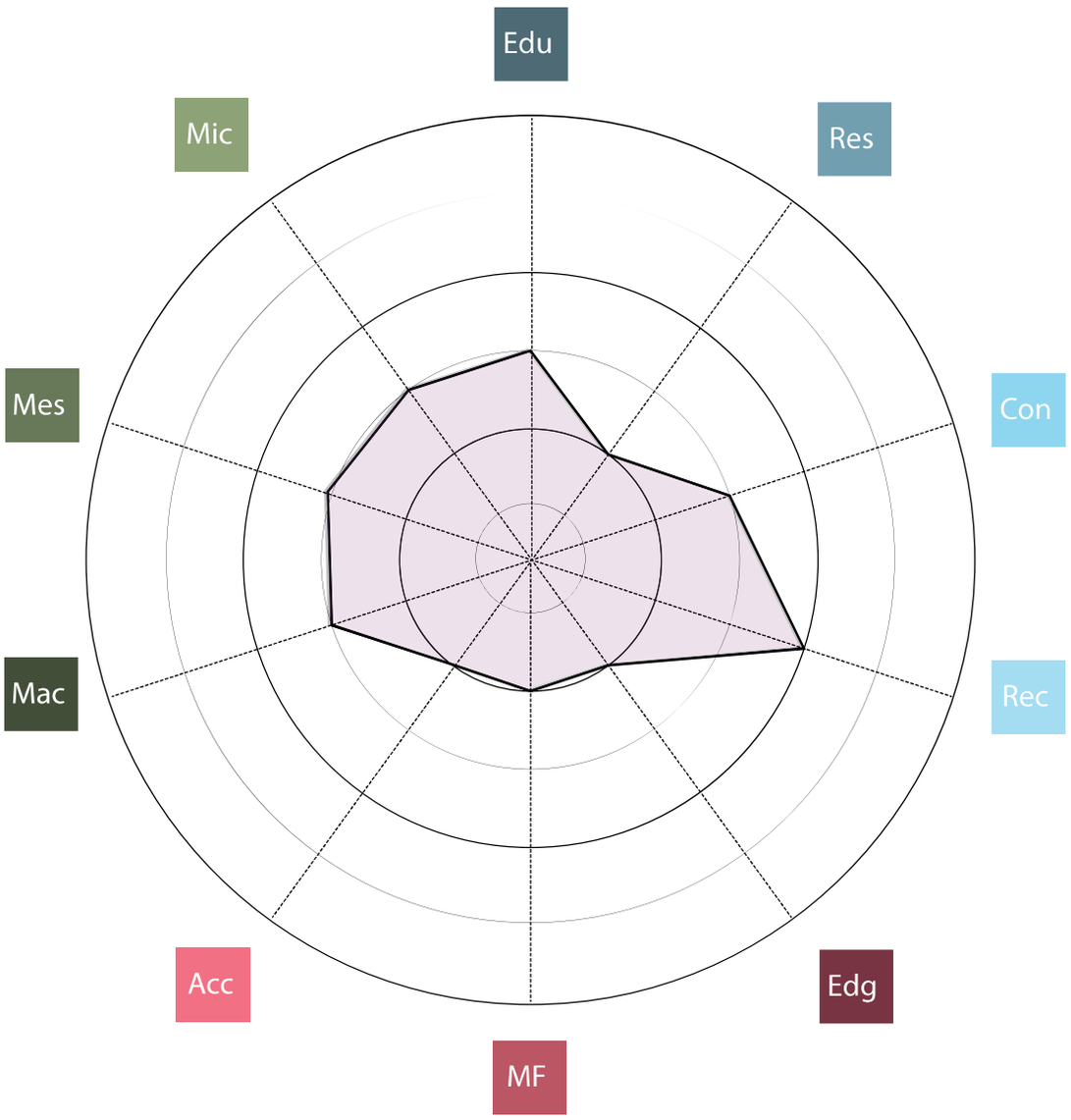
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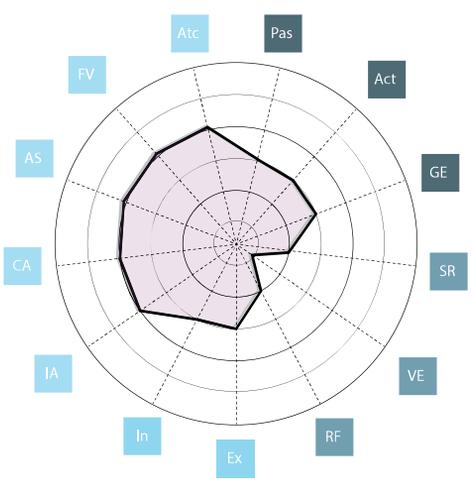
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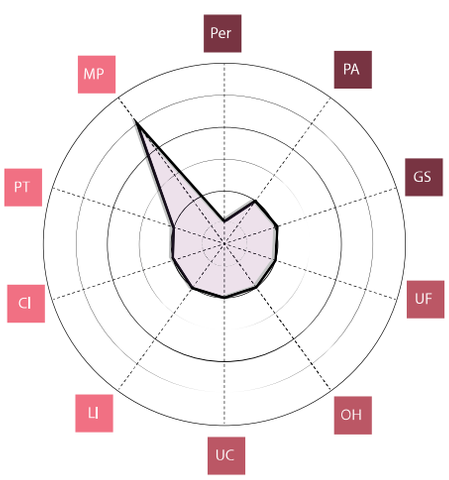
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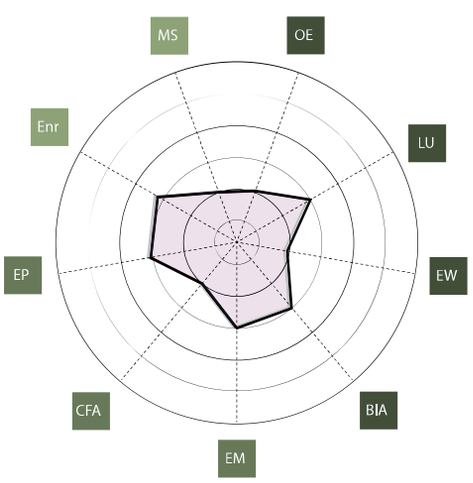
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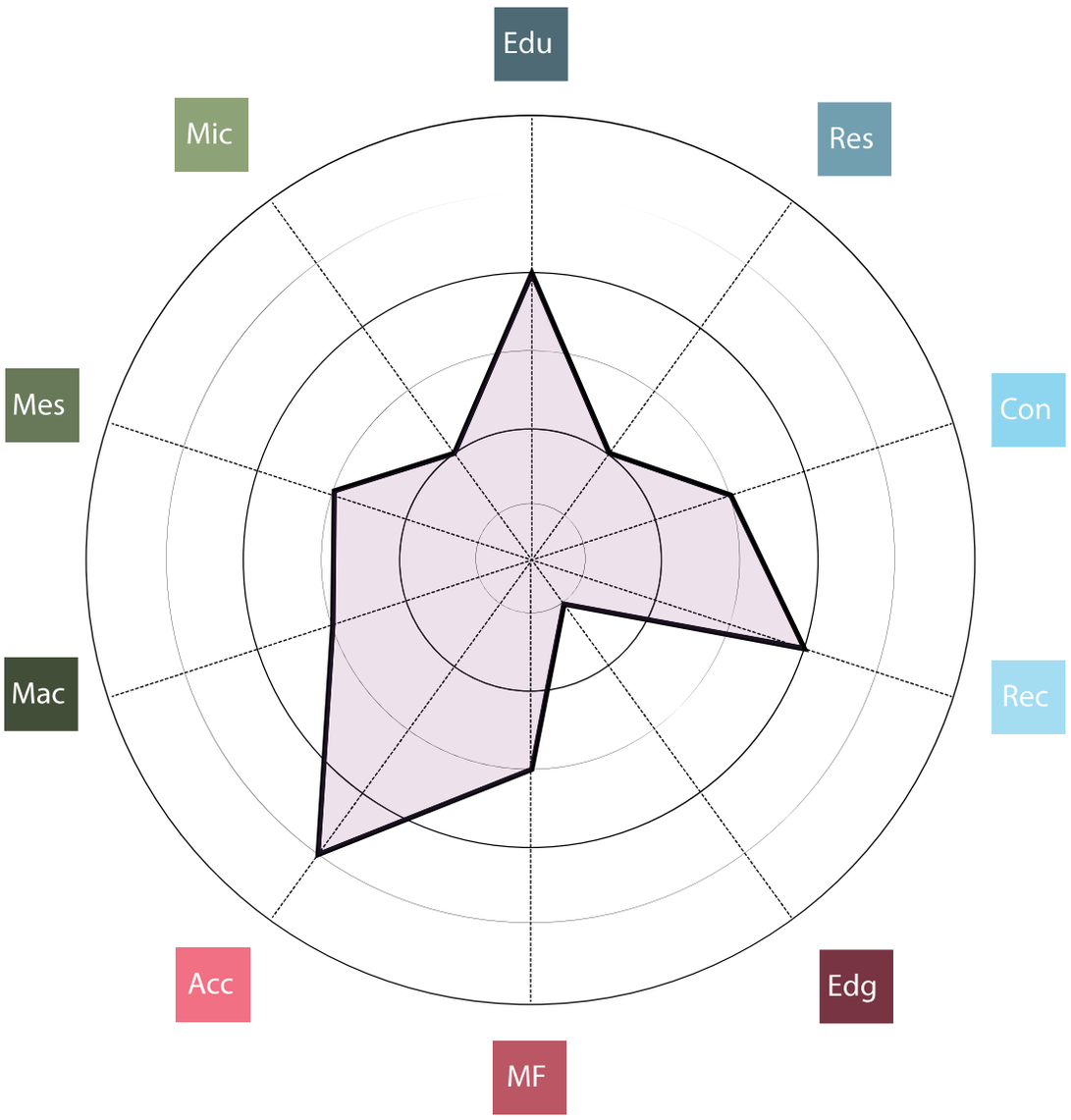
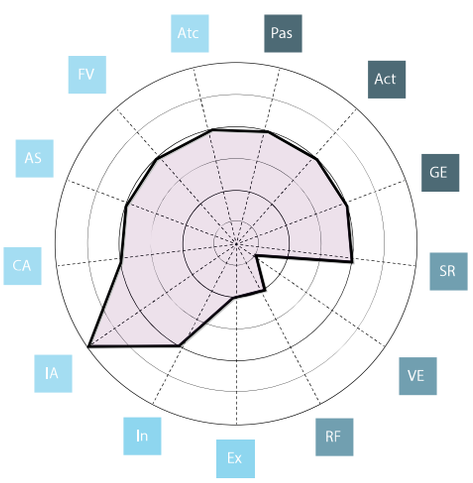
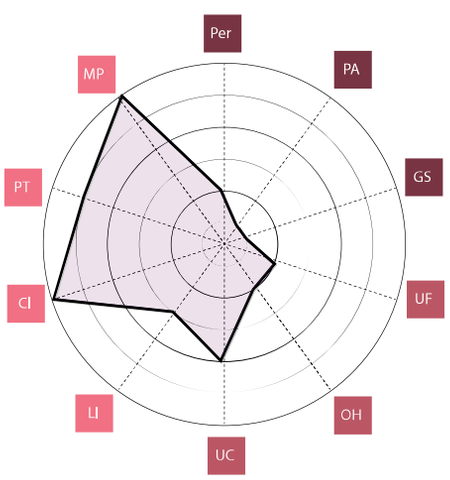
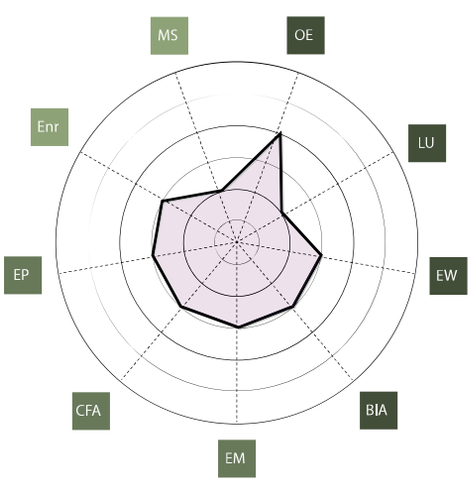
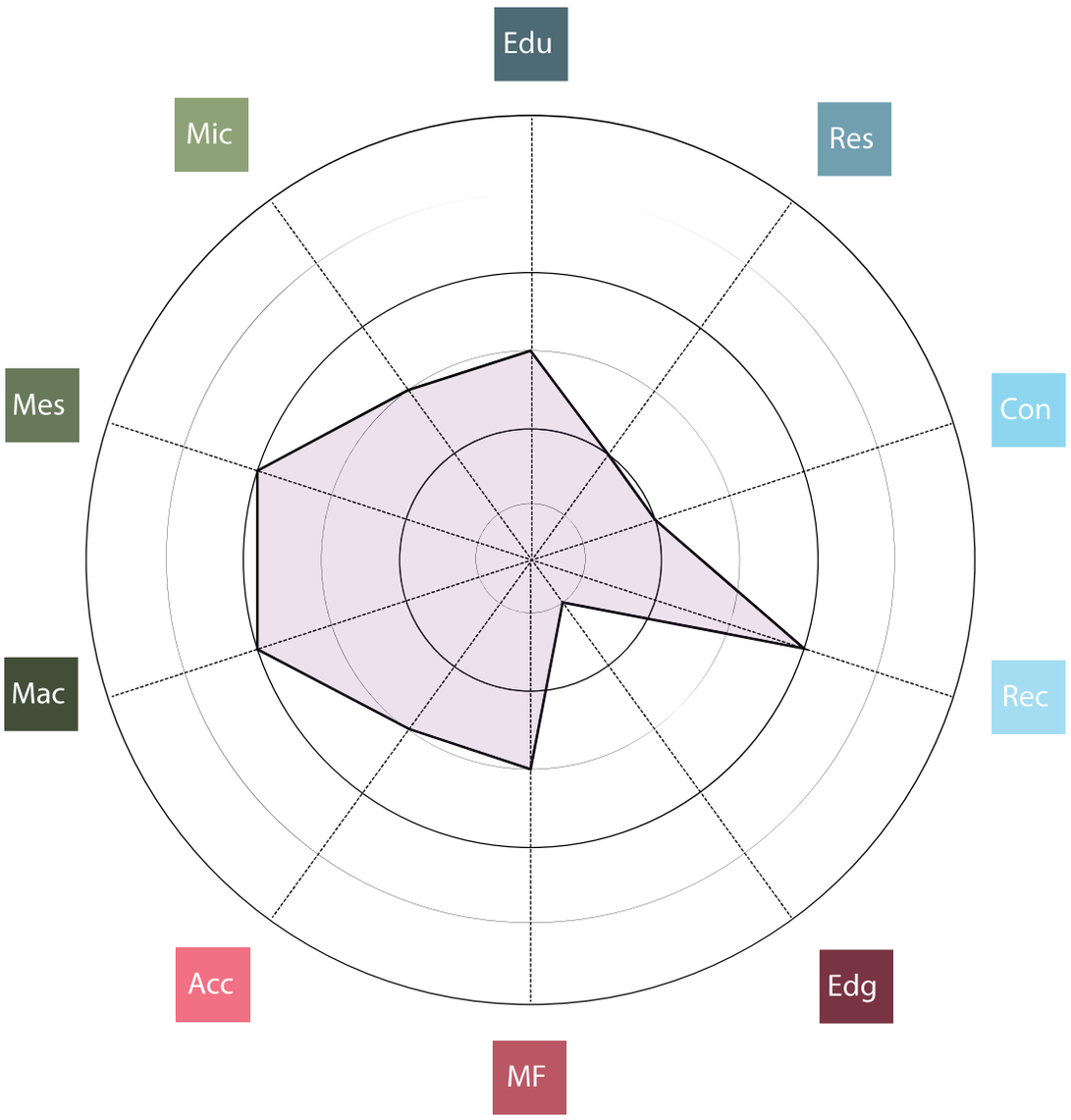








Rotterdam Zoo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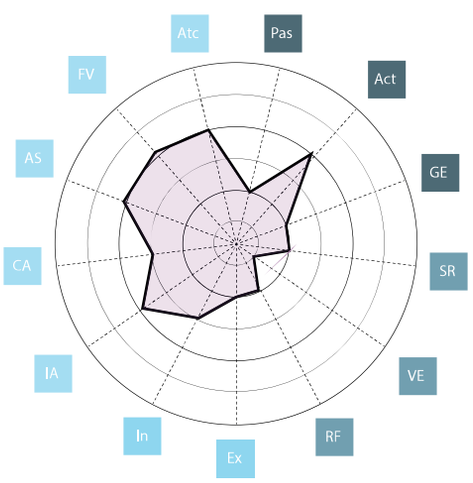
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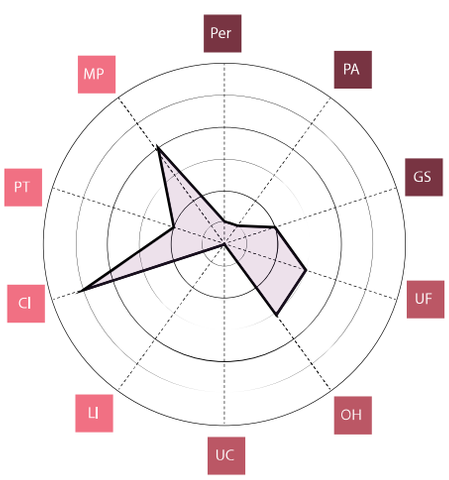
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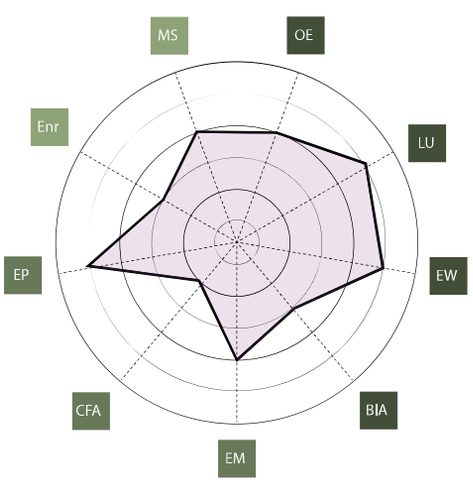
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Tilburg Zoo

6.4 Evaluation Zoos

Using the ZET the following main conclusions about the current condition of the investigated zoos in the Netherlands can be drawn.

The components of the objectives vary a lot form zoo to zoo but the general performance of the aspects gives a more similar view. Most zoos for full the current objectives society asked of zoos, but to become a future zoo they will need to step up. Further the objective of research is surprisingly weak by all zoos due to their poor communication about their activities also the conservation objective has communicational problem.

The spatial performances of the zoos vary from zoo to zoo. With Arnhem Zoo preforming very well in general, but Amsterdam Zoo less. Especially in the amount of space and enrichment possibilities zoos will need to improve to become future zoos.

The relationship between zoos and the urban environment is very weak on the lower scale levels. Most zoos have a very low value or none on the aspect of edge, with no permeability or public edge by which zoo and urban fabric could be connected. Although the urban position of the zoo this might influence it's still poses a question about the sustainability of the current zoos within the urban fabric. Its believe is even strengthened by the fact that zoos also perform very weak on the mixing of function between city and zoo, even though there has been a rising trend in this in recent years. Accessibility wise zoos operate often well on a regional or local level, but preform weaker on local integration

6.5 Future zoo Guidelines and Requirements

In thesis the goal is to develop a method for sustainable wildlife exhibition within the urban environment. Given the results from the analysis and study and indexation of future developments within field of the zoo and urban environment and after evaluatin current zoos, guidelines can be established. These guidelines offer basic rules on how the future zoo should spatially manifest itself towards animals, visitors and the city as well as how its objectives should operate to be sustainable. Meaning that offers answers to the ethical issues, ecological stress, visitors recreational demands as well as economic feasibility. The following basic rules can be divided into guidelines, requirements and opportunities.

Guidelines are the main ordering rules of decisions in developing the future zoo need to be established, it effects both the mental, social and spatial place of the zoo.

Requirements are elements that need to be placed in the future zoo having an either a mental, social or spatial standard.

Opportunities are chances the future zoo has to create extra links to enhance the objectives, spatial layout or urban connection. They are not necessary but strongly recommended.

The guidelines, requirement and opportunities are organised according to the chapter ordering from the analysis stage. It should be noted again that the zoo is a complex system, so guidelines, requirements and opportunities could sometimes be classified in multiple categories.

6.5.1 Objectives

Education

Guideline
> A trip to the zoo is biology class

Requirement:
> education facilities > cooperated in with city
> education personalised
> education interactive

Opportunity
> natural history museum

Description guideline:

Recreation

Guideline: The zoo adventures experience into the natural wild

Requirement:
> accessible for all people

> new experiences > novelty/regular renews
> options for sleeping over (multiple day experience)

Opportunity
> separately accessible zone/ experiences

Research

Guideline: The zoo is a living laboratory

Requirement:
> links with higher education/ universities
> exhibits suitable for scientific experiments
> research centre/ laboratory on site
> research used to better exhibits
> engage visitors with helped research at zoo and outside zoo

Opportunity:
> organize research projects outside the zoo, with city people

Conservation

Guideline:
> breeding centres for endangered animals

Requirement:
> managing meta-populations
> Teach visitor what they can do in daily live
> exhibits suitable of reintroduction training

Opportunity:
> Focus on smaller, easier to safe species
> activate visitors to donate and help during visit

6.3.2 Urban fabric

Urban fabric

Guideline:
> Blur edges of the zoo and urban environment
> cooperate city function within or on the border of the zoo
> Zoo is a public park

Requirement:
> good accessibility on local level > space syntax
> good accessibility by car (highway) regional visitors
> good accessibility by public transport, urban visitors
> Each zoo zone needs an urban function accompanying it
> Make zoo part of 24-hour urban life
> open zoo as much as possible to the public

Opportunity:

> exhibits used as border edge
> housing if possible
> make zoo part of urban metabolism both in production and consumption
    > food
    > water
    > waste
    > heat

People

Guideline
> attract different kind of visits (stop bye, short, day, multiple days)

Requirement:
> older visitor's accessibility and attractiveness
> focus on children
> widen opening hours of facilities to adjust to rhythm of the city

6.5.3 Lay-out

Layout

Guideline:
> animals around people (people caged)
> different ways of exploring the zoo

Requirement:
> organised by ecosystem
> immerse visitors in natural world
> layout follows urban patterns and vice versa (blurring boundary)
> organise as safari tracks
> no fences visible by guests

Opportunity
> Architecture reflecting urban setting (high urban setting> more humanised architecture/ layout)

Exhibits

Guideline:
> multi species ecosystem exhibits/ biozones
>rotation exhibition

Requirement:
> nature is the norm
> lots of space
> novelty within exhibit
> choice within exhibit
> many enrichment possibilities
> interaction with visitors

> possibilities to hide
> Different viewing perspectives for visitors

Animals

Guideline:
> iconic ambassador species/ top animal per zone
> Adjust collection to conservation work done outside zoo

Requirement:
> great variety of species
> focus on smaller species > insects, amphibia, fish
> only animals whose needs can be taken care of

Opportunity:
> microtropia
> adjust collection to demographics of the urban environment or historical relations

Attractions and facilities

Guideline
> mix between city and zoo attraction/facilities occupying each other

Requirement:
> different 'rides/ attraction' as safari to entertain people
> playgrounds both outdoor and indoor
> Diverse assortment of food, drinks and shops

Opportunity
> urban facilities as entrances to the zoo
> food production by local community

Application

Chapter 7
Design

7.0 Introduction

The future zoo can have many different variations and features depending upon to what extent certain parameters of the tool and how guidelines will be followed and spatially constructed. Still some generic future design principles can be establishing for the spatial manifestation of the future zoo, these will be described according to the zoo design parameters introduced by Natasha Meuser. The Rotterdam Zoo will act as a example and test to visualize what the future zoo could look like.

7.1 Topics of zoo design

Formulating design principles for zoo design is a challenge at first glance, since there is no one zoo typology or perfect zoo layout. However, in her many analysis of zoo building Meuser has been able to formulate a list of ten design topics to on which the future design of zoos need to find spatial answers. This list has been used to translate the guidelines into spatial design principles using there design topics as a frame work to aid the formulation of the principles. Meuser describes the following ten design topics for the future zoo.

1.Invention of a new worlds
Bringing animals and visitors together in a specific geographical region, biotope or other natural link. Often architecture and other elements are themed after the corresponding region.

2.Urban integration
The different urban contexts of a zoo need to be considered in design a zoo offering both opportunities as well as limitations.

3.Building form
The buildings and their architecture can evoke different connection between human and wildlife. Buildings can be human architectural wonders, heavily themed, totally disguised by nature etc.

4. Spatial accessibility and routing
How the visitor is guided through the enclosure(s) determines the relationship between visitor and animal. It can also influence the sense of adventure and surprise.

5.Spatial closures
Animals will need to be held in captivity either by fence or trenches or something different. How the animals will be enclosed and to what extent this border will be visible or permittable for the visitor as well as the animal terms both their experiences

6.Security management
Besides small methods of keeping animal captive sometimes also larger infrastructure is necessary to separate human form animal. Being important for safety as well as sometime as defining feature in exhibit design

7.Staging of animal
How the animal can be attractively presented and exhibits explored, creating an enriching experience for the visitor and the animal

8.Signs and didactics
House style of zoos needs to be carefully chosen since it influences how information is presented but even how benches and buildings look. It could for instance be highly themed or very minimalistic designed.

9.Layout and shaping
The different spaces and materials, colour and light setting visitor and animals encountered can strongly influence the experience of space or highlight certain elements.

10.Architecture and branding
Branding is an important instant to create a identity for the zoo and so a recognisable image of the zoo design and building form play an important role in creating advertising for the zoo.

7.2 Future zoo design Principles

Following the guidelines, requirements and opportunities for the future zo the these design principles have been established:

1. *Invention of a new worlds*
    - o Biozones
        - > Related to concervation (projects) and education

2. *Urban integration*
    - o Zoo and urban function combined
        - > Sport
        - > Outdoor activities
    - o Blurred edges
    - o Zoo is a public park in urban environment
    - o Zoo architecture arranged in coexistence with surrounding environment
    - o Local flora and fauna promotion
    - o Places to meet people (both in park and zoo)

3. *Building form*
    - o Semi nature
        - > Natural elements with human characteristics
    - o Architectural building, with animals central
    - o Influenced by 'local' vernacular architecture form the biozones region

4. *Spatial accessibility and routing*
    - o Urban zoo intermediated zone
    - o Walking route
    - o Special route
        - > Cable care
        - > Boat
        - > Canopy
        - > ect

5. *Spatial closures*
    - o Visible hard spatial limitations as limited as possible
    - o Humans encaged
    - o Viewing point over view in the ecosystem

6. *Security management*
    - o Limited security spatial fence
    - o Natural/ soft elements

7. *Display of the animals*
    - o Large ecosystem building/ exhibits
    - o Rotation possibilities
    - o Different exhibits spaces for different functions of animal behaviour
    - o Walking trails for animals that need it (predators)

- Lots of enrichment opportunities for the animals

8. Signs and didactics

- Strong enfaces (spatial) on educational, conservation, research and recreation
- Interactive signs and education
- Personalised education
- Animal tracking possibilities

9. Layout and shaping

- Zoo is a botanical garden
- Semi nature
  - > Natural elements with human characteristics
- Natural elements
- Use light/ openness to place focus

10. Architecture and branding

- Recognisable elements true one design throughout design
- Spatially identifying objects in zoo, park and city

7.3 Design location

As application site were the guidelines and design principles can be tested and showed has been chosen the Rotterdam zoo. The Rotterdam zoo most visited zoo in the Netherlands with around 1,5 million visitor a year it is a key player in the recreational landscape of Rotterdam. Further it hosts a large collection of animals and many of which are iconic animals. Additionally, it is located on an interesting urban spot surrounded by popular neighbourhoods, a highway and canal and some under used park structures. The exhibits and facilities currently at the zoo are of sufficient quality but will need to change to become a sustainable exotic wildlife exhibition in the future.

7.4 Ravensteyn's architecture

The current Rotterdam zoo one of the first zoos to be designed by one man only. Not just a park, but also the interiors of the buildings and even the details the trellis was his design. Van Ravensteyn's work shows association with modern Italian classism and with Dutch traditionalism at the time he designed the zoo. van Ravensteyn's approach to architectural design embodied in his work for the Rotterdam Zoo bears resemblance to the ideas of 'postmodernism'. In a way, Van Ravensteyn. Who finally received the title 'conscience of the functionalism' and who combine functionalistic materials of modern architecture with decoration, symbols and quotations of other architectural periods, could be called a postmodernist avant-la-letter.

The design of the 'new' Rotterdam zoo was influenced by the then new ideas of naturalistic barrier methods of exhibition. But Van Ravensteyn was missing the architectural ensemble within most of the design of the exhibits and building done in this new style. The starting point of the

design was not to show as many animals as possible but instate create meadow that was primarily ordered towards a symmetry axe within the zoo *Fig 45*. On this symmetry axe, all the main buildings would be in stone, well the other stables outside axe would be made from wood. The use of this symmetry axe was born out of his ideas about urbanism and architecture with his preference for grandeur and baroque. Focus point within the design would be the Riviere-hall complex and the viewing tower. Where a clustering of facilities and (indoor)exhibits would take place.

The layout of the zoo is marked by the bear theatre on the south side of the zoo and the giraffe exhibit with next to it the teahouse on the northside. The predator exhibits south of the Rivièra-hal and the large pond with the basins for the sea lions and polar bears north of the building on the axe. The symmetry axe in the landscape architecture is for the visitor difficult to experience since the meadows and exhibits don't follow a strict symmetrical pattern but the road structure flows through the meadows.

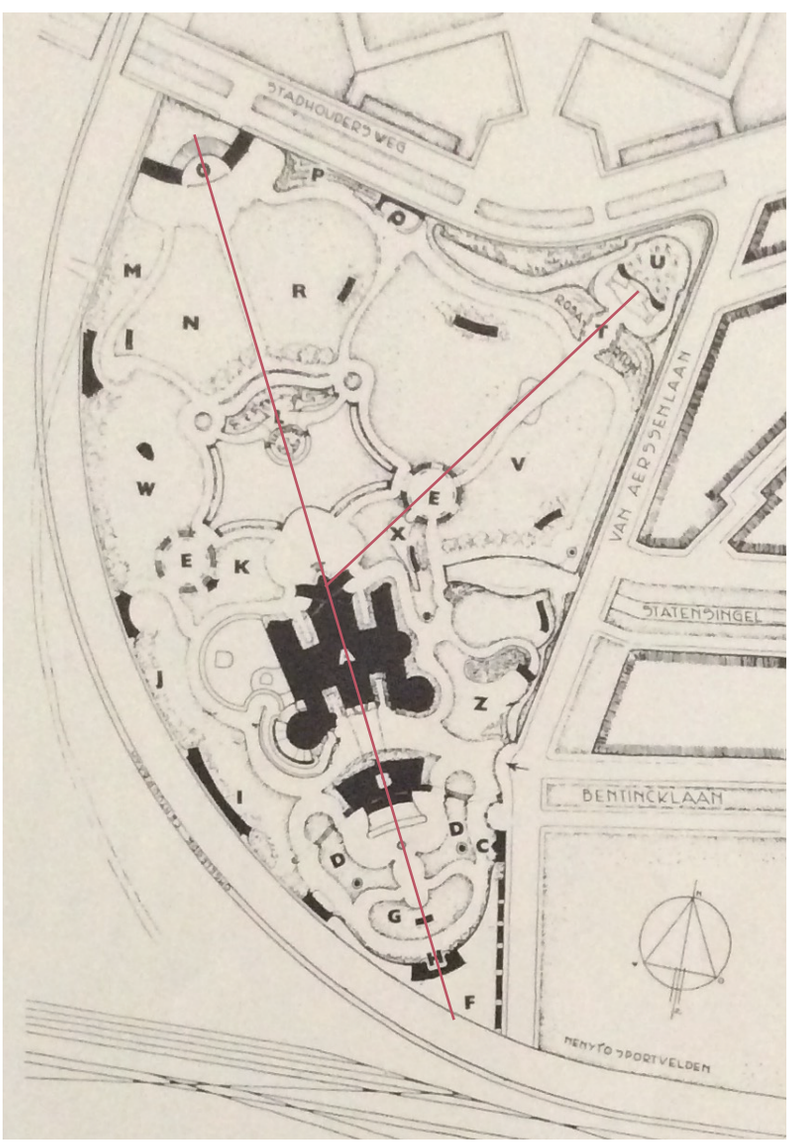


Figure 45 Ravensteyn plan for Rotterdam zoo, with main axes

7.5 Future zoo Rotterdam

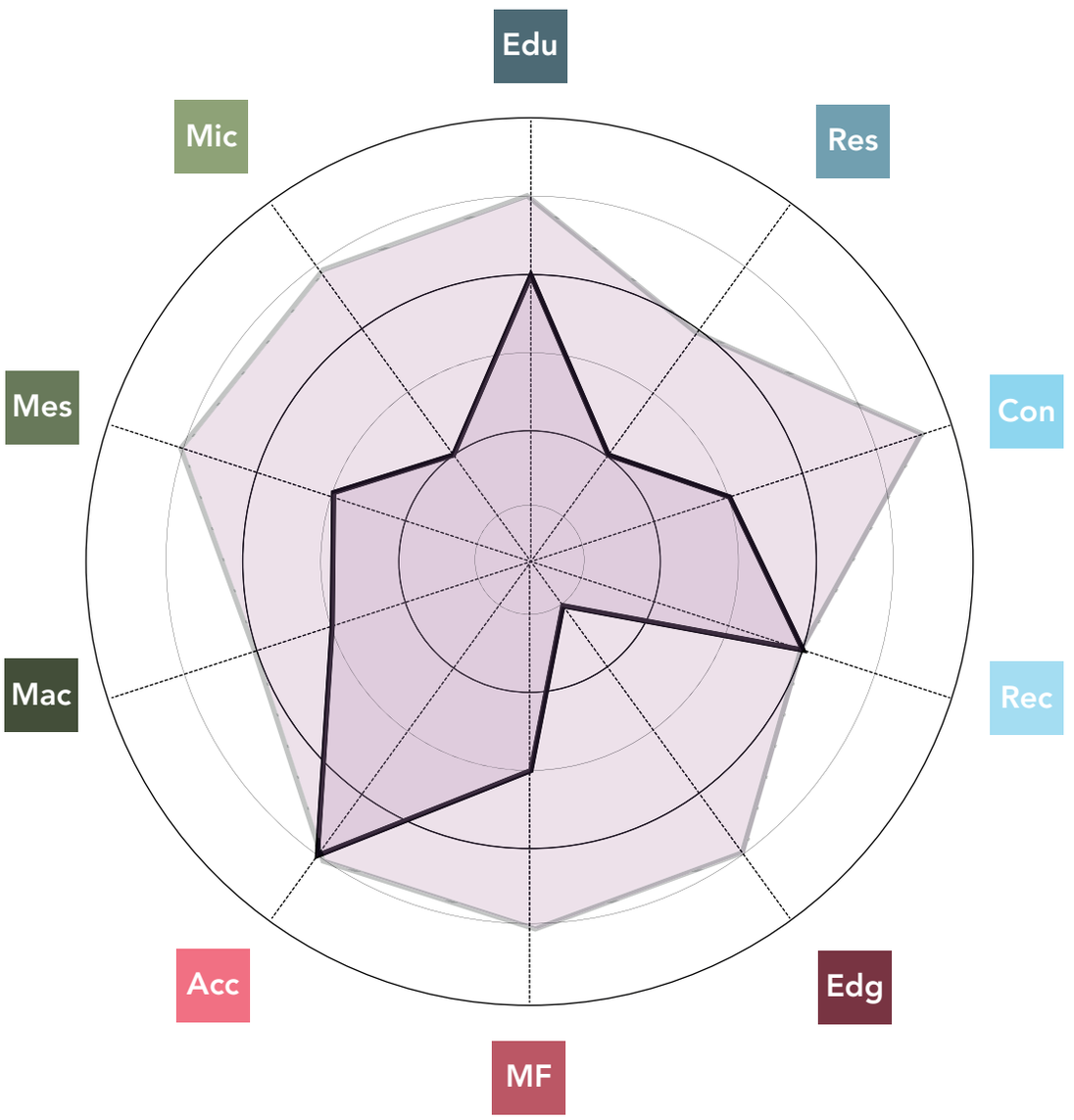
To create the future zoo advancements on most of the aspects need to be made. The future zoo of Rotterdam has need will be primarily a cultural and educational zoo institution, since these functions apply best to the urban position the zoo is situated in. To become a future zoo on all aspects at least the second parameter needs to be achieved. Especially in the urban connection this will mean a lot of improvements, primarily in the edge aspect. Since animal welfare is crucial for the future zoo to exist the parameters of exhibits need to be fully achieved. Since the Rotterdam Zoo will function as a educational and cultural centre also the parameter on mixed function and educational also need to be fully for filled in the future Rotterdam zoo Fig 46.

Measures the Rotterdam zoo will need to take to reach highest parameters:

+ facilities for interactive and personalised methods of education
+ separately accessible educational facilities
+ research station or laboratory
+ microtropia or insect house
+ introduce rotation exhibition
+ large indoor facilities (for animals that are form another climate)
+ introduces rides or other special manners to explore the biozones
+ Order animals by ecosystem
+ multiple iconic animal per biozone
+ unzoo exhibition method for biozones
+ integrate zoo in Rotterdam park structure
+ create new and connect biotopes with park structure
+add multiple (cultural) urban function on edge zoo urban fabric, at least one per biozone
+ make areas separate accessible and usable of 24/7 use possibilities
+zoo infrastructure should create new links with the urban environment and different urban environments with each other.

Besides these demands for change following from the tool, there are also demands and opportunities form the city of Rotterdam for the zoo or the city to which the zoo could provide a solution. These demand and opportunities have been combined in the flowing diagram.

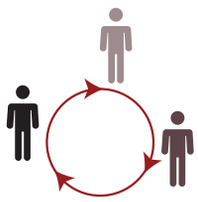
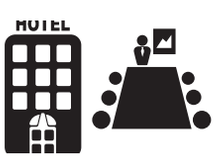
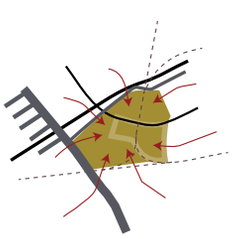
Figure 46 Desired ZET score of Rotterdam zoo



Future Rotterdam Zoo

7.6 Multiple benefit

The figure shows problems, needs currently within in Rotterdam based on the city vision Rotterdam 2030 (Rotterdam, 2007).

	What	*How*
	*Integration of social and ethical groups*	Offering public space for meeting opportunities
	*Cooperation between businesses and education institutions*	Establishing the (Diergaarde) Blijdorp area as a place for research and educational institutions
	*Festival and event space*	Creating space in the zoo and in the park for events and leisure
	*Strong neigbourhood identity*	Making know that Blijdorp area is the Zoo area in both mental and spatial form
	*Business hotel and congress facilities*	Making use of existing buildings in the zoo and link this to the Van Nelle Fabriek
	*New housing*	Use under utilized areas or areas in decay around the Blijdorp park
	Use green space better	Making Blijdorp park the main metropolitan park in the west-side of Rotterdam

Rotterdam Zoo opportunities

Zoo is a place for integration, opening up the edges to make it more approachable
High quality public park
Sport and other leisure facilities

Bringing the natural history museum Rotterdam to this area
Clustering natural studies of HABO and WO in the Blijdorp area, zoo as research institution
Better cooperate with the neighbouring primary and high schools

Music space in the zoo (Riviera-hal), preferably classical music. For small scale concerts
Park music area for mid-size pop concerts
Restaurants and cafe pavilions on the edge of the zoo

Strong visual connections and interactive edge of the zoo
Renovation and highlighting the Ravensteyn monuments
Natural park with opportunities for native wildlife to settle

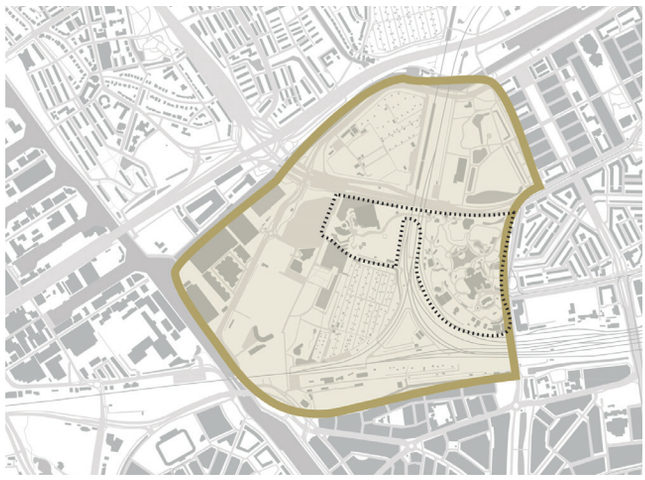
Transform certain zoo building or edge building that can be used for congress, hotel or other business
Enhancing the Van Nelle Fabriek area as a business direct with the Blijdrop
Park as green lunch and recreation area

Lots of edge space of the Blijdorp park can be used for new housing, especially around the water side
High quality green living housing at the edge of the park

Better connection and accessibility form neighboring districts

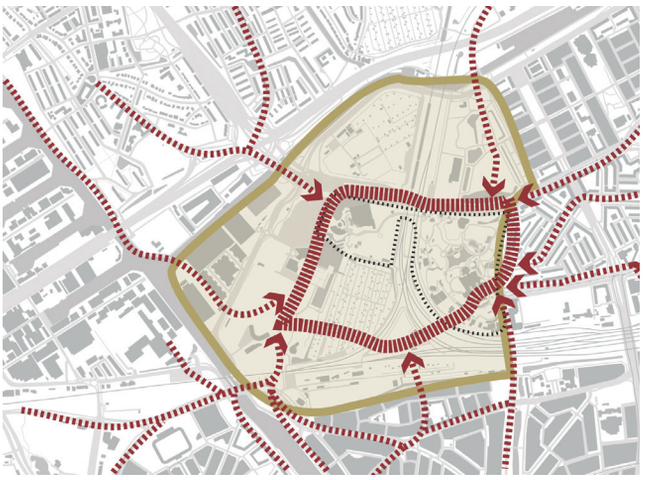
Build-up Future zoo Rotterdam

The project area for the future zoo Rotterdam is the current zoo space as well as the neighbouring Roel Langerakpark, Vroesenpark and allotment gardens.

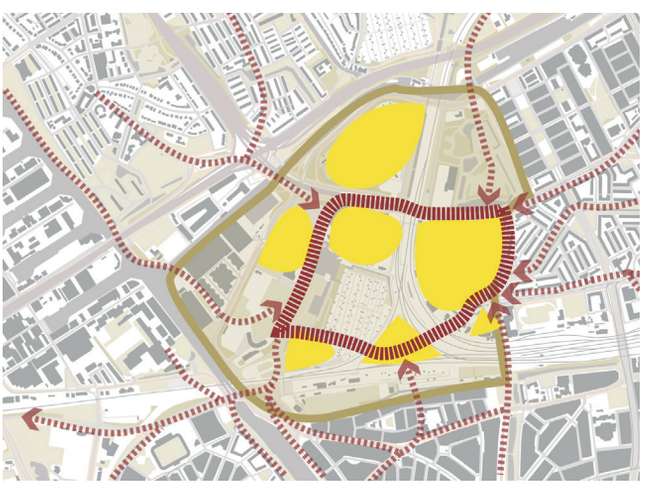


The future zoo will link, strengthen and create new green corridors to creating a urban park that is well integrated in the local and regional green infrastructure

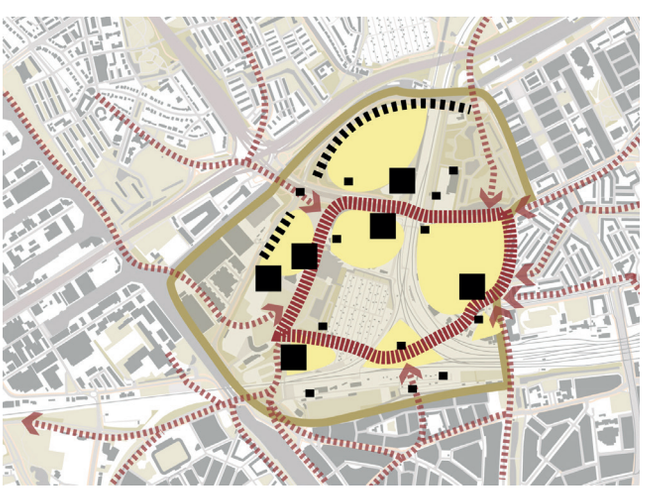
The future zoo area will be integrate in the local walking, bike and public transport infrastructure.



A ring will be created to connect the local infrastructures together in a currently very divided and closed off area. Theirby opening the area up for the city and linking the different neighbourhoods closer together.



Along this route in the park the nine biozones will be located. each separately accessible. Visitors will take the public park route in moving between the biozones.



In the urban park and on the edges of the zoo, different urban functions will be located, such as a housing, concert-hall, library, swimming pool, ice skating ring, museum etc. These functions will blend together with the biozones of the zoo.

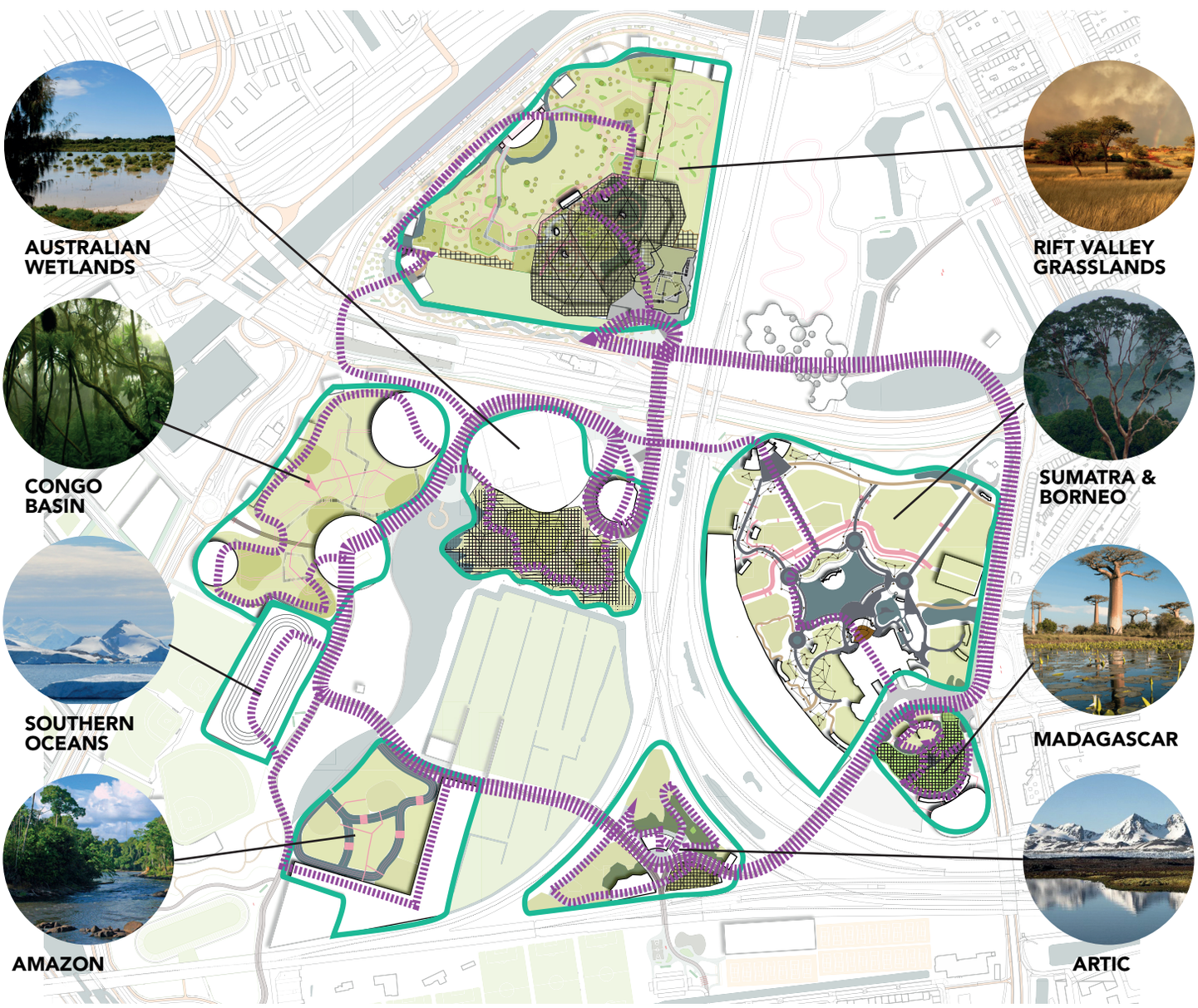
Future Rotterdam Zoo

Biozones

A selection of the biozones have been made following four criteria: WWF priority places, current conservation projects Rotterdam zoo, current species collection and opportunities in the zoo Dutch zoo landscape. WWF priority places represent places WWF prioritise in their conservation efforts because of their wealth and variety of life they support, the destructive challenges they face, and our ability to positively impact them. Since the future zoo is a centre for conservation the chosen biozones has to be also a priority place for the WWF. The biozones within the future zoo of Rotterdam are stated below.

In the Future Zoo of Rotterdam the different biozones are linked with each other by a public route. The Different zoos form islands within the larger Blijdorp Park. This makes it possible to separately visit every biozone, visitors can chose to only go to one zone or make a day tour. Visitors buy a 'chip' cart and can then check-in at the zone they want to visit

Routes connecting the different biozones

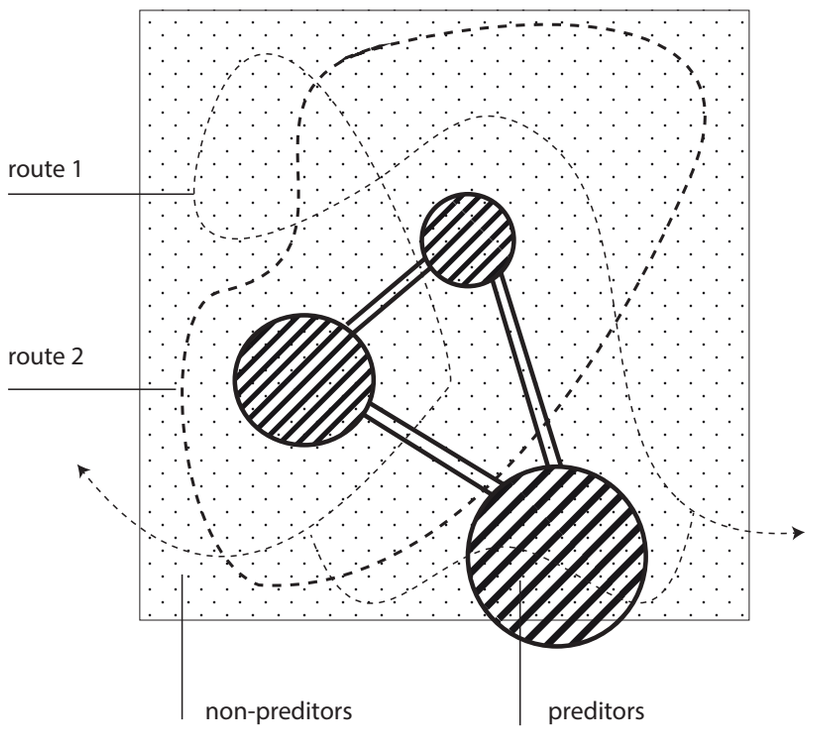


Part of the city

The Future Rotterdam zoo will be part of an urban park and also host many urban function in the zoo or on the edge. The park forms a green relating environment within the city connecting different neighbourhoods. These urban function form the entrances to the zoo. The main urban function are related to culture, sport and education.

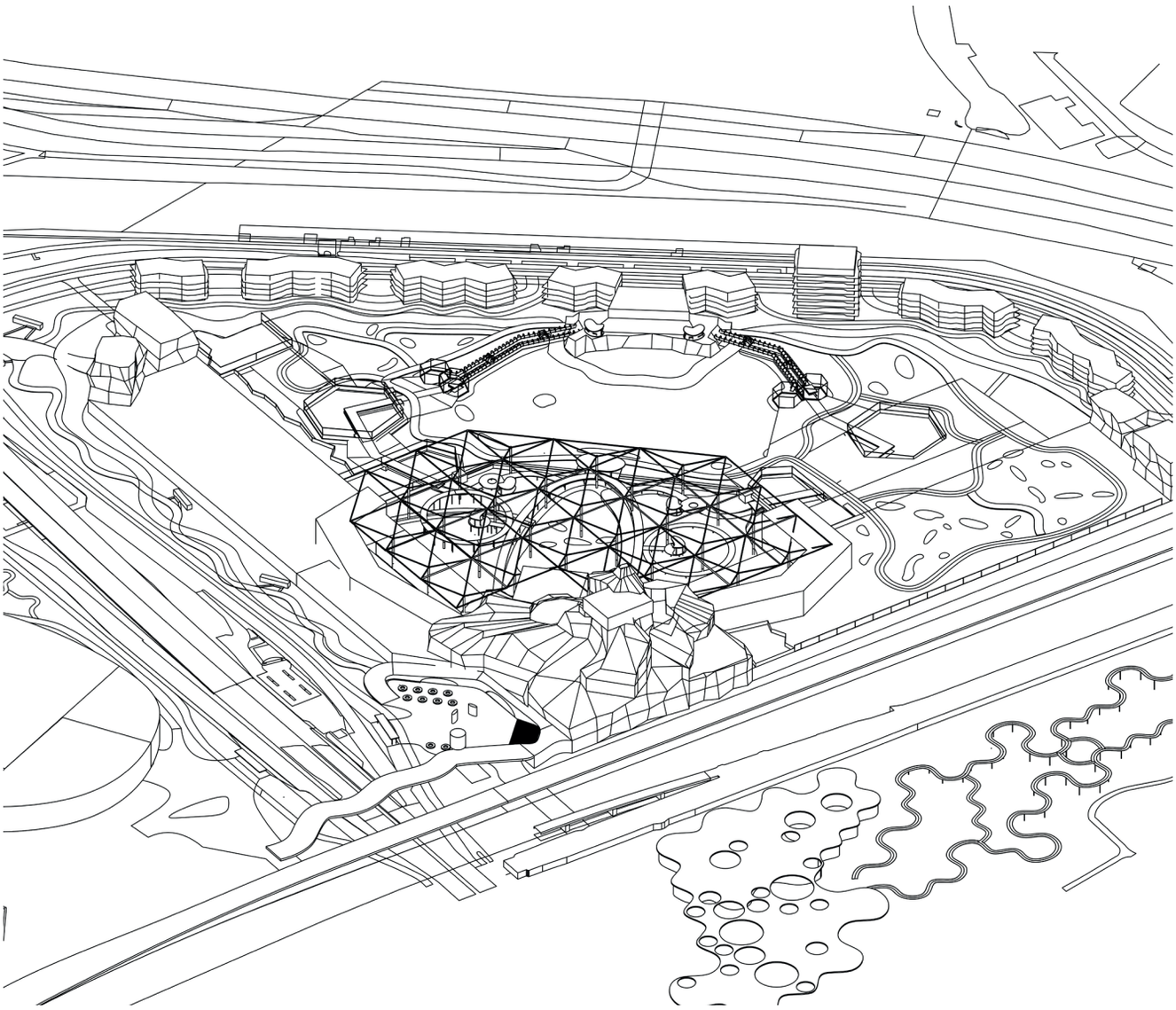
Cultural function will be music pavilions, concert hall and theatre hall. Sport will be done on the many sporting fields and courts, but also in the swimming pool and on the ice skate ring, meanwhile getting a glimps from the penguins. Educational functions are present in the form of lecture hall, natural history museum and a library. Further on the edges housing will be located if possible as well as places for dinning or drinks.

Urban functions within the park



7.7 Future Zoo Biozone concept

Each biozone consist of two kind of spaces: the ecozone and rotation system. Within the ecozone non-predators or animals that do not cause problems with each other are grouped together like you would take an ecosytem import directly out of the wild. In the rotational system animals that wouldn't fit in the ecozone are placed, primarily preditors. The different rotation exhibits are connected by walkways to allow for the rotation. Between the ecozone and exhibits two types of human routes flow. a walking route and a special adventures route. The human routes are subordinate to the animal space.



Biozone: Savanna

Urban functions:

o Rock
- >Ccncert-hal (750 seats)
- > 2x Theatre of cinema (200 seats)
- > 5 lecture rooms
- > large restaurant
- > offices space (2000m2)
- > hotel (300 rooms)
- > sky-bar
- > Exposition space (1500 m2)

o Housing
- > 280 mid- and luxurious apartments

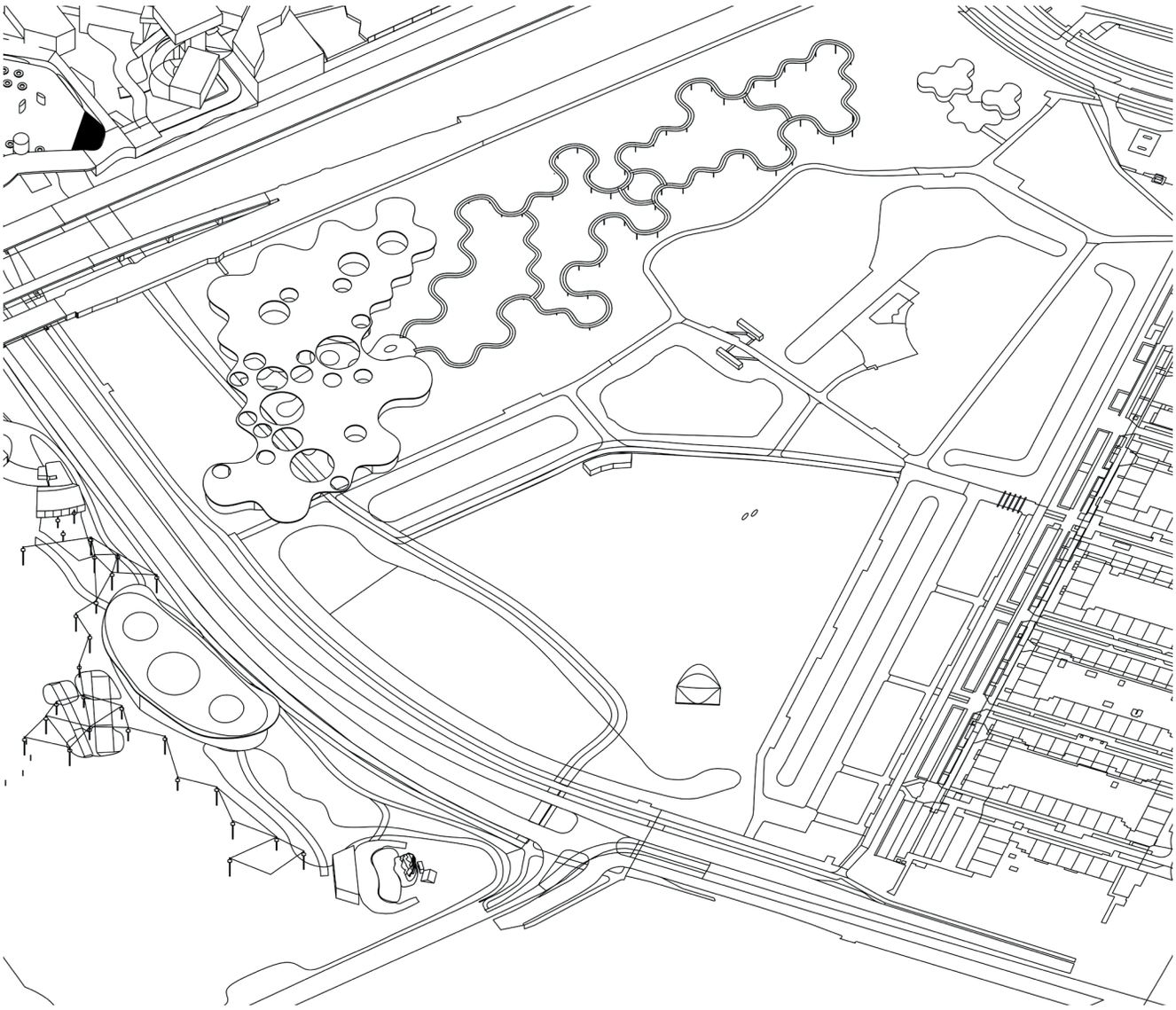
Objective stations
> 7 stations

Exhibits
o 3 Ecozones
- > Main savanna (4,6 ha)
- > Aviary (2 ha)
- > Rock (4000 m2)

o 7 Enclosures
- > 1200- 1500 m2 each

o Walkways Rotation system
o Indoor
- > Main facility (10.000 m2)
- > Giraffe (1050 m2)
- > Rock animals (500m2)

Exploring wildlife
o safari pods
o walking path
o walk-in exhibit



Vroesenpark

Urban functions:

o Public Park
>Music pavilion
> small cafe
> playground

o Scouting building

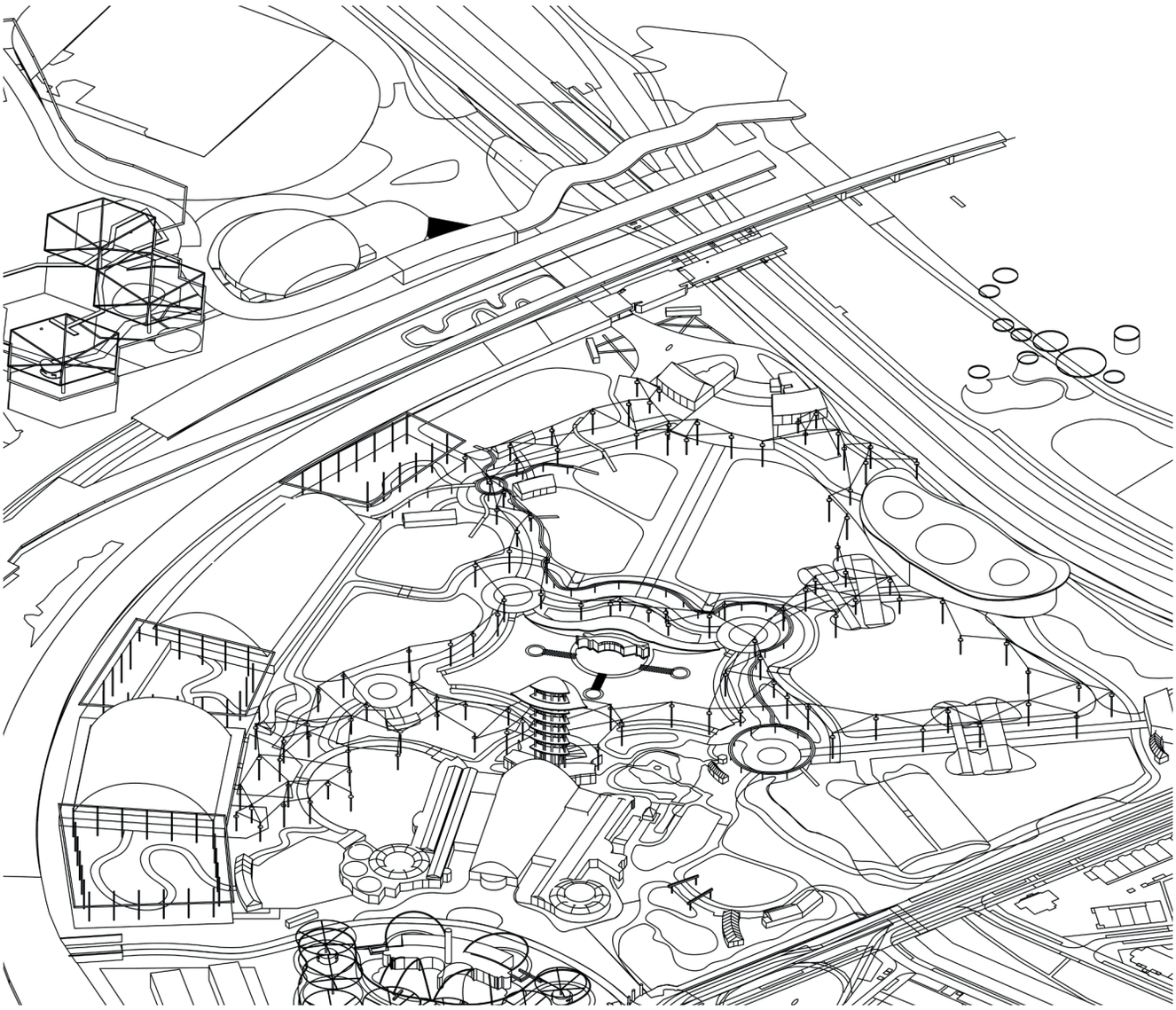
o Petting zoo

Zoo related functions:

Zoo related functions:

o Biological research and health station
> 8000 m2
o Zoo Academy
> 3500 m2 Exploring wildlife

o Public tree canopy path



Biozone: Borneo + Sumatra

Urban functions:

o Riviera-hal
>Restaurant
> Library

oGiraffe pavilion
> cafe

o Takin-rock
> Fitness centre

Objective stations
> 9 stations

o Routing type:
> walking path
> walk-in exhibit

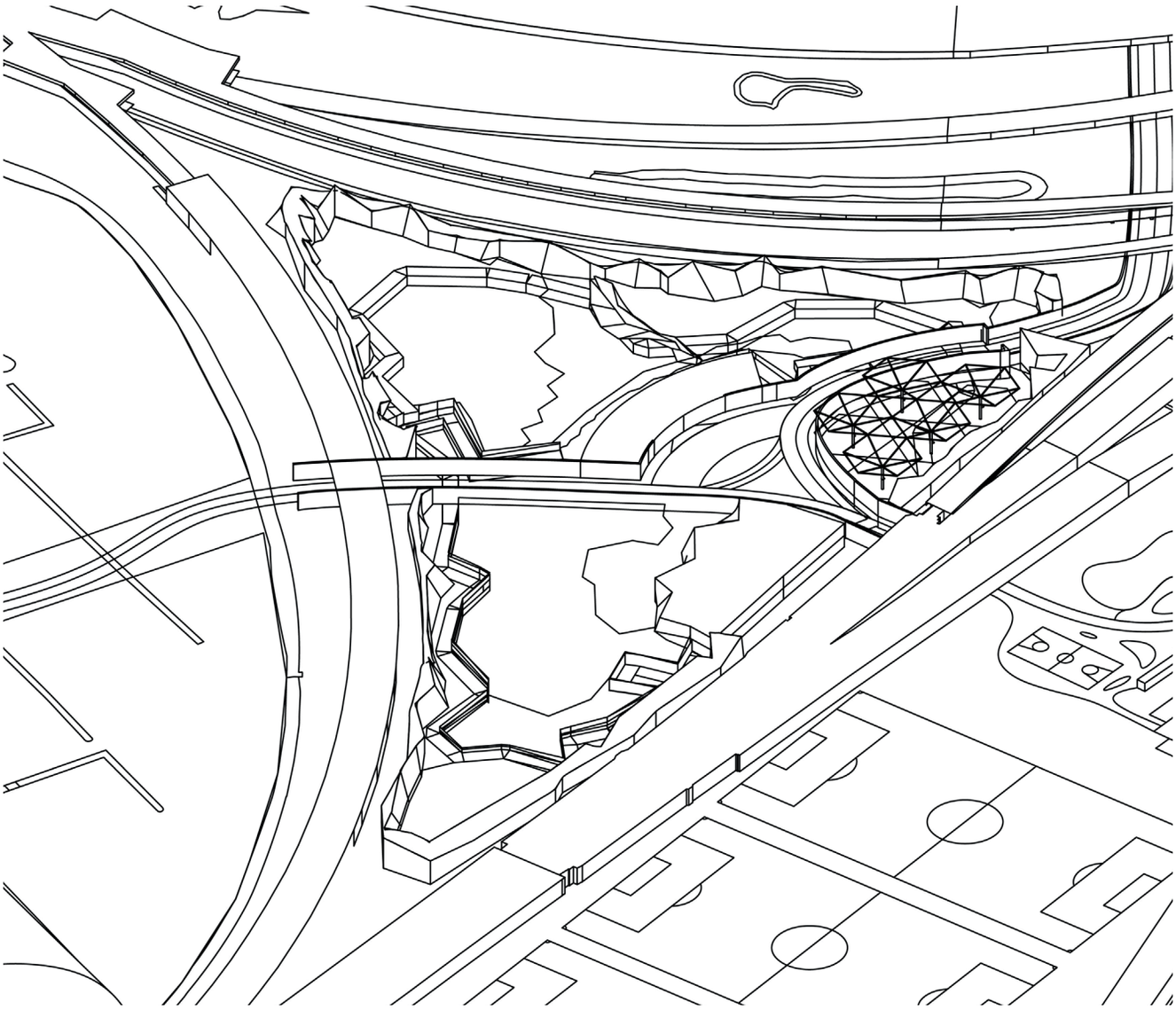
Zoo:

Ecozone
> total 2,5 ha made up of smaller connected areas

o 4 Enclosures
> between 1200-3000 m2
o 3 Aviaries
> 10.000 m2 combined

o 3 indoor hall
> between 3300 -4500 m2

o Walkways Rotation system
> predator
> non- predator
> Canopy connection system



Biozone: Artic Seas

Urban functions:

o Urban Connection point

Objective station
> Artic station (2600m2)
> Screens in tunnel under railway

o Routing type:
  > walking path
  > walk-in exhibit
  > underwater glass tunnel

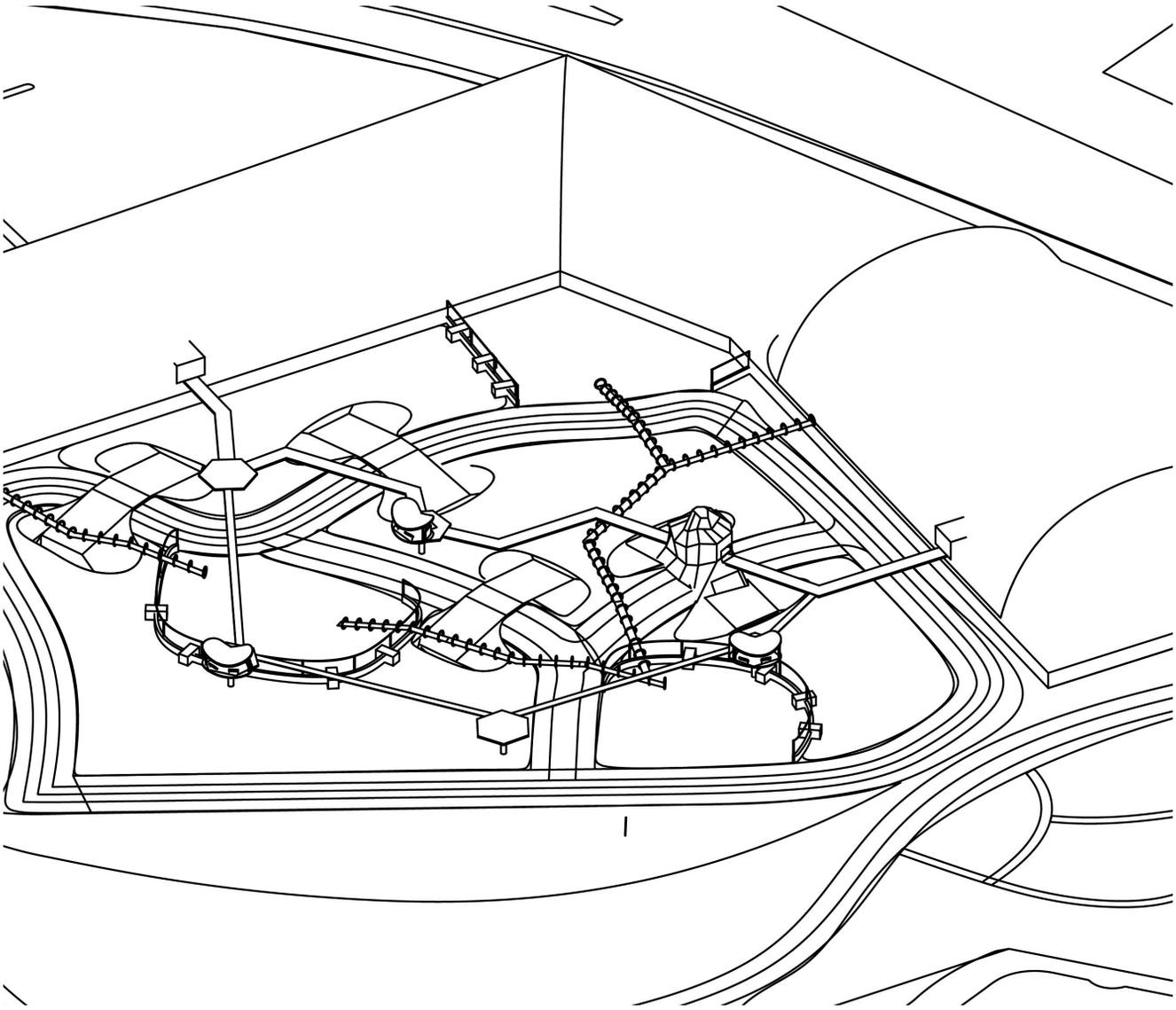
Zoo:

o 2 main Enclosures
  > about 4000 m2 each

o 1 Aviary
  > 2.000 m2

o 3 sub-enclosures
  > between 1000-2000 m2

o Exhibit connection system



Biozone: Amazon Guianas

Urban functions:

o Swimming pool
> 5000 m2
> 2 swimming bath
> 1 leisure bath

o Objective stations
> 3 stations

o Routing type:
> walking path
> walk-in exhibit
> Boat ride

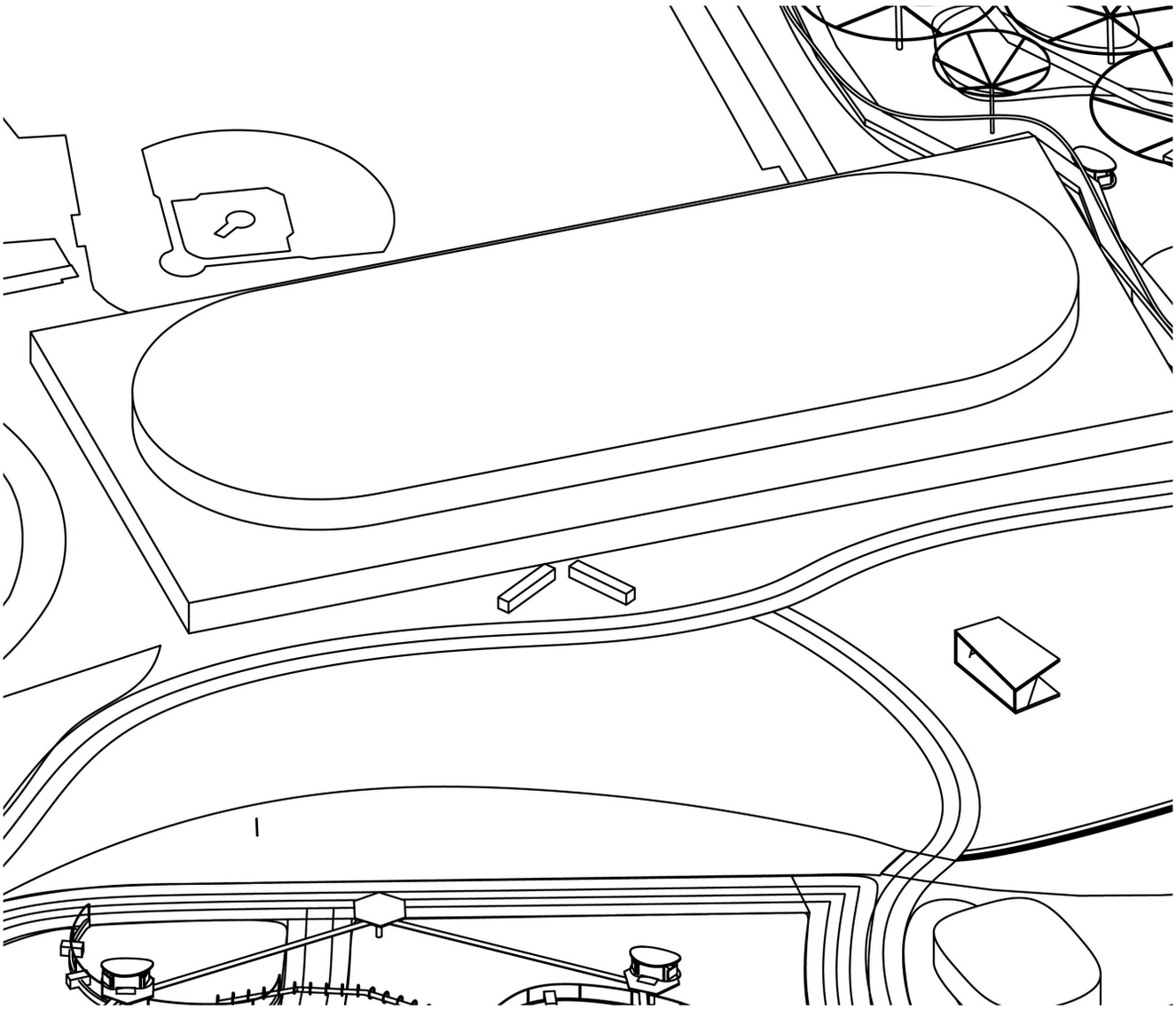
Zoo:

Ecozone
> total 1,2 ha made up of smaller connected areas

o 4 Enclosures
> between 1200-1400 m2

o indoor hall
> between 1,7 ha

o Walkways Rotation system
> predator
> non- predator



Biozone: Southern Oceam

Urban functions:

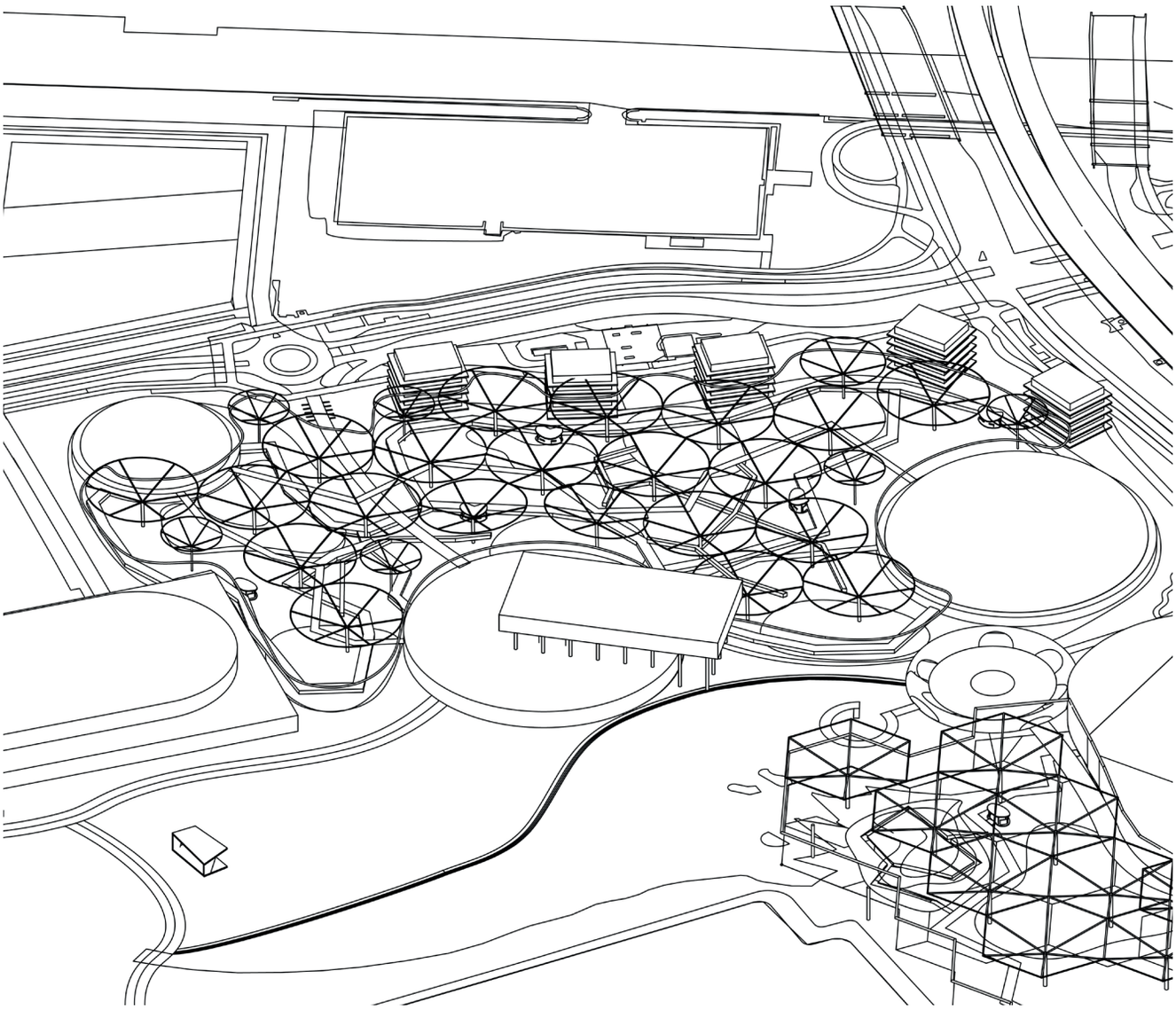
o Indoor iceskating ring
> 18000m2
> 400m track

o Objective stations
> 1 station

o Routing type:
> walking path
> Underwater tunnel

Zoo:

Ecozone
> 7000 m2 indoor



Biozone: Congo Basin

Urban functions:

o Main Blijdorp park building
>Natural History Museum
> restaurant
> indoor playground

o Housinng
> mid- and luxiours apartments
> 120

Objective stations
> 5 stations

o Routing type:
> lowered walking path
> walk-in exhibit
> tree walk

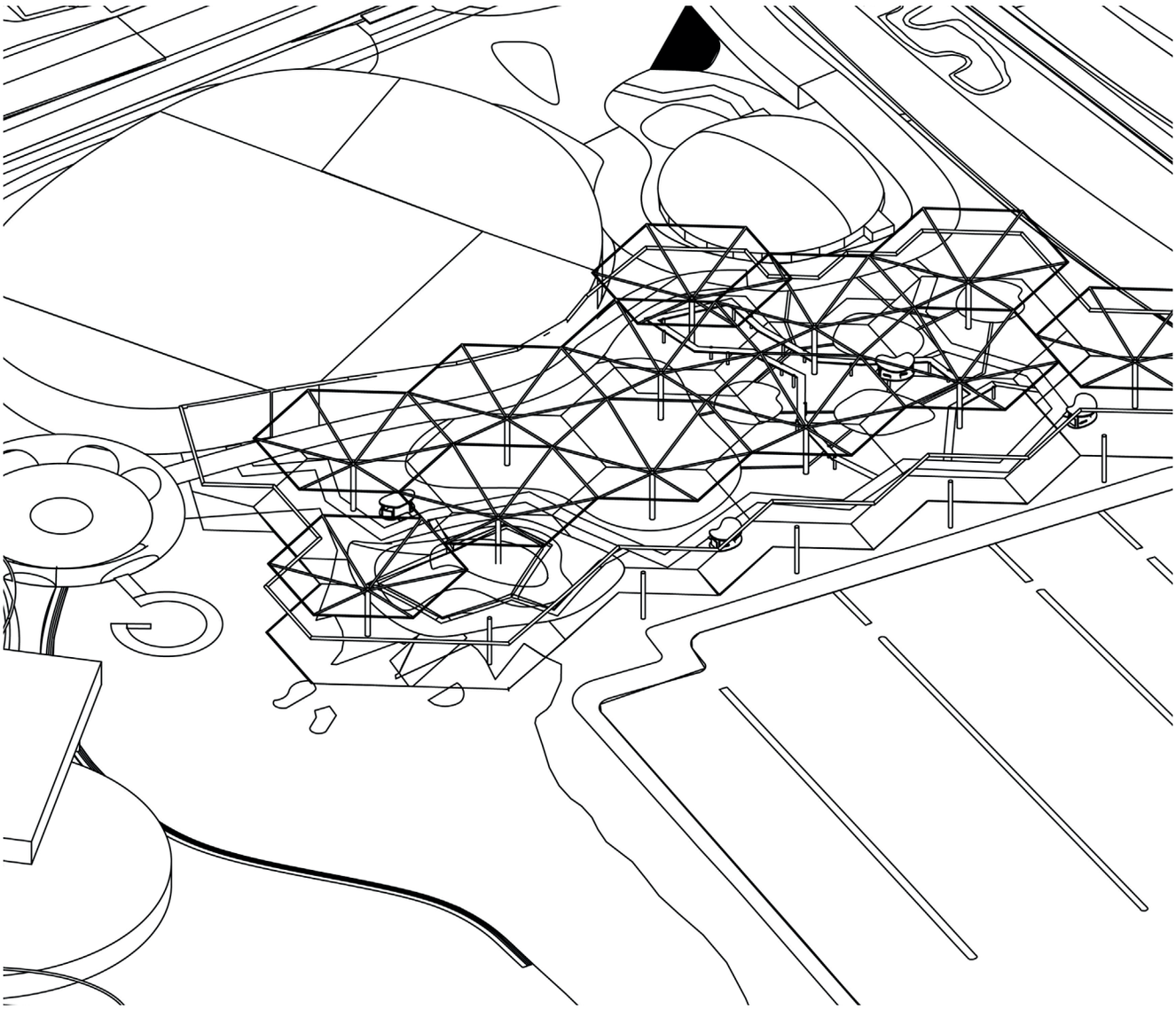
Zoo:

Ecozone
> 4,5 ha under the avairy

o 4 Enclosures
> between 1500-3000 m2

o 3 indoor halls
> gorrila playround (2000m2)
> Okapi bush (8000m2)
> Hippodome (3000m2)

o Walkways Rotation system
> non- predator



Biozone: Australia

Urban functions:

o Offices
> 12.000m2
o Cafe

o Objective stations
> 4 stations

o Routing type:
> walking path
> walk-in exhibit
> tree walk

Zoo:

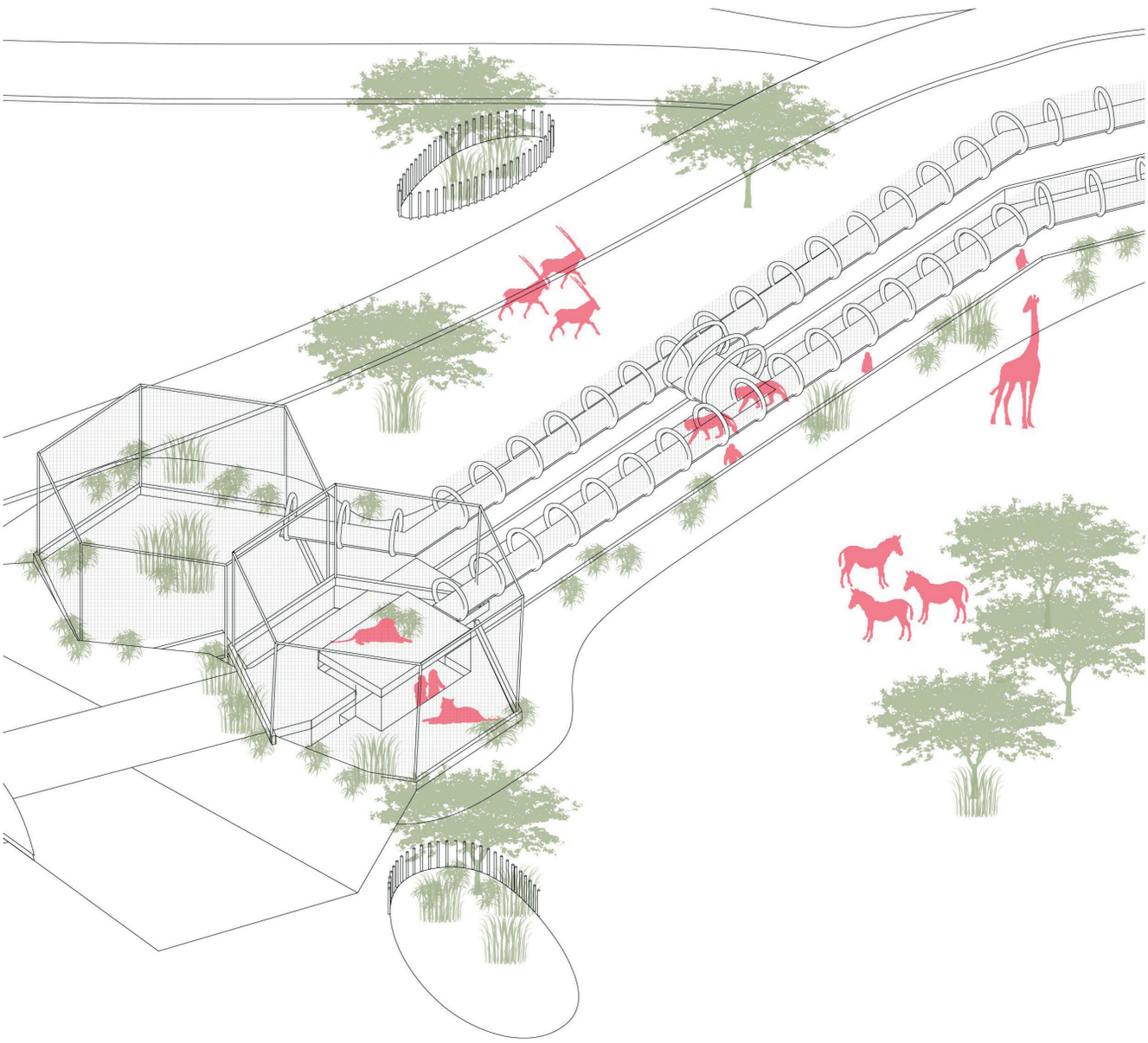
Ecozone
> One Aviary
> total 2,25 ha

o Enclosures
> 5 smaller (325 m2)
> 1 large (4000m2)

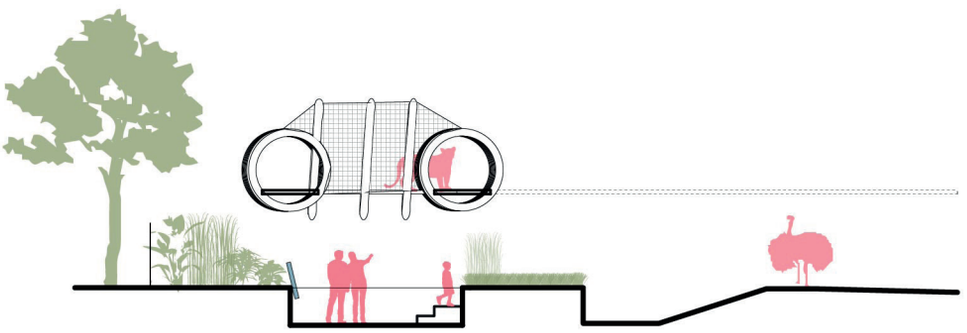
o 2 indoor hall
> Aquarium + tropical hall (1,ha)
> Dry climate hall (2500m2)
> microtopia (2000m2)

o Walkways Rotation system
> non- predator

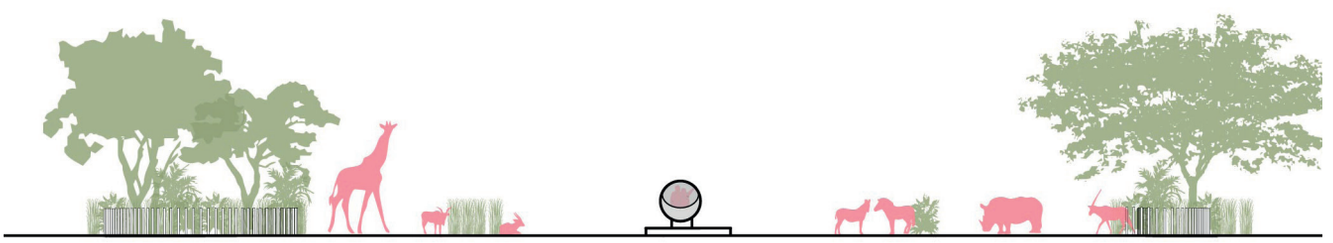
Visiting the zoo



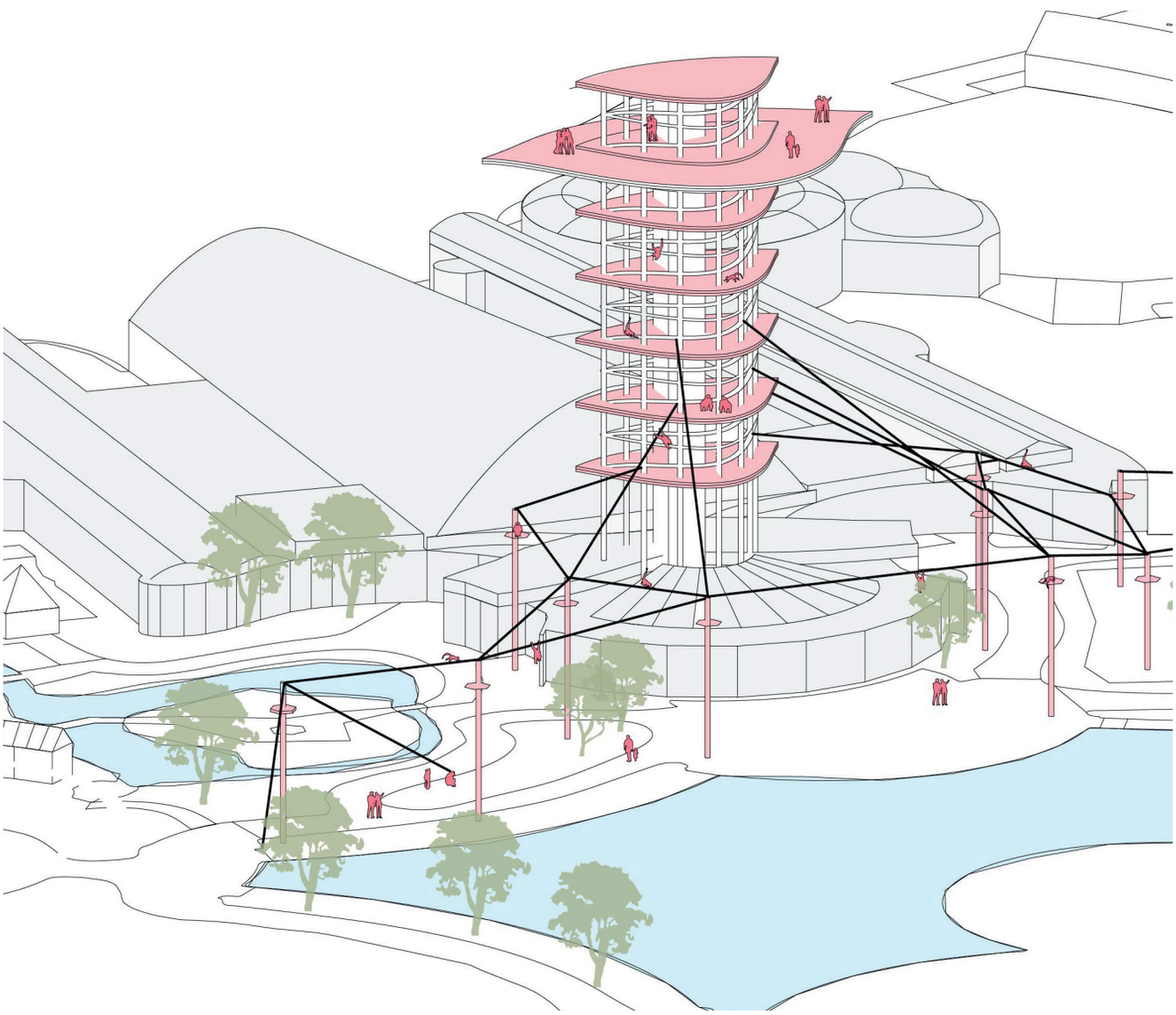
Visitors are surrounded by animals



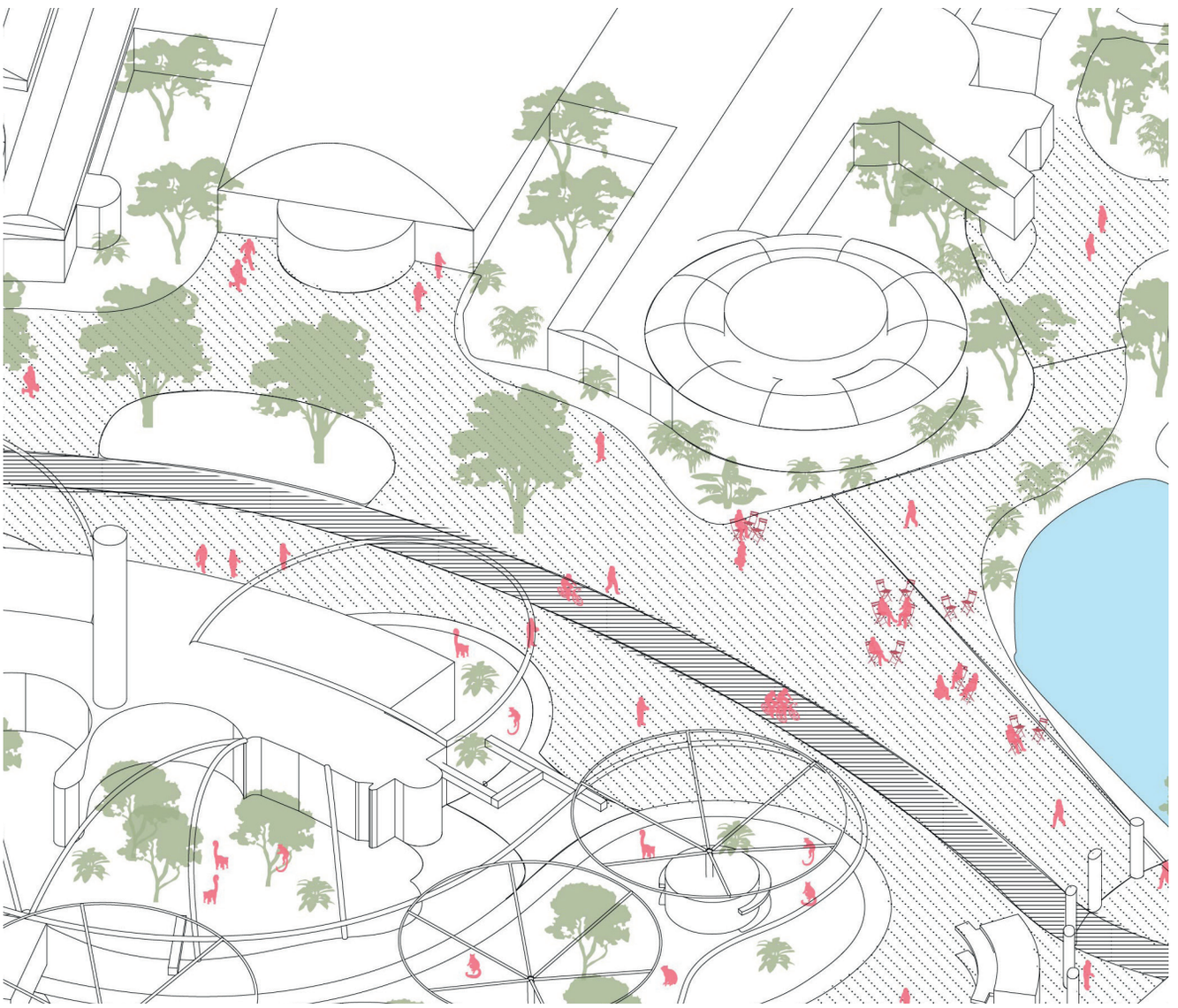
Lowered path, animal rotaion above walking path



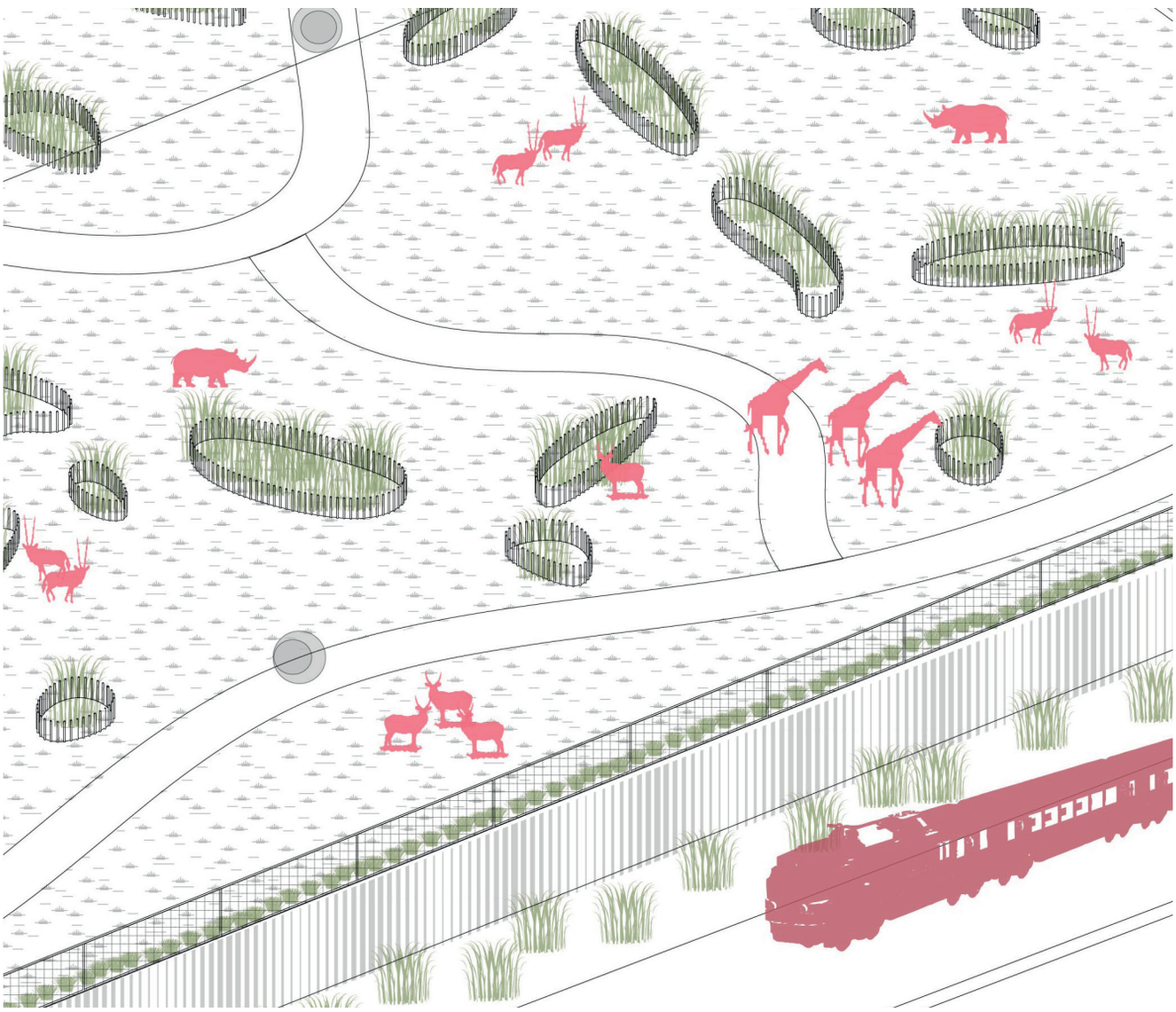
Safaripods driving through the ecozone



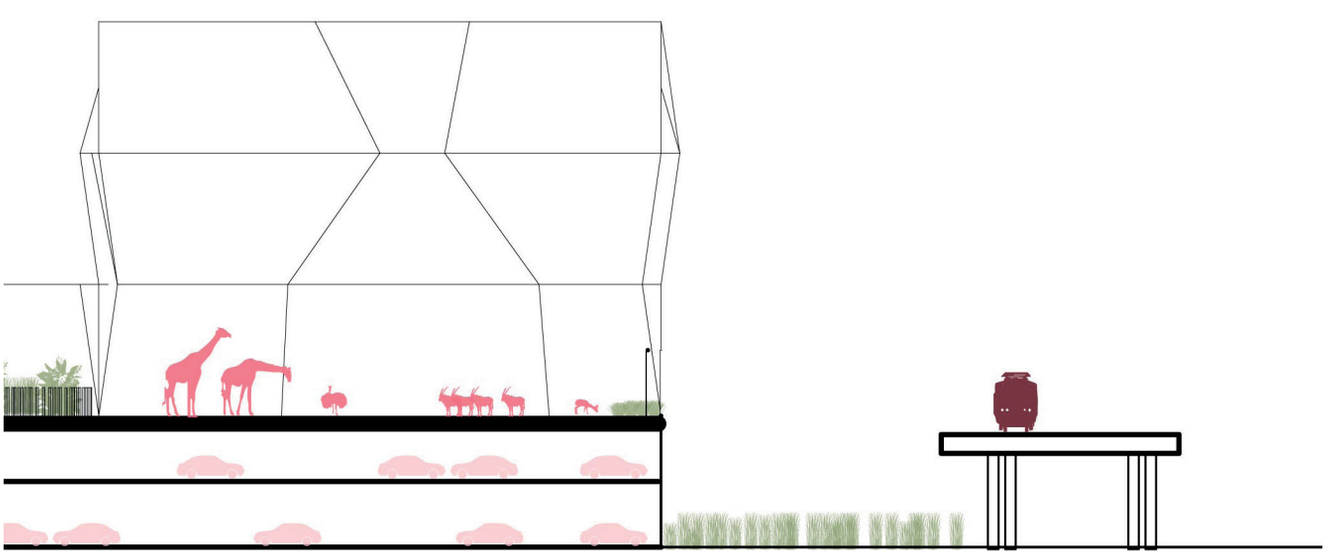
Climbing tower as part of the ape canopy structure, with viewing deck on top for the visitors



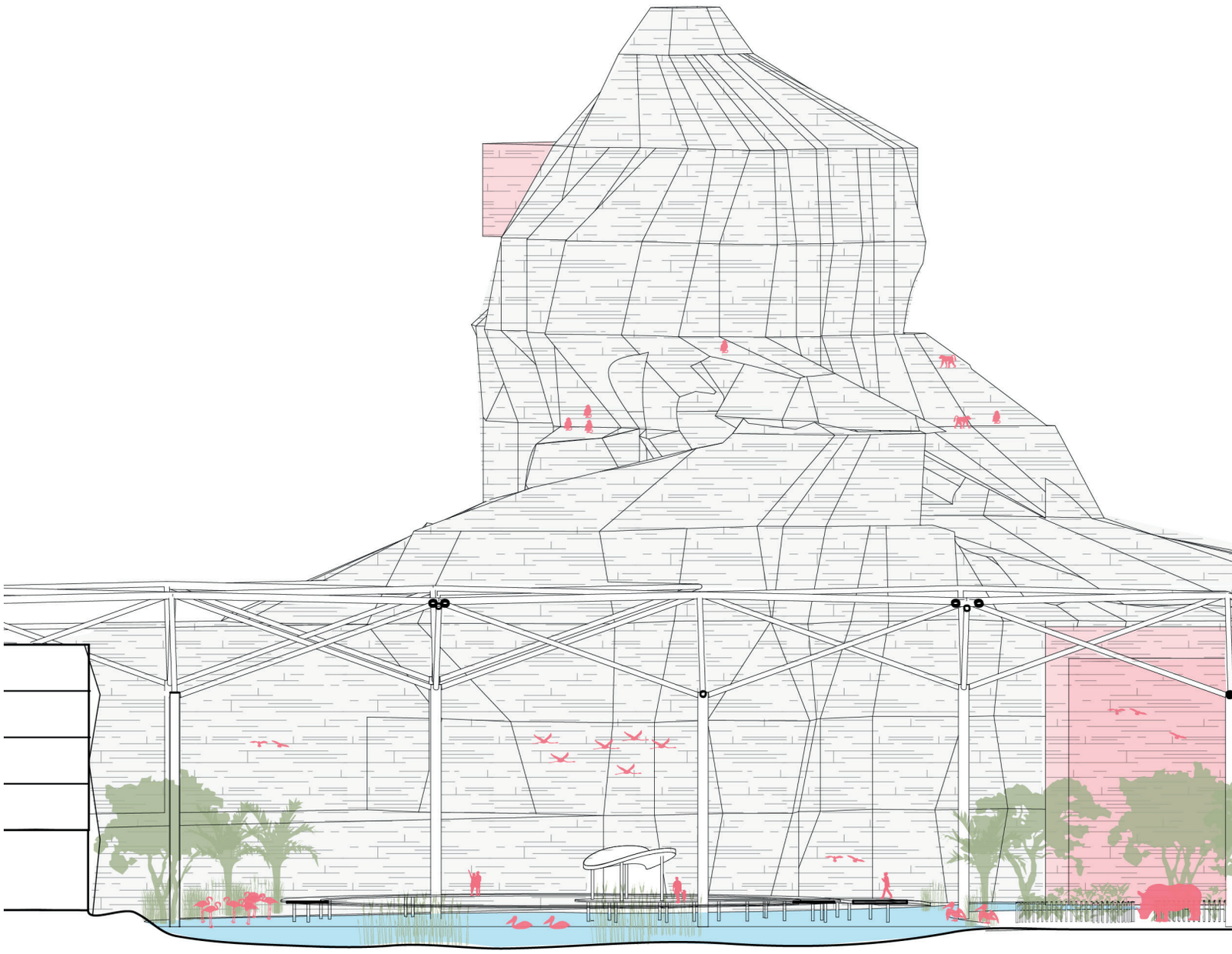
Square is formed in front of the Riviera-hal,
opening up the zoo to the city



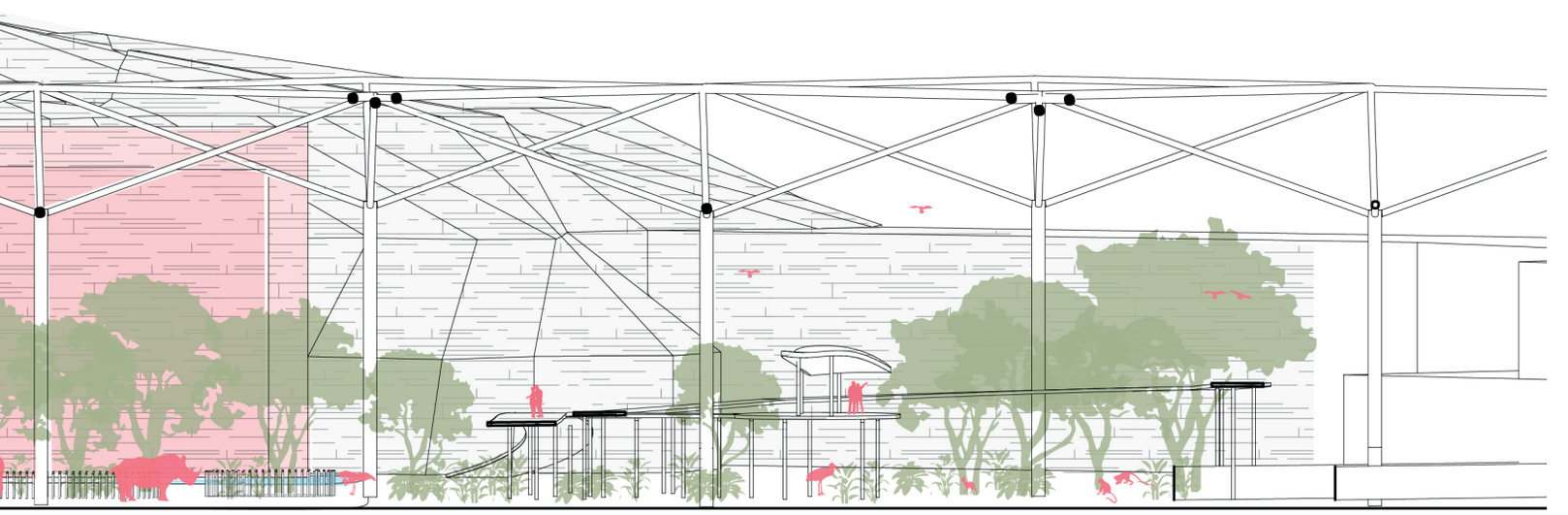
Safari on the train, by making the roof of the parking garage part of the safari, the exhibit is enlarged but also on the same level as the trains. So that rail-travelers will have the feeling they are for a moment driving through the savanna

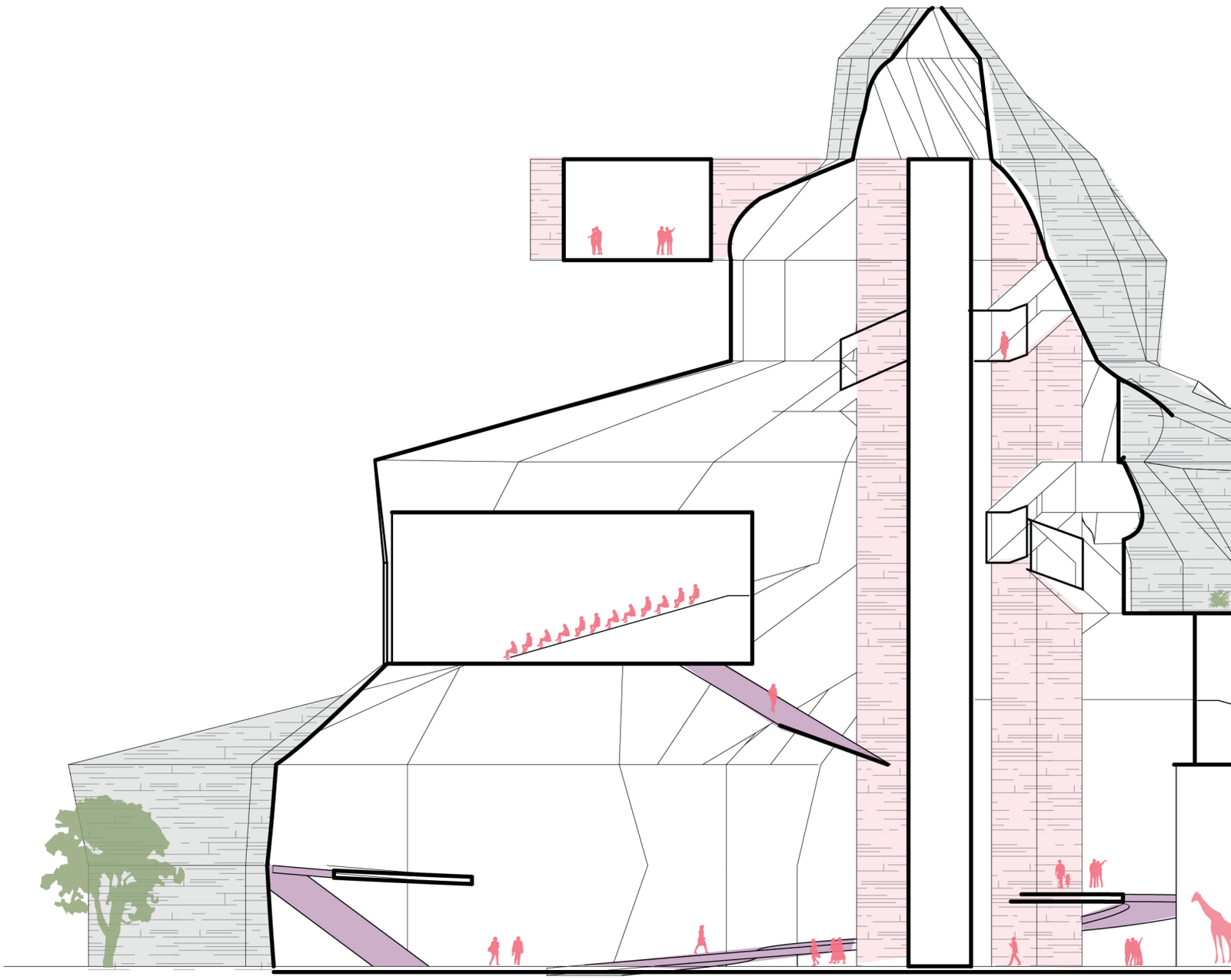


In the section can be seen how the railway and the ecozone level out.

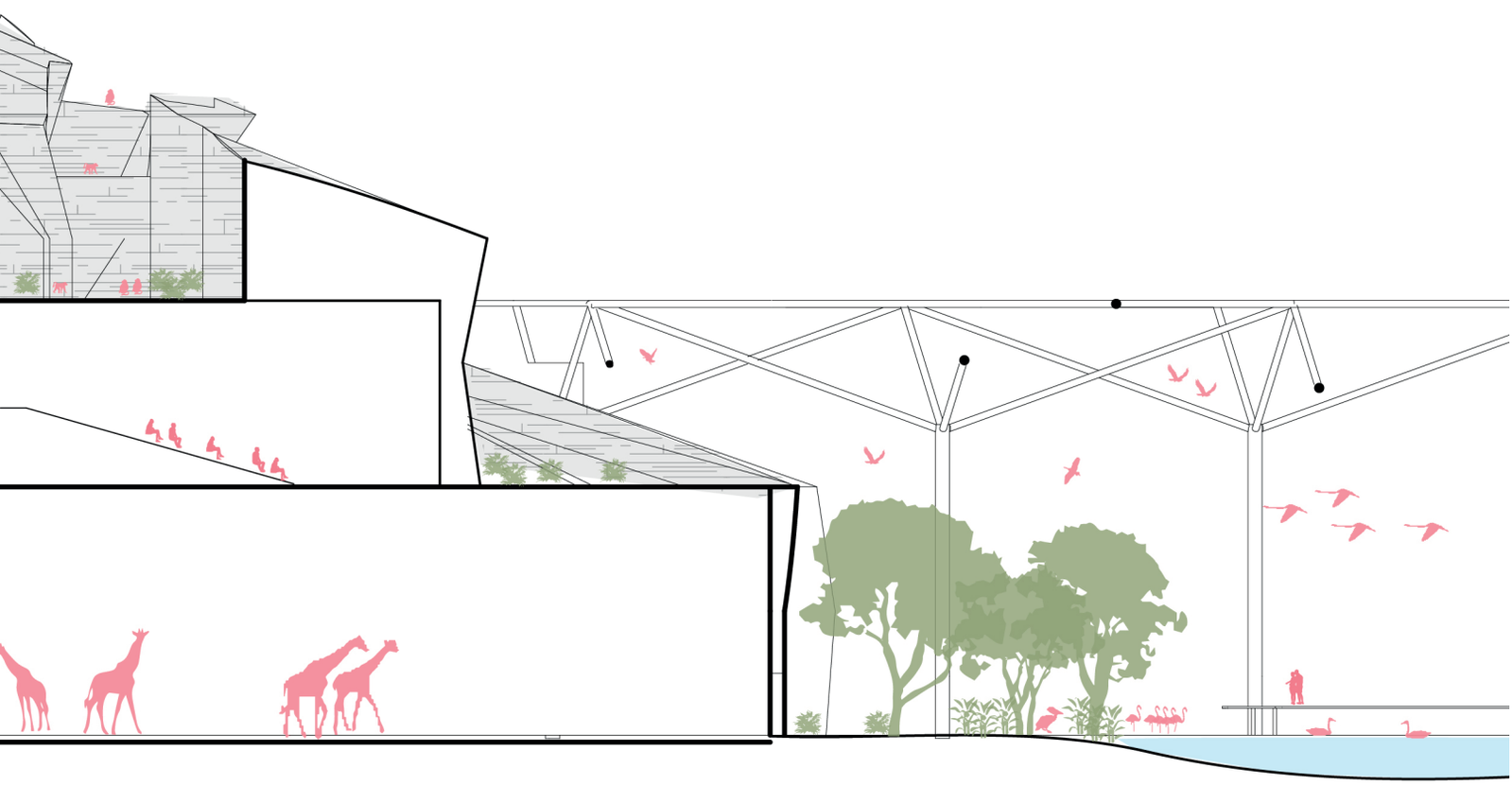


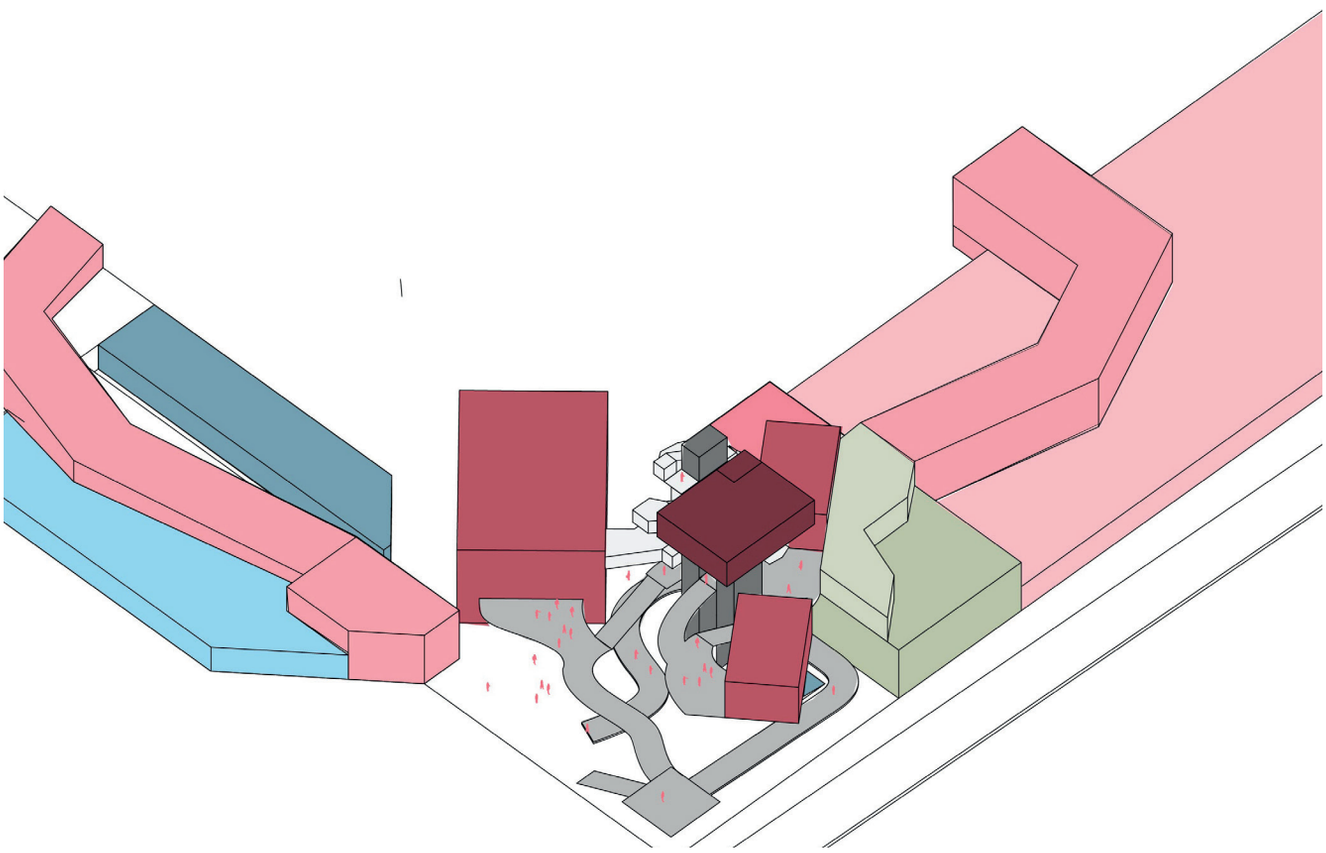
The rock, seen through the avairy, concerthall is picking out





Within the rock different urban functions are placed. These functions are placed in a manner to create great views.





Volume scheme of functions within the rock

Skybar

Cultural halls

Hotel

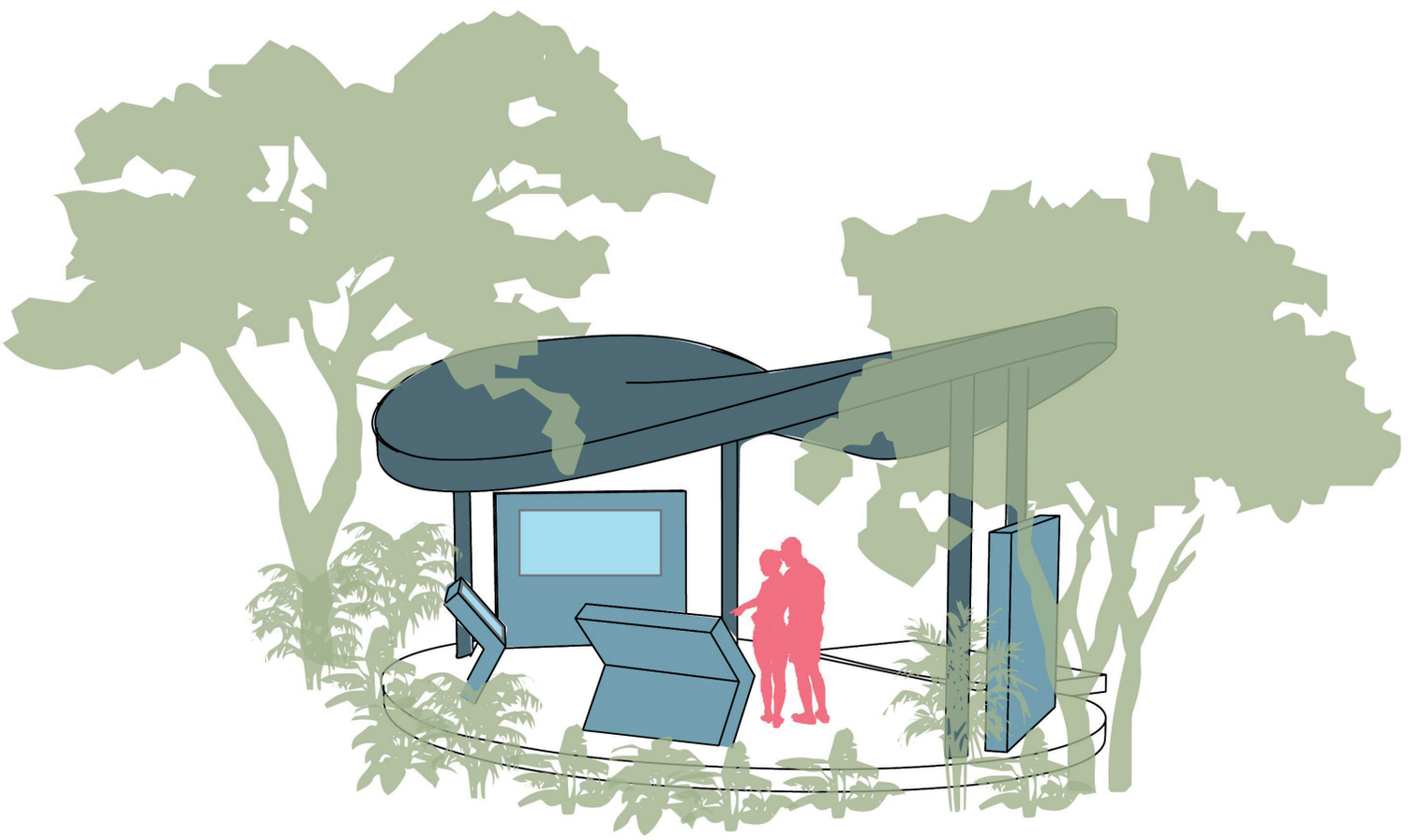
Parking Garage

EXPO

Lecture rooms

Indoor Giraffes

Indoor Ethiopian highlands



Information stand, with interactive screen to engage people and learn the visitors about biology, conservation or animal behaviour.+++++

Chapter 8
Evaluation

8.1 Conclusions

From the research a variety of conclusions can be formulated about the future methods for sustainable exotic wildlife exhibition within the urban environment.

8.1.1 Objectives

Since the beginning of civilization until now five main objectives or reasons have there been for exhibition exotic wildlife, status, recreation, research, education and conservation. Over different time periods the prominence to the objectives has varied. For most of history status have been the dominate reason for exotic wildlife captivity until the industrial revolution when research became the dominant reason. In recent decades conseration has been increasing as objectibve for the zoo and in the future zoo conservatio is expected to be the dominat objective for zoos. Also eductaion and the throughout significant recreation will be of importance for the future zoo.

8.1.2 Lay-out

Based on Coe and Meuser three main methods of wildlife exhibition can be identified; caged barrier, naturalistic barrier and immersion exhibit. These three methods have developed form each other increasing towards a more naturalistic approach of animals exhibition and with increasing attention towards animal welfare. Within these three methods of wildlife exhibition five exhibition styles can be identified by the hand of Meuser, colonial style, Panoramic Landscape style, Formalism and Functionalism style, Natural style, Branding and theming style.

8.1.3 Urban fabric

There are four urban position whee the zoo can be situated can be identified, centre, urban, edge and rural. Until the industrial revolutions zoos were primarily situated in rural environments and the estates or landhouses of the elite. During the the industrial revolution the zoos position changed form a primarily rural setting to an urban setting. In the 19th centre they became one of the new urban institutions of the time, like theater and boulevards. They became an integrate part of the urban fabric and were very popular along the elites social and cultural life in the city. As popular institution is zoos even spurred urban development in of the city. But as the zoo became more leisure attractions and more open for the public their part in the social and cultural life started to weaken. The introduction of the car made travel to the zoo more easy and changed the preferred position of the zoo. During the time that visitors reached the zoo primarily by public transport zoos preferred to be located in the centre or urban environment with a lot of accessibility by public transport infrastructure. When the car became the main more of transportation this shifted towards highways exist, making rural or edge positions more favorable. This increased orientation to the car made that the zoos became less well integration with the urban fabric thereby also further weakening the social connection with the city.

8.1.4 Zoo Evaluation Tool

The zoo can be described and evaluated in different topics, each with a some aspects which can then be divided in different components. The zoo in the urban environment has three main topics. First the objective, related to the to the mental zoo space, secondly the urban setting related to the social side of zoos space in the urban environment and lastly the spatial arrangement of the zoo related the spatial characteristics of the zoo space. The topic of objectives can be divided in aspects conservation, education, recreation and research. The urban setting in the aspects edge, mixed functions and accessibility. While the spatial arrangement of the zoo is divided aspects of scale into macro, meso and micro. Together these aspects are the main evaluation points of the Zoo Evaluation Tool.

8.1.5 Future Zoo

The most potential for the future zoo in the urban environment is the blending of the two together and using each other strengths to give the zoo a social and cultural role in the city and make it part of the urban fabric and offer the city a green relaxing space were animals can come easily in context with exotic wildlife. There by strengthener the relation between human and animal, Most potential for doing zoo is on the edge of the zoo by making them more permeable creating unique and interesting mixes of functions on those edges as well as better accessible. Thereby integrating the urban fabric and social life of the city with the zoo. The by better integration the zoo has the potential to offer solutions and help with urban issues such as urban heat island, biodiversity, stress and segregation of people. The highest potential for integrating the zoo with the city are the center and urban, although also in edge and rural zoos better integration with the surrounding landscapes and urban networks can create a more blurred edge between zoo and city although the methods for mixing might differ.

8.1.6 Use Zoo Evaluation Tool

The (future) Zoo Evaluation Tool can help evaluate zoos on different topics and aspects and see how it preforms. The ZET itself does not propose or implies an perfect or ideal future zoo since their is no one perfect future zoo. Instead it helps to indicate what the currents conditions of zoo is on various aspects and components. The ZET can thereby help to formulate questions or channel manner of thinking in which directions zoo professionals, urban designers ect, want to develop their zoo or see potential. As the context can differ as well as the preferred outcome of the future zoo desired by helping the evaluate the case it can point to improvements to be made and then offers guidelines and design principles to help to forfil those goals.

In the design this has been applied. By using the tool and formulation the type of future zoo desired for this location broth guidelines and design principles were given. Which were then specified for the context and the proportionate of the Rotterdam Zoo.

8.2 Limitations

Within the research and conclusions drawing within this thesis certain limitations have been present that might has influenced the outcomes of the thesis.

The prime limitation of this thesis is the positive attitude to wildlife captivity and so the realisation of the future zoo. The research has been build on the attitude that their will be zoos in the future. That the objectives of the zoo can only be achieved by having a zoo and no other manners. The attudute form this thesis towards animal captivity has been taken form the conservationist point of view, were the benefit of the species stands in higher regard that the animals welfare of the individual.

Further in gathering the data and literature and analysis the data their has been made selections. Selections for certain sources have been made, such as Coe and Meuser were other sources would have been present and might have given different opinions about the zoo. Also it has been difficult to gather form certain topics 'hard' data because these topics are difficultly measurable. How well zoos preform on for instance recreation and conservation in difficult to put in quantitative measurement.

Additionally, within making the Zoo Evaluation Tool certain aspects have been choice with specific components. thereby strengthening the tool and the research with the thesis towards these aspects. Other choices might have been made and could have been viable as aspects as the zoo is a complex system. Furthermore from the selected aspects no ranking between the different aspects has been made. Well they might not be all on the same level as one an other.

Within the design proposal for the case study of the Rotterdam zoo also some limitations are present. First of all no financial boundaries have been taken into consideration in developing the design proposal. Thanking away this limitation on the creative process allowed for a free follow of thinking and many possibilities to realize the design proposal. But by removing the very real and present limitation the outcomes of the design might not be financially feasible.

Likewise, the social consequences of this major redevelopment of the Rotterdam Zoo and surrounding parks could expected to be great. Bit within this theses social and political impact of this transformation action have not been seen as a limiting force in the development of the future zoo. While the removal and replacement of the allotment gardens might count on much resistance for the current occupants for example.

8.3 Recommendations

To better this research some recommendations can be made to achieve more profound results or create a stronger scientific basis.

Interviews with experts on zoo designing, zoo management or urban development and municipal policy could have given more foundation for the founded results. Theses field opinions from experts might have given practical insides that currently haven't been considered.

Also, more looking into depth to urban metabolism the flow makes use of could have given ideas for interesting mixes of functions or other forms of integration with the urban fabric or surrounding landscape.

Within this thesis more analysis could have been made on the necessity of the blending between zoo and the urban environment. Currently blending of the two is taking as a positive element with a relatively small scientific bias . deeper analysis and more through literature study might have made this statement more solid.

Lastly the research could have been more focused on how the city can be beneficial for the zoo instead of the zoo for the city. What does the city offer the zoo in a wider sense then only visitors.

8.4 Further Research

From this thesis further field of research between the (future) zoo and the urban environment could be researched.

Firstly in-depth study in the metabolism of the zoo and that city to create a more circulate integrate system would be a interesting field of study. The zoo uses a lot of resources and produces a lot of very unique products. linking these to flows within the urban fabric might be very promising and open up untaught mixing opportunities to make both more sustainable.

Further research could be further explored in how inhabitants of a city experience the zoo and how they use it in their daily, monthly or yearly experience. What are he positive benefits of having a zoo within your ity for the quality of live and recreation and of certain groups. How does the zoo help branding the city and other influences the zoo might have on the happyness and attractiveness of the city.

Investigation can also be deepened in the edge it self and the necessity of blending the edge between urban environment and zoo. What are the aspects and elements to take in to consideration when design the edge, for instance on the leve of security and does the edge even matter so much for the experience of the zoo and how does it matter most and were can the best improvements be made.

Reflection

Relationship between research and design

In my graduation project, has been mostly structured design by research. I have worked in three stages analysis, synthesis and application stage. In the analysis stage consteted of three segments data collection, additional data collection and analysis of the data and a literature study in to various field concerning the future zoo. These analysis stage led to the synthesis stage, in which the collected information was gathered and transformed into a tool to evaluated current zoos and future zoos by using different parameters. Out of this tool and the previous analysis stage guidelines, requirements and opportunities for the future zoo were formulated on three field. Objectives of the future zoo, urban connection of the future zoo and spatial characteristics of the future zoo. These guidelines, requirements and opportunities have been tested in the application stage of the design. The design serves to test the proposed guidelines, which had been transformed into design principles, as well as show a spatial possibility of an future zoo. Now conclusion can be drawn by using the tool again to see if the designed zoo really is a future zoo in the urban environment or if this aim not has been reached or only partially.

The research done in to different themes of the future zoo gave both expected results as surprising ones. Expected result where of course the great concern for animal welfare the future zoo will have to oblige too to be ethically feasible. Surprising insides were found in the relation between zoo and city and especially the spatial relation within the urban fabric. Before the research and analysis, it had not occurred to me that the spatial relation between the zoo and city was so weak and often completely blocked off, forming gated communities within the urban environment. Although are often not perceived as such. This inside gave opportunities to establish guidelines for improvement in the future zoo. By working with first strong emphases on research I had found out that there has been quit an amount of literature and research done into the zoos history, conservation and animal welfare. But the research concerning the zoo and the urban environment is very limited. At this point more research could have been given towards the park surrounding the zoo and urban metabolism of the zoo would have been an interesting opportunity which has not been explored. The network in which the zoo operates hasn't been research into depth at the moment but offers great opportunities, especially conserving food, waste, heat and local biodiversity. Guidelines for the future zoo have been formulated, but more is always possible. Especially in the chose making for certain aspects and components of the tool could be better established by the use of scientific sources. Further the research into the future zoo has been primarily into the zoo itself and its inner working and less in its relation to the large recreation and education network it is part of in the city and region. Although in the case study design demands and wishes form the local municoplality have been taken into consideration. In general the tool and guidelines have allowed for stronger urban connection suggestion, but not at how these would influence the cultural and recreational infrastructure of the city.

My research has mainly been conducted by literary studies, data analysis, comparisons, mapping of elements, fieldtrips, visits zoos digitally by website and video as well as watching future zoo conferences online. The

literary study has been mainly focused on history, ethics of captivity, animal welfare and conservation, zoo architecture and exhibit design. This has given me insight on how the zoo has developed and what the ethical debate, future challenges and opportunities are for the future zoo. At this moment the design has not been visualised in the report good enough, but this will be done during the presentation. The mapping, data analysis, comparisons, digital visits and fieldtrips has to help me better with the design and the guidelines and also have expanded my frame of reference for when I started designing.

My primarily design by research relationship within my project has given me the ground rules for my design. Although this research hasn't always produced useful results, sometimes much time spend on not that significant elements for the design of the future zoo. Further the design has been constantly changing in the last month as did the structure of the report which over the last few month as changed a couple of times.

What would you do different the next time

First of all, I have greatly underestimated my ability to put my ideas and finding onto paper. Currently I can tell you everything about the future zoo but I can't write it down (fast enough). I have never liked writing, I find that with my dyslexia I'm very bad at is, especially in making good sentences. When writing I often think faster than I can type making putting this proper down om paper quiet a hassle. Since I do not like to write and would much reader research or design I have postpone putting stuff in to writing because I would rather do the things I like about the graduation project. But currently I find myself and a wall or cliff. I feel I will never succeed in writing down what I know to my own fulfilment or yours as tutors.

Further looking back an adjustment would be to set clearer goals where I want to go in my research and design working more structured. I currently strongly have the feeling that my research and design are going more and more all over the place. I have very much been struggling with how to ordered the analysis, literature and report and then combining them back together in to a spatial design. Therefore, I'm losing direction within my research and design. Which is consuming a lot of unnecessary time and work. Likewise, when designing I work a little in this space and in that space. Not following any clear design structure or approach. With the guidelines, always present in the back of my mind but not as a rule book next to me, giving me some structure.

Also, I really would have wanted to do some interviews. Input with expert interviews would have made it possible to discuss the tool, guidelines and design for the future zoo with experts in practices. There advise or ideas would have developed the project a lot further especially with more practical information of the running of zoos, one not easily encounters doing research by my methods.

In making a planning for my thesis a still need to plan more carefully, as I'm still too optimistic about what can be done in 24 hours. Often this is worsened by that i sometimes put a lot of effort in non-significant thinks will not thinking of the larger picture.

Acknowledgement

It feels like yesterday, but 1,5 year ago I started my adventure into the future zoo. Luckily, I didn't have to travel alone on this sometimes bumpy right. I have a lot of people to thank for their support in one form or another for producing this thesis. Although I would like to thank a couple of friends especially.

Firstly, I would like to thank my mentors Gerdy Verschuure-Stuip and Ulf Hackauf you have guided me in this whole quest into the future zoo. You helped and advised me through ups and downs with feedback and new approaches to tackle this problem. I know I can be difficult for tutors since I have a mind of my own that goes in all directions, but you always steered me back on course, to really finding a new method of exhibiting wildlife in the urban environment and not only a modern version of an exhibition element. Gerdy I will miss you're your positive attitude always cheering me up during or session, giving me new energy to carry on even though I the situation were sometimes quiet dark. Ulf, I thank for helping back on the ground when I was going into a rabbit hole, and helping me to stay critical on my work. So that there is no cable car ride through Rotterdam suddenly popping up with little function, but still helping me to think big when searching a solution.

Further I want to thank my father Han de Haas, for helping me with all the writing within this thesis. Checking the structure and spelling of all my texts, helped made this work. Although also your fellow enthusiasm into the future zoo made for great brainstorms on the topic.

Next to my father I would also want to thank the rest of my family putting up with me through all the thesis stress. As well as having to listen me talk about the future zoo at almost every moment. And going with me on field trips to different zoos in the past year.

Next to my family I also what to thank my friends, first the ones here on the faculty. Marieke, Koen, Lex and others without are little relate coffee brainstorms or complains sessies I wound not have made it.

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appendix

animal welfare & conservation

3.0 introduction

The human relationship with other animals symbolises many aspects of the links between humans and nature (Reiser, 2017) .In recent decades, the relationship society has towards nature, biodiversity and animals has been shifting. Though to increase in knowledge and understanding of nature and global processes such as globalisation, mass consumptions effects on the food industry, climate change, land use and land cover change, deforestation and desertification have a disputative impact on plant and animal's life(Keulartz, 2015).The awareness of these trends with the public have brought the way humans think about treating other animals more and more in to question in our western society. This includes the caging of animals in zoos for variety of reasons such as conservation, education, research and entertainment.

3.1 actors in animal welfare debate

In the animal welfare debate different views can be identified. Best organised and mostly vocally active are the groups that view animal captivity as ethically wrong such as PETA and the Born Free movement. First, these groups have the opinion that keeping animals in captivity is wrong. In addition, these groups have the opinion find that zoos do little to nothing beneficiary for conservation, education and research on animals (Foundation, 2017; PETA, 2017). They debate on a foremost individual animal welfare level rather than an overall species approach. In the 'Partij voor de Dieren' or Party for Animals, currently holding 5 seats in the Dutch parliament (150 seats), called in their last election program for the ban of all zoos in the Netherlands since animas should not be used for entertainment (PvdD, 2016).

Next to these animal's right view is the animal welfare view which is not as strong mobilised as the previous view. This view states that holding animal's captive can be ethical if it is done for the right reasons (conservation, education and research) and that the animals being held captive get the optimum opportunities to live a life as if it was in the wild. Especially on conservation they find it ethical to hold some animals in captivity of it can safeguard the species as a hole, even though it may lead to lower welfare of those individual animals. This view is most clearly advocated by the different larger high standard zoos associates (EAZA, 2017a, 2017b; NVD, 2017) and by famous and largely respected wildlife conservationists and researches such as Frans de Waal and Jane Goodall .

3.2 self-awereness

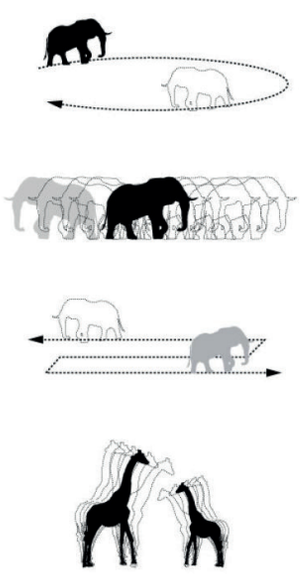
The primary ethical problem that animal right groups have with captivity must do with self-awareness or to a certain extend animals have. In recent years more and more studies have showed the incredible intellect and personality animals can have (De Waal & Waal, 2007). Animals are not just robots who just act on their instincts, but animals have characters, make choices and actively realise and interpret their surrounding world. Some animals such as elephants, dolphins and great apes have self-awareness. These animals show recognition of themselves when looking in a mirror (Reiss & Marino, 2001). Because of this self-awareness these animals are very likely actively aware of their captive situation, they know they are in a prison. But most animals don't pass the mirror test. Although a lot of animals have not a high self-awareness level, it is for the Future Zoo important that the way of holding these animal's captivity enables animals to express the important aspects of their wild behaviour.

3.3 zoochosis

Inability of zoos to for fill the needs of their animals to express the important aspects of their behaviour, lacking sufficient space or social structure may lead to ‘zoochosis’. The symptoms of ‘zoochosis’ arise by zoo animals under conditions of stress, depression, frustration and boredom. Signs of ‘zoochosis’ by animals indicate that a zoo is neglecting or have been unable in their attempts to enhance the animals physiological and psychosocial welfare (Chutchawanjumrut, 2015).

Originally wild animals face many challenges in captivity. The artificial environment of the zoo can sometimes not offer the choice and varieties of behaviour to them. Leading to an animal feeling bored, frustrated and stressed. As a result of this animals may develop stereotypic behaviour that is both compulsive and unnatural (Chutchawanjumrut, 2015). Zoochosis is in believed to be a brain dysfunction that is the result of stress. Although the correlation between stress and the time when stereotypic behaviour is expressed and when it becomes part of regular behaviour of the animal is inconsequential. Although stress might be the cause of the behaviour developments towards zoochosis, it isn’t making it stick. Further stress is an ordinary part of life. Therefore, there is a difference between being stressed and having a poor quality of life or welfare.

Besides stress there are several other factors that can bring about stereotypical behaviour of zoochosis. Most importantly, the few stimulations, enrichment or opportunities to hide form the view public in their artificial environments. Most often the exhibits don’t facilitate in their species-specific behaviour needs. Also, the generalization of animal’s behaviour of a species don’t that the individuality and personal needs of the animal in to account. All animals are different, with different, backgrounds, temperaments and personalities. Sometimes a zoo might for full the species-specific needs but not the individual animal ones, which greats a lack in the welfare of the individual animal. To what extend this is ethical is as earlier mentioned a topic of ethical discussion and view. Animal welfare concerns and possible causes for the development of zoochosis can be the relocation of animals to other zoos, disrupting families or pack units for purpose of breeding. The training of animals by using negative reinforcement techniques or being trained to preform unnatural behaviour. And last, drugs and medical fertility control may harm the animal’s welfare. The future zoo needs to tackle the causes and outcomes of zoochosis. To make the captivity of animals ethically viable.




Neck-twisting
Pacing
Swaying
Self-mutilation
Coprophilia

3.4 tackeling zoochosis

3.4.1 existing strategies (that fell short)

Current strategies to better the animal welfare fall short or have limited effects. Naturalistic decorating of an exhibit is predominantly done (Chutchawanjumrut, 2015). The animals exhibit is than using foliage, trees, rocks and boulders made in to an exhibit expressing their natural environment in an ideal humanized version. Which often works well from the visitor perspective but for animals this is mixed. Natural element does help to great better animal environment and provide places to hide. But often these elements are still artificial with floors and walls made from concrete. In such cases it helps little in addressing the symptoms of zoochosis. Another often tried technique to enhance animal welfare is the enlargement of the exhibit. Creating more spacious enclosures also can help to counter zoochosis symptoms. But space itself is not enough, there should also be something to do for the animal (SOURCE).

3.4.2 enrichment

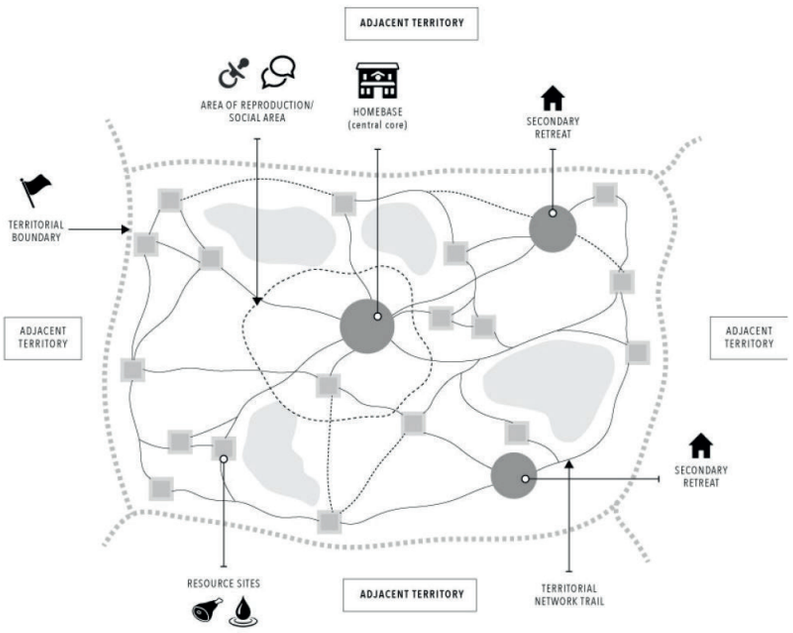
To tackle zoochosis and held animal in captivity in an ethical manner they need to be free from frustration and boredom as much as practically possible is something all views can agree on. A prominent solution for this is creating great enrichment opportunities for the animals. Enrichment refers to the process of providing appropriate species-specific stimulation that encourage and allows the animals to exhibit their natural behaviours both physical as well as social. It provides choice, novelty and discovery for the animals.

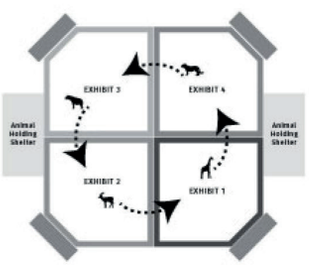
3.4.3 Novelty

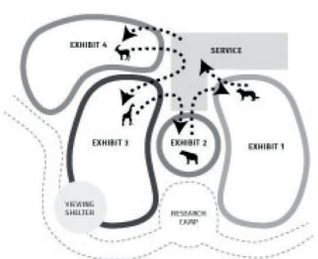
Novelty is one of the core concepts of enrichments (Chutchawanjumrut, 2015). Novelty follows the idea that animals should be allowed to experience newness, unpredictability, unfamiliarity, or even a slight difference in their enclosure. By adding a new object ‘toy’, bringing in new smells or sounds, other species to intact with, or even temporarily relocation an animal to a nearby exhibited will enhance the sense of discovery with the animal and allow for activities and natural behaviour to take place. Research so far indicates that almost all animals do not share our sense of time and primarily live in the ‘present’ moment (Chutchawanjumrut, 2015). Therefore, the reusing of the same object or ‘toy’ once a week or two still provides that same sense of novelty to them. Allowing animals to experience novelty can relief them form boredom, incurring them to be more proactive while still living in a captive environment.

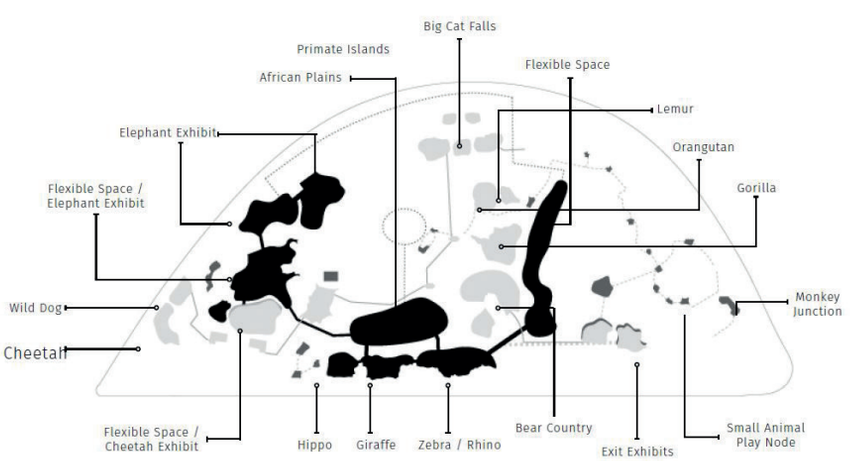
3.4.4 Choice

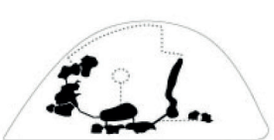
The second core concept of enrichment is choice (Chutchawanjumrut, 2015). Zoo exhibits are often static, unchangeable and simple. The enclosure contains the same faces of species, familiar characteristics of rocks, trees and water and everyday routine activities. Even though animals may not have a sense of future goal or the past, their wild natural habitat is filled with spontaneity and unpredictability in prey type, pred-



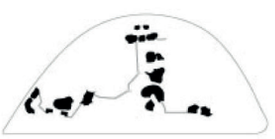








Potential Future
Large Animal Raceways



Medium & Large Animal Raceways
(great apes, big cats, bears)

Existing Primate Raceways

3.5 Animals as entertainment

Besides zoochosis cause by boredom and frustration animal rights activists find the captivity of wild animal also unethical since animal are only held as recreation attraction and entertainment for us humans. Viewing the conservation, education and research zoos do only as a 'curtain' for the big business they are. Even more so, zoos are showing clear tendencies toward Disneyfication (Beardsworth & Bryman, 2001). Currently paying visitors are the primary source of income for zoos, making it vital for them to be attractive entertainment attractions in a very competitive recreation industry. Zoos need their guests to be able to run their expensive operations and make their contributions towards conservation education and research, that is why zoos argue that entertainment and disneyfization isn't unethical if it doesn't affect the welfare of the animals. animal rights groups will find any monetary gain form animals wrong; therefore, the future zoo won't be able to come in to dialog with them. Nevertheless, the future zoo does needs to consider that entertainment and recreation never may come in conflict with the welfare of the animals. furthermore, the future zoo should seek other economic opportunities to enhance their financial situation since the closer a zoo comes towards the concept of a conservation centre, the costlier they become (Hediger, 1969).

3.6 human – animal relation paradox

The debate of animal welfare in zoos and the ethical role of recreation in zoos also brings forward a paradox human – animal relations. Humans – animal encounters can happen in different settings with different forms of engagement, where animals are in different conditions and where the interaction could be mediated or not (Cohen, 2009; Reiser, 2017). In everyday life, there are two main human - animal encounters, pets as subjects for human affection and love and livestock as objects for human use, zoo animals fall somewhere in between(Reiser, 2017). This is where the paradox comes in to play while animal welfare concern with the public for livestock is limited or disregarded for economic value and profit maximalization. Pets are treated as family members and put create care in their welfare (Reiser, 2017). Take for instance our treatment of chickens. Some people have a couple of them at their home for a daily supply of fresh eggs. Those people often care intensively for their animals. While at the same time thousands of chickens with hardly any space are also laying eggs under often limited welfare condition. The public in general isn't really concerned about these industrial practises since those eggs are cheap. Paradox ally enough such a person would be very concerned about animal welfare if they saw an exotic bird in a smaller cage at the zoo. meanwhile the condition of this animal welfare is much better than that of the chicken on the farm. Zoos as an important and popular tourist attraction stand in the middle between livestock and pets. They are part of the recreation industry and in this setting people show irrational and ambivalent behaviour towards how and what they perceive as welfare for these animals(Reiser, 2017).

3.7 climate

The welfare of animal exhibits is not only determent by creating sufficient opportunities for natural behaviour and keeping the animal's active. Outside influence also can greatly influence the welfare of animal, namely the local climate the zoo is situated in. animal rights groups but also some zoo directors have been increasingly vocal about this issue. Zoos generally have species form all different sorts of climates in their zoo. these animals are of course not build for these climates, to some extend animals just as humans can adjust if it is not to regular. A polar bear made for the cold polar climate will have it hot on the warm summer days however in autumn, winter and spring it has no to little discomforts. Nevertheless, when the climate and temperature contrast become more extreme discomforts for animals may become permanent and a welfare is at stake. For instance, one may question if it is wise to have polar bears 150 km form the equator in the tropical climate of Singapore besides the shade and cooled water provided. On the other hand, some zoo animals are located in climates that parts of the year too cold for them, forcing them to stay indoors. Regular meaning that these animals for a part of the year would be encloses without fresh air in often smaller exhibits. Ron Kagan director form the Detroit zoo has been very outspoken about this. In 2005, he decided to move the elephants to a sanctuary in California since the present exhibited wasn't sufficient anymore for the elephants, especially during the long and cold winter in Detroit when the animals had to stay inside. Updating the exhibit to good indoor and outdoor conditions would have been too difficult and expansive. Instead a large polar bear exhibit was realized upon the site of the old elephant exhibit. For being so vocal about that zoo should not have animals that have nothing to do with the climate they are in he received much criticism from parts of the zoo community, according to animal's rights activists because zoos don't want to bring up this topic. The future zoo should take in to account what its local climate conditions are and how this brings constrains to the holding of different species from other climate regions. Whenever contrast become to wide an animal would be forced to live a large part of the year indoor to keep warm or cold. These indoor facilities should deliver at least the same space, enrichments as possibilities for natural behaviour that outdoor exhibits would have had. The easiest way to overcome the climate issue for the future zoo would be to house predominantly animals from a similar climate region.

3.8 new technologies

In the wildlife captivity debate the argument that zoos have become or are increasingly becoming obsolete because of modern technologies. primarily animal right activist and innovative thinkers praise the advancements and possibilities if virtual reality can bring in the seeing of wildlife. Virtual reality will make it possible that by way of simple putting on glasses people can see nature anywhere in the world from their home just as if they were there. This could be done either by showing livestream from a national park, something which is by webcam already done, or by the means of making a simulation of the wild. Animals rights activist find that virtual reality, documentaries, Opponents to this view state that virtual reality, documentaries and internet could indeed be very beneficial for education people and possibly better integrated within the zoo. However, they also argue that virtual reality, documentaries or internet cannot replace the real thing. Arguing that how good simulating an animal may become you

cannot sense it as it would be as if it were standing right in front of you. Seeing an animal in person is much more personal and more memorable experience than seeing that animal on a screen, without the full sensory experience.

3.9 Why we need zoos

3.9.1 loss of the wild and its biodiversity

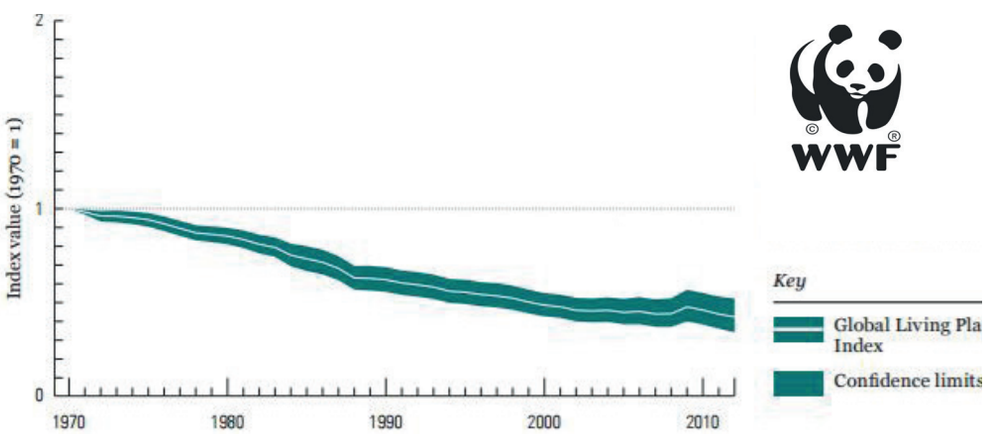
By zoo advocates one of the main arguments being made for keeping wildlife in captivity is their role they can, could and should play in species conservation. 'captivity for conservation' could be an ethically acceptable goal for the modern zoo is being argued (Keulartz, 2015). The magnitude of our human influence on the natural environment of wild animal form bio invasion, habitat fragmentation, biodiversity loss and climate change is enormous. Therefore, a more proactive and interventionist strategy is needed (Keulartz, 2015). This becomes evident in publications form the Living Planet Report published by the World Wildlife Fund in 2016. It reported that since 1970 our planet has lost 58 percent of its total vertebrate animals. In this period there has been an average decline of 2 per cent and there is no sign yet of that this rate will decrease. The strongest decline has been observed with the freshwater species, since their habitats have been strongly influenced by our human presents(WWF, 2016).

3.9.2 Unexpected disagreement

With these alarming trends of wildlife rapidly declining one would aspect that both wildlife conservationist as animal rights groups would find agreement in the ethicality of captivity for conservation, nevertheless there are conflicts on this issue (Minteer & Collins, 2013). This is primarily due to their as previously shortly mentioned view of an animal and a species and how that relate to one another and to animal welfare. Due to their individualist view of an animal and its welfare animal ethicists have generally adopted a conventionalist species concept. That see the specie merely as a category or label belonging to an animal convenient for mapping. While environmental ethicists hold a generally realistic species concept view, arguing that a species is a real historical entity (Keulartz, 2015). Therefore, they view the welfare if the species can stand above the welfare of the individual, something the individualistic animals-centred animals rights groups do not argue on (Keulartz, 2015). This gap is currently too wide to bridge, even in cases where advocates of both sides have a common cause (Minteer & Collins, 2013).

3.9.3 conservation as scheme?

Besides the individual welfare concerns of animal rights groups, they also argue that the conservation that zoos proclaim to do in their zoos have largely failed. They believe the breeding of animals is performantly done to attract new visitors to the zoo and that 'surplus' animals are consequently killed, primarily to prevent inbreeding. Further they find that the Noah's Ark principle of zoos is a same. Because the space for all the zoo animals in the world could easily fit within new York 212.7 km2 borough of Brooklyn (Conway, 2011). As exhibits will increase in size to meet animal welfare, the number of space available and number of



FROM 1970 TO 2012 THE GLOBAL LPI SHOWS A 58 PER CENT OVERALL DECLINE IN VERTEBRATE POPULATION ABUNDANCE

THE TERRESTRIAL LPI SHOWS THAT POPULATIONS HAVE DECLINED BY 38 PER CENT OVERALL BETWEEN 1970 AND 2012

THE FRESHWATER LPI SHOWS THAT ON AVERAGE THE ABUNDANCE OF POPULATIONS MONITORED IN THE FRESHWATER SYSTEM HAS DECLINED BY 81 PER CENT BETWEEN 1970 AND 2012

THE MARINE LPI SHOWS A 36 PER CENT OVERALL DECLINE BETWEEN 1970 AND 2012

endangered species a zoo can care for will decrease. Especially since zoos find it hard to give up popular animals that are not threatened with extinction. Due to this looming lack of space it is estimated that zoos at current stance will be unable to accommodate more than 800 of the around 7500 vertebrate species threatened with extinction listed on the IUCN Red list. this is leading to some chosen few is being argued. Where survival of the fittest is being changed in survival of the cutest. Or as Leslie Kaufman put it 'feels less like Noah building an ark and more like Schindler making a list' (Kaufman, 2012). Currently zoos hold in captivity about one in seven (15%) of the threatened vertebrate species, as a resource for ex situ conservation efforts (Conde, Flesness, Colchero, Jones, & Scheuerlein, 2011). Animal right groups argue that zoos struggle breeding these animals and especially the reintroduction results can only have indicated that conservation in zoos is failing. For instance, the giant panda breeding program, millions have been spent and 400 giant pandas have been born and raised in zoos. Only five of them have been reintroduced into the wild, of which three survived. It is estimated that only 16 out of 145 reintroduction projects using captive-born animals have been successful. Furthermore most of the animals in these programs were raised in specialized facilities (Keulartz, 2015). (BBC Horizon) Bexell is also afraid that conservation in zoos is sending the wrong message to the public. She is afraid that zoos are sending the message they will save species and the biodiversity while people can just consume the earth as without consequences. To really have biodiversity human behaviour needs to change, that zoo as Ark won't make a difference in the end. So, although a lot have been learned with the current conservation and reintroduction programs she wouldn't say it was worth it. Since it is giving humanity false hope. On the contrary stand S. Redrobe (BBC Horizon) how states that if we weren't breeding animals in zoos, they would even go extended more rapidly. And we wouldn't have any repository populations left. This repository function for animals how are threatened by rapid habitat loss or pandemic diseases in the wild for zoos becomes evident in the case of Save the Tasmanian Devil project. Because of a highly transmittable cancer disease outbreak, the population of Tasmanian devils has been reduced by 70% since 1996 in Tasmania and are likely to become completely extinct within a decade. Zoos in Australia and New Zealand have captured a number of healthy individuals and are breeding than apart form the wild population as a safety measure to ensure the species will not go extinct while research is tone on curing the disease in the wild population.

3.9.4 Conservation is more than breeding

Conservation in zoos is more than only the breeding of animals. the role of zoos as conservationists is much broader including, research, training, education, awareness campaigns and direct support for in situ projects (Keulartz, 2015). For breeding and reintroduction projects also a wider view is necessary. With more cooperation between zoos and between zoos and the 'wild'. This should primarily be done by the future zoo in the sense of sharing its expertise it has on animal and species. Because of habitat loss and habitat fragmentation animal populations are being split up in smaller fragments, creating metapopulations, collections of subpopulations. These metapopulation ask for a management since they are more vulnerable for local extinction and inbreeding deficits because of the smaller genetic pulls. With metapopulation management

the distinction between classic in situ and ex situ conservation is gradually braking up (Keulartz, 2015). By animal's conservationist is even stated that the future zoo will need to step in here to with its knowledge but also by breeding and exchange programs of animals, integrated species conservation planning. It calls for the exchange between in situ and ex situ populations. On the one hand, captive populations can be used to restocking of wildlife populations where they are declining or reintroduction where they have vanished and on the other hand by exchanging the populations the genetic diversity can be boosted. (Keulartz, 2015; Minteer & Collins, 2013). The future should also make this visible within de education given within their facilities where different exhibits or zones can be directly linked to specific in situ projects and national parks. By linking more directly with local project zoos can make a more compelling and convincing case for conservation of areas as well as have a clearer objective for raising funds for different projects. It has been suggested to set aside a percentage of the admission fee for in situ conservation projects which people can choose to donate to when visiting a zoo. thereby making a more compelling case as conservation centres and raising more money than they currently do, which is often a criticism from animal rights groups. The WNF in the Netherlands annually reserves around 25 million euro in direct contributions. Imagine if the 10 million zoo visitors would also contribute 2 or 3 euros, the funds raised for natural wildlife could greatly increase.

Further the ever-present collections if charismatic mega fauna lions, tiger's giraffes elephants bears, etc. are only a small part of the many species there are. An effective strategy to increase the number conservation efforts of a zoo with its limited space available as well as offering better welfare would be to focus more on smaller species within the future zoo. (Keulartz, 2015) especially amphibia, invertebrates and some species of fish would be a point of focus that now often is missed. These species occupy less space, are relatively inexpensive to keep an, have a high birth rate and are easy to reintroduce (Keulartz, 2015). In the future zoo, as ethical conservation centre more attention should be on those species. There is a lot of discussion if a can attract enough visitors without big charismatic animals. the micro-organism museum Microtropia in Amsterdam next to the zoo is doing quite well. Currently it is argued that the captivity of these more difficult to hold animals is ethically viable because they are ambassadors for their wild ecosystems and raise public awareness and support van in situ conservation. In the future zoo, this role for the animals is likely to continue of kept under sufficient circumstances.

3.9.5 Conservation is ethical motivation for captivity

As the risks of species becoming extinct becomes even more pervasive reductions in animal welfare due to capture, research, captive breeding and reintroduction well increasingly become more ethically justified. Animal rights groups will continue to criticise the conservation efforts of the zoos, and not without a reason. The future zoo will need to adapt and transform to become a high quality conservation centre if not it will transform more in place for entertainment that will provoke increasing criticism, not only form animal rights groups but also from wildlife conservationists (Keulartz, 2015).

BEHAVIORAL
(active) ENRICHMENT

Methods of engineering the environment for behavioral opportunities at Washington Park Zoo (Oregon), developed by Hal Markowitz

ENVIRONMENTAL
(passive) ENRICHMENT

Environmental enrichment devices (EEDs) Habitat Enrichment Sensory Enrichment Food Enrichment

ator type, scent, sound, hiding places, varied land and water features etc. All offering choices of an animal to make on what to do when what where. Providing a sense of having choice is essential for the future zoo animal exhibits. Starting point should be to mimic the paths an animal would take on his daily life in a natural world. Zoo might not be able fully provide de space equivalent of their natural habitats, but the illusion of choices for an animal to spend his day can be a pathway.

3.4.5 rotation exhibition

In this manner, the swiss biologist and zoo theorist Heini Hediger has develop the concept of zoo rotation on the basis of home range or territory of an animal. Hediger states that an animal's territory is not simply a homogeneous area, but rather consist of one home base and a few secondary areas. But the majority of the territory an animal would use is the trail to get from one spot to another creating an network of resource spaces to satisfy its needs for hunger, thirst, shelter, social, mating etc, the trail between these places is what an animal would use most frequently. The area of the territory varies very much depending on the distance between these resource spaces. Implication that the range of an animal is more defined by the distance an animal has to walk rather then it would want to.

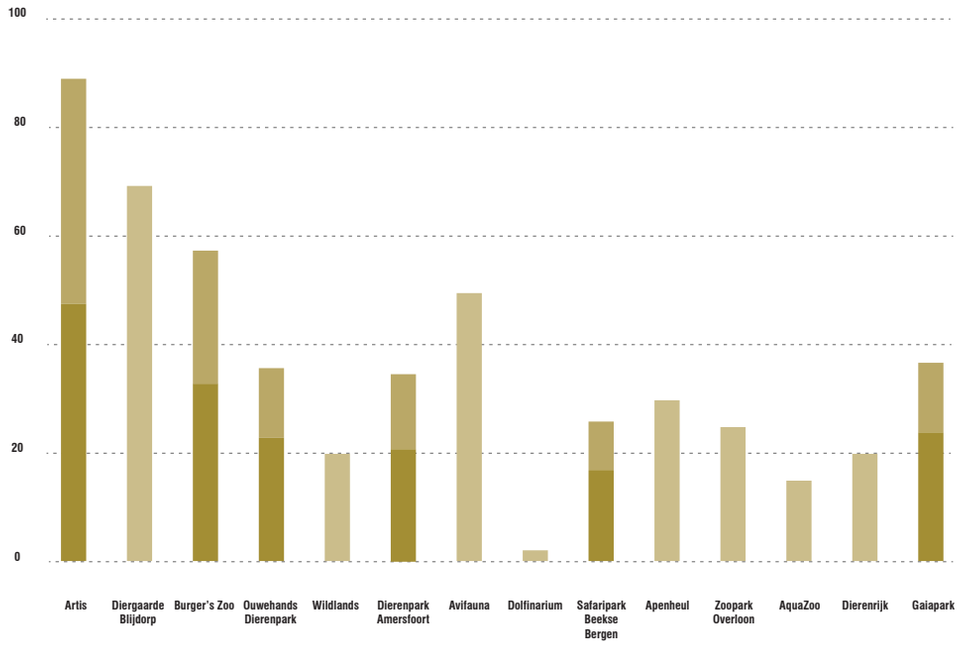
The concept of allowing animal to visit different territories within the zoo context has been further developed by landscape architect and zoo designer Jon Coe. In his work, he has promoted enclosure designs built for the specific animal behaviour. Coe finds that most zoos often fall short in this therefore offering not the sufficient animal welfare to make the zoo ethically viable but as actively worked to change this. In his work towards immersion exhibition and rotation exhibition. Currently animal rotation has only a few cases been implemented. the largest and most fully implementation of animal rotation has been in the Philadelphia zoo, since this urban zoo couldn't expand it 'turned inside out' by interconnecting all the animal areas with an interconnecting trail network. Which provides the animals with unprecedented opportunities for discovery, enrichment, and exercise.

6.13 EEP

In the contemporary and future zoo, one of the main objectives is the conservation of endangered wildlife. All around the world ecosystems and the thereby related biodiversity is degradation, primarily due to human interventions. Zoo is and should be arcs for this wildlife. They form an essential piece in safeguarding this wildlife for future generation together with natural reserves. Therefore, zoo has started different international breeding programs to coordinate and share knowledge and information about wildlife and to enlarge their numbers in captivity. With as a goal reintroducing these animals back into the wild in (restored) habitats. Although this reintroduction of different species of wildlife has proven to be difficult, conservation efforts need to continue. Another breeding objectives for zoos are to sustain wildlife populations in captivity so they can be visited by the public and do not go extinct within captivity. Further the fact that young animals usually attract an increase in a number of visitors, especially the more popular species, make breeding animals and important goals for the zoo. Likewise breeding success with animals is seen as one of the indications that the welfare of the animals is an adequate condition.

In the Netherlands to main breeding programs are in place the European Endangered Species Programme (EEP) and the European Studbook (ESB) these programs aim at conserving healthy populations of an animal in captivity while safeguarding the genetic health of te animals under their care. The EEP is the most intensive type of population management for species kept in EAZA zoos. With active demographic and genetic analyses so each year recommendations can be made on which animals should breed or not breed, which individual animals should go from one zoo to another, and so on to get the highest possible breeding success. Animals that participated in these programs are (critically) endangered. The ESB is less intensive than the EEP programme. All data on births, deaths, transfers etc is collected. Thereby the populations are monitored and if necessary recommendations on breeding or transfers of animals can be made. The number of programs in which a zoo participate is a good indicator for how well a zoo does in their conservation and research efforts as well as the practice of the collection of animals they hold. A high participation grade can relate to a high quality of zoo. In the Netherlands, no all zoos made specified with what number of species were in an EEP or ESB program but only the number of programs they held. In the diagram is shown that Artis by a margin is holding the most breeding programs followed by Diergaarde Blijdorp, Burgers's Zoo and Avifauna all older or specialised zoos with (historically) extensive wildlife collection. Although they ratio species to breeding program higher seems to be with the younger zoos such as at GaiaZoo is the case. The diagram also shows that there is no real relation between conservation efforts of zoos and visitor attendance.

EEP and ESB programs in zoo



4.7 Disneyfication in zoos

4.7.1 Disney's theme parks

In 1955, Walt Disney opened his first Disney theme park, Disneyland, in Anaheim California. Nowadays there are six Disney theme parks all over the world, receiving millions of visitors annually. Besides the locale urban changes in environment the building of these parks caused, Disney's theme parks have influenced the urban environment and its institutions. Large – scale changes are detectable in economy and culture, symbolized by the Disney parks (Bryman, 1999). Disneyfication or the broader Disneyization refers to the popularizing or commercialising of the urban environment and its institutions (Bryman, 1999; Erikson, 1999). Yet these changes in our urban environment and our institutions is not without controversies or criticism (Baudrillard & Lotringer, 2005; Erikson, 1999; Terrell, 1991; Wallace, 1985).

One of those concerns is authenticity. "In an efforts to attract massive numbers of travellers, many sites have homogenised their wares to the lowest common denominator, offering up a standardised tourist experience that frequently supplants idiosyncratic cultural identities" (Cohen Hattab & Kerber, 2004). Authenticity itself has become an increasingly slippery concept. What is authentic or inauthentic is often disregarded by the visitors for the ability of a place or institutions to condense the complexities into a cohesive, captivating narrative with lots of fun (Schoenberg, 2004) (Cohen Hattab & Kerber, 2004).

'The labelling of diverse urban phenomena in terms developed and theorized with reference to western cities, Disneyification, increasingly confuses our understanding of urban transformations, thus hinder our ability to understand change and its causes, and to derive implications for planning and policy' (Shatkin, 2008).

4.7.2 The disneyization of society

Disneyland's ideological function as to popularizing or commercialising of the urban environment and its institutions (Erikson, 1999) is portraying "the capitalist American ideology of consumption, technological progress, morality, etc. in a non-conflictual way"(English, 2007). A variety of contemporary spaces have achieved a relative level of 'Disneyfication', "many other cultural institutions, museums and heritage centres, arenas for spectacle, exhibitions and festivals, seem to have as their aim the cultivation of nostalgia, the nurturing of uncritical aesthetic sensibilities, and the absorption of future possibilities into a non-conflictual arena that is eternally present." (Harvey, 2000). Or as (Bryman, 1999) state " Disneyization is depicted as a process by which the principles of the Disney theme parks dominate more and more sectors of society". Here two terms very similar terms are used Disneyization and Disneyfication. Both terms have almost the same meaning.

4.7.3 Disneyfication

Disneyfication referred to the often-criticized way in which Walt Disney use an original (folk)tale through a Disney mincer to engineer with a

distorted version of its which is instantly recognizable as a Disney product. With the urbanism vocabulary Disneyfication is to mention three different phenomenon although the term is not explicitly defined (Bryman, 1999; Warren, 1994). Firstly, it is as social order which is controlled by an all-powerful organization. Secondly, a breach between production and consumption which is achieved 'though the visual removal of all hint of production and the blanketing of consumption with layers of fantasy so that residents are blinkered from seeing the actual labour process that condition and define lives'(Warren, 1994) p92). Thirdly. It is only residents' capacity to consume that is viewed as in any sense significant nor important. But Disnification has limited domains of application and uses. The term Disneyization which will be used within this article is meant to have a fuller scope of the trends being discussed.

4.7.4 Disneyization

Disneyization is depicted as a process by which the principles of the Disney theme parks dominate more and more sectors of society (Bryman, 1999). The universe create by Disney comprises: escape and fantasy, innocence, romance and happiness, sexual stereotypes, individualism, and the reinvention of folk tales (Rojek, 1993) for the people how see or visit it. Disneyization emphasizes on the principles associated with the Disney parks which have spread increasingly beyond their gates. Four dimensions can be primarily outlined: theming, dedifferentiation of consumption, merchandising and emotional labour.

4.7.5 Theming

Theming is the most recognizable dimension of Disneyization. The last decades more and more areas of economic, social and cultural life are becoming themed. For example, in the restaurant industry. Diners are surrounded by sounds and sights that are constitutive of the themed environment, which is the primary reason for a visit to such a restaurant (Bryman, 1999). In similar types the same trend and uses of theming can be observed like, hotels, cruise ships, shopping malls, amusement parks and to some extent even parts of airports. One of most spatial representation of these events is the Strip in Las Vegas (Gottdiener, 1997; Ritzer & Liska, 1997).

Theming was a mechanism for Walt Disney to achieve the goal of being appealing to adults as much as children, which he found a major problem at existing amusement parks, thereby distinguishing Disneyland from amusement parks. The process of theming was central to this product differentiation strategy, since most amusement parks were loose assemblages of rides of various degrees of thrills(Bryman, 1999).
According to Bryman (Bryman, 1999) theming in the Disney park accomplished at least two things. Firstly, it established coherence to the various rides and attractions in Disneyland and the environment in which they were located. Secondly, in the design of rides and attractions, the accent was placed on their theme rather than on the thrill factor, which was the emphasis in the traditional amusement parks.

4.7.6 Dedifferentiation of consumption

'Dedifferentiation of consumption' is the trend whereby the various forms of consumption associated with different institutional spheres become interlocked with each other and increasingly difficult to distinguish according to (Bryman, 1999). Therefore, blurring the boundary between shopping, eating, hotel accommodation and theme parks. Disney theme parks act as a context for shopping and consuming, they are in to a certain extend disguised supermarkets, vehicles for selling goods and food (Bryman, 1999). These different revenue and profit streams have become interwoven and depended upon its other and survival of the parks(Bryman, 1999).

Further examples of dedifferentiation of consumption is the wat many airport terminals are being turned into mini-malls (Hamilton & Harlow, 1995) or Las Vegas Disneyization in the form of dedifferentiation has broken down the conventional characteristics between casinos, hotels, restaurants, shopping and theme parks.

4.7.7 Merchandising

According to Bryman merchandising is "the promotion of goods in the form of or bearing copyright images and logos, including such products made under license" (Bryman, 1999)p12).

Within the Disneyization of the Disney theme parks there are two main points in regard to merchandising. Firstly, they provide place for selling of the merchandise, being of major importance for the economics of the parks which have been designed in a way to maximise the guest purchases of merchandise. Secondly, make their own specific merchandise adjusted to an attraction of other element (Bryman, 1999). Besides in theme parks this mechanisation can also be seen in themed restaurants, professional sporting clubs and universities for instance. Where one often can enter only the shop, with entering the place itself.

4.7.8 Emotional labour

Emotional labour can be described as the act of expressing socially desired emotions during service transaction (Bryman, 1999). Workers exhibit and feel cheerfulness and friendliness towards costumers as part of the service encounter. The friendliness and helpfulness of Disney theme parks employees is renowned and is one of the things that visitors appreciate (Sorkin, 1992). Employees look like they are having fun too and therefore not engaging in real work. This ever-smiling Disney theme park employee has become a stereotype of modern culture(Bryman, 1999).

4.7.9 Has Disneyization influenced zoos?

The elements of Disneyization can be observed within zoo with different levels of intensity. First theming of layout or exhibit(s) is very much present in the modern zoos. Zoos are organised or 'themed' in different manners: geographically, by climate or by the ecosystem. Either it is on the level of the total layout like Diergaarde Blijdorp in Rotterdam. Artis in Amsterdamis organised by smaller collections of exhibits, such as the Pampas area. In recent years theming of the zoo environment also has

increased in relation to the exhibition trends of cultural resonance and storytelling. This is in the Netherlands most clearly visible in Wildlands Zoo in Emmen. This zoo is opened in 2016. Visitor are being immersed in either an arctic, savanna, or jungle theme accompanied by vernacular architecture, dining, shops and rides. Also in exhibits, this theming can be indicated such as now under development being the Panda Pavilion in Ouwehand Zoo in Rhenen or the Mangrove in Burgers Zoo in Arnhem. But this theming in zoos is only partly a result Disneyization. Since theming in zoos plays an important part in ordering their wildlife collection and creating theirs by a stronger connection. Further, the in the nineteenth century already exhibits with a certain often place like look were built in a certain theme, such as the Egyptian temple and the Antwerp Zoo. Further, the Hagenbeck style already indicates characteristics of theming both predating Disney parks by many decades.

The dedifferentiation of consumption is to a lesser extent present in de modern zoo, primarily by food and drinks. In often larger developments the building of restaurants and sometimes shops is included, in the similar atmosphere as the wildlife exhibits. For instance, the restaurant in Burgers Bush and Burgers Desert as well as in Wildlands. Although since people visit zoos primarily to see animals the fusion with other consumption elements have been limited.

This is also one of the reasons merchandising isn't very present within the Dutch zoos. All zoos have one or multiple shops to generate extra revenue from stuffed animals, toys, books etc. But these shops are general, not full shopping experience themselves nor can they be reached without entering the park. Zoos also very sparsely sell products of themselves besides post-carts. Although there must be noted that in recent years mascots for the zoo have increased in popularity, with a special stuffed animal.

Emotional labour is also not present in the way Disneyization implies. Primary reason for this is that the zoo is not as much in contact with its guest as a theme park or restaurant may be. Animals shows, feeding or guided tours are often the predominant way of interaction with the visitors. In these few moments, a high level of emotional labour can be observed. But this emotional labour is of an authentic nature following form a great affection with the natural world and can thereby hardly be characterised as a Disneyization attitude.

Th trend of the immersion design exhibits, aimed the higher the connection between visitor and wildlife, has clear Disneyization characteristics. This immersion of zoo exhibits is very like the immersion Disney theme parks try to establish with their rides or the casinos from Las Vegas. The establishment of this new way of wildlife exhibition also parallels with the development of Disneyization in urban environment. Although the development of this way of exhibition is also influenced by zoos becoming conservation centres with great care for animal well-fare.

Has Disneyization affected the zoo? The role of the zoo as a place for recreation and entertainment predated Disney theme parks by almost a century, but in the way, this has manifested themselves in recent decades some Disneyization can be observed. Most notably in the increase use of theming in zoos and in wildlife exhibition trends, foremost the immersion

exhibit. Other elements of Disneyization are not as profoundly present as they have become in other urban elements. Dedifferentiation of consumption and merchandising have had only a modest effect on the zoo and emotional labour can be observed but is of a different kind than Disneyization implies.

Tables originating from Tribe (2004)

The motivations of zoo visitors

Country	Reason for visiting	%	Reference
USA	Education for Children	38	Kellen (1979)
	To do something with family/ friends	26	
	Personally fascinated by wild animals	25	
	Animals are pretty to look at	11	
USA	Education/ Relational	56	Andereck & Caldwell (1994)
	Education	21	
	Recreation/ Novelty	11	
	Photography	11	
UK	To have a day out	64	English Tourist Board (1983)
	To treat the children	53	
	To watch animals and birds	22	
	For entertainment	13	
	For a change	13	
	To learn about animals and birds	7	
UK	For fun/ Entertainment	39	Rajack & Warren (1996)
	Visit with friends	36	
	To see rare animals	5	
	Education	4	
Australia	Entertainment	63	Ford (1998)
	Education	37	
Australia	Spend time with friends	77	Tribe (2003)
	Be in pleasant outdoor space	54	
	Learn about animals	33	
	Escape pressures of daily life	31	
	Learn about wildlife conservation	25	

Visitor perceptions of roles of zoos

Country	Role	%	Reference
USA	Conservation	74	Rajack & Warren (1996)
	Research	49	
	Education	42	
	Entertainment	7	
Australia	Education	68	Ford (1998)
	Research	23	
	Entertainment	22	
	Display	21	
Australia	Education public	61	Australia
	Breed endangered species	52	
	Educate school children	43	
	Support wildlife conservation	41	
	Provide a pleasant day out	39	
	Research	17	
	Entertainment	8	

6.11 Specialised zoos

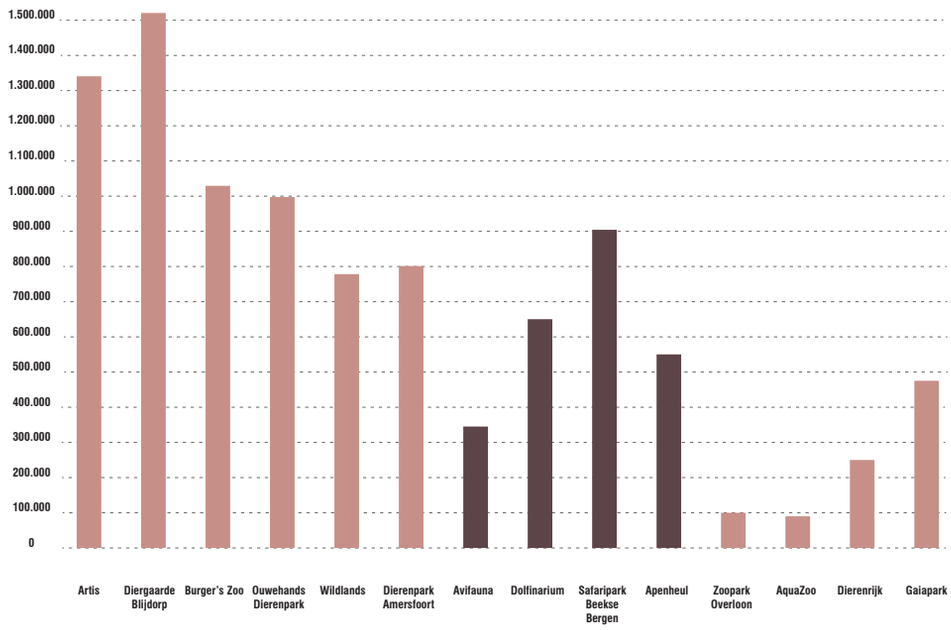
Well, most zoos hold a variety of mammals, birds, reptiles, fish and Amphibia so zoos specialise in one type of wildlife or a specific region within their animal collection. This may be done because the animals in question are held in a certain way of the exhibition that makes the zoo special to other zoos (at that time). Thereby attraction a specific group of visitor which to come (from a great distance) to a certain wildlife experience. Specialised zoos and with their (at that time) unique way of exhibiting animals were especially popular in the Netherlands in the late '60. At a time when the old zoo was getting more and more under pressure and new innovative wildlife, exhibition ideas were formed.

The oldest specialised zoo is Avifauna which holds a vast collection of birds. Originating from private bird collection that was made open to the public. The Dolfinarium specialised in marine animals (shows) and especially dolphins. Currently, they are the only part in the Netherlands that holds these animals, offering a unique experience for the visitor. Although historically the Netherlands had more places where dolphins were held. But most of the exhibits closed down in the in '80. In recent years' visitor numbers, have been declining mostly because of welfare concerns by the public about the captivity of dolphins and other whale species. Safaripark Beekse Bergen is the currently the only safari park I the Netherlands that allows visitors to drive through certain exhibits with primarily African animals. Apenheul is specialised in monkeys and apes and is unique in the way that it offers the visitors the experience of going into the some of the monkey enclosures thereby offering a special wildlife experience.

In most of this zoo, there is in recent years I diversification taking place adding other species of animals to the collection, often animals that life in the same ecosystems as the animals that are already held. In the general zoos, there has also been a tendency to implement on a smaller scale some of the special ways of exhibiting that was precisely seen only in these specialised zoos. Especially the ability to walk between certain animals has been implemented a couple of time.

The specialist zoos on average receive fewer annual visitors than the conventional zoos. Although Safaripark Beekse Bergen did make it into the top 5 in 2015. On average the specialist zoos had around 610.000 visitors well the conventional zoos welcomed around 740.000 people. The success of Safaripark Beekse Bergen a specialist zoo since its primary based around the idea of a safari might be that it has developed over time a wide variety of different wildlife. Contrary to other zoos how specific more on a certain kind of species.

visitor number specialized zoos



Influence of different species

Until the mid of the mid of the 20th century, the prestige of a zoo and its manager was for a large part determent by the number of different species the zoo held. Zoos were living museums and to exhibit the full range of the natural world as much wildlife as possible had to be represented. Especially in the 19th century, this led to a vast collection of animals with maybe only 1 or 2 individuals since that was enough to create this post-stamp collection. In the early 20th century this started to change under the influence of the new type of exhibition introduced by Hagenbeck in Hamburg, where larger herds in greater exhibits where held. This goal of creating post-stamp collection can still be seen in Dutch zoos today. In old (renovated) exhibits, name or in a the number of species zoos still holds. In the diagram Artis and Blijdrop top the list at holding the most different species both above 400. This is largely due to the fact that these zoos used to have post stamp collections of wildlife. In their history, Artis has held 1672 different species and Blijdorp 1525. Due to welfare concerns, new insight into types of exhibition and limited space, the number of different species has come down. Zoos established before the second world war also tend to have larger than average collection due to after effects of this post-stamp collection, the availability of getting lots of wildlife historically from the wild and having the advancement of older and have had the time to realise a larger collection. In the diagram, this is harder to unravel mostly since Wildlands is holding many fewer species than its peers have. This can be explained by the recent move of the zoo to a new location with new (larger) exhibits. Going back from over 300 different species of 90 different species. Seemingly a stranger in the midst of a number of species at the Dutch zoos is Avifauna holding around 300 species holding much more than its peers. The primary explanation for this that avifauna specialises in birds with are primarily smaller animals which make it less complicated to hold a great variety of on a relatively small surface. Further, it's beneficial that there is a many different bird species. If we compare the number of visitors to a zoo and the number of different species it also becomes clear that having more species in a zoo doesn't indicate that a zoo will receive more visitors, avifauna being a prime example for this. This may also have been one of the reasons Wildlands left over 200 different species behind when moving to the new site.

number of species in zoo