Palestine Polytechnic University

College of Engineering and Technology
Civil Engineering and Architecture Department

Graduation Project

Hebron Zoo

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Chapter 1

General Introduction to Zoos

1.1 Preface.

1.2 Introduction.

1.3 The importance of project selection.

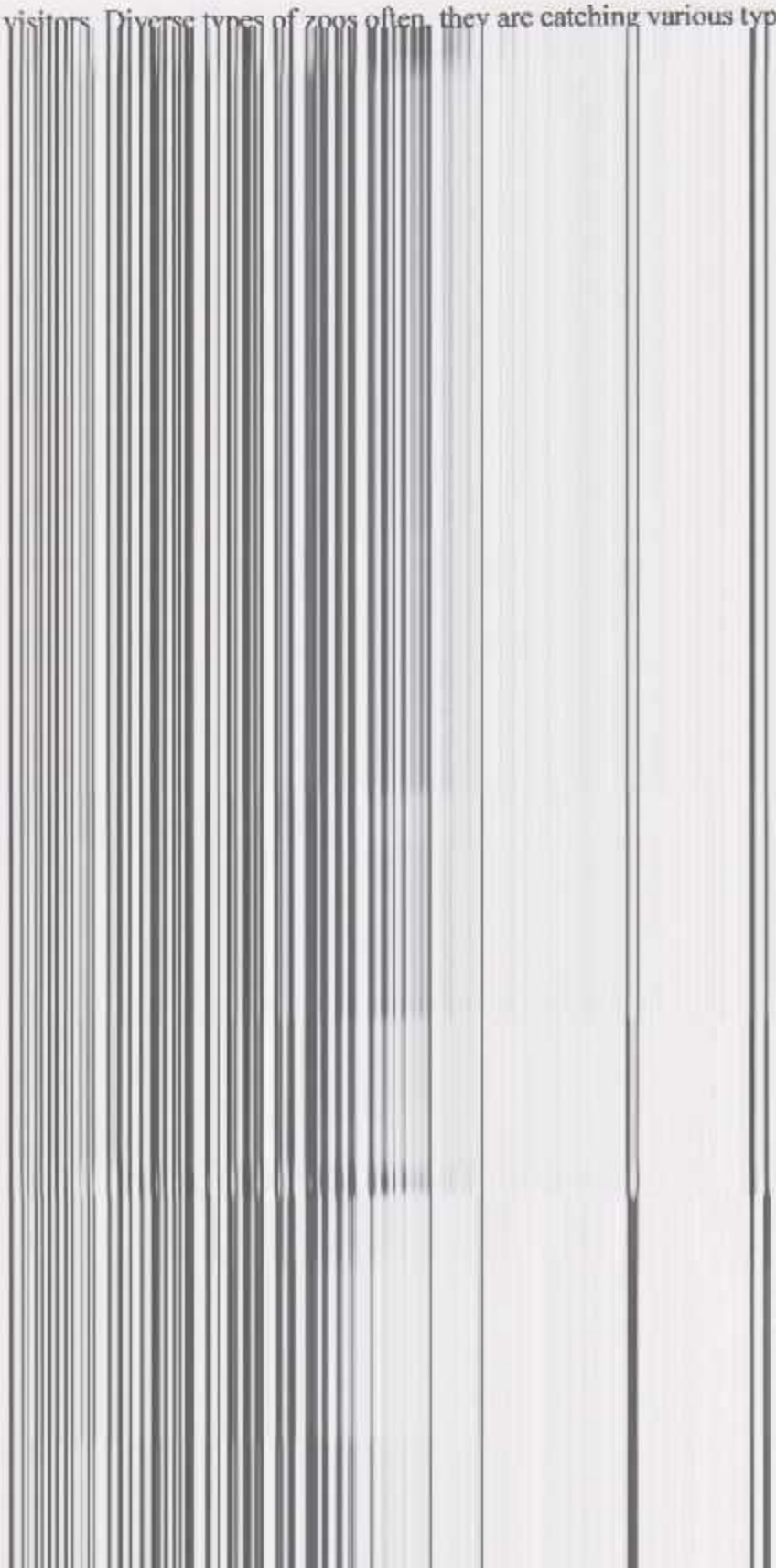
1.4 Goals.

1.5 Description of the project.

1.6 Research Methodologies.

1. 1 Preface:

Zoo Gardens are equipped with special equipment for raising and lodging pets and brutality for attracting people to see the various animals for a fee from visitors. Diverse types of zoos often, they are catching various types of animals from



1 - To achieve economic development in the region through the presence of parks and have a cafeteria, as well as the price of tickets for entry to the park.

2 - Tourism development in the region, particularly their lack of tourism long ago as the project prepares for visitors to the area they visit.

3 - Achieving cultural development of citizens in the education of pet animals and predator, and the presence of alien plants also cultural performances.

4 - Work to create an area of natural flora and fauna unique Palestinian society is eager to enjoy the view.

5 - Work to create recreational areas for the population, especially that after population like that.

1. 5 Research methodology:

We have taken in the project the following methods for the project by:

1 - collect the necessary information by:

- Books, magazines and cultural bulletins.
- Field visits to the site and some theme parks in the city of Qalqilia and the Jerusalem.
- Web sites.

So that the information includes:

a. Design of the foundations of public parks and zoos founded by multi-way.

b. Previous studies of zoos or any similar projects in Palestine or outside it.

c. Information that shows the design process for the park, which is based on the basis of specific and general information about plant and animal parks in the world.

d. Any other important information.

2 - Work on the study of a detailed study of the site, linking the land site in the city center is a milestone so clear to residents and visitors, and to study the topography and geography of the land and nature of the soil and climate, and everything related to the environment.

3 - What we study the information and discussion and application on the ground.

4 - Start the design process.

1. 6 Project description:

The draft proposed by the zoo in the governorate of Hebron on several events:

- Exhibition internal and external.
- Library science.
- Stuffed animal's museums and heritage.
- Specialist medical center for the treatment of animals.
- Agricultural center to take care of in the garden and plants in the park.
- Cages of animals and birds.
- Artificial lakes.
- Museum of aquaculture and fish.

- Homes for reptiles.
- Open space for animals, herbal.
- Hall to view the documentary films.
- Chapel.
- Offices for staff and administrators.
- Parks and green areas and parks.
- Public services and guard rooms, a cafeteria, toilets and stores.
- Parking.

Here we describe in brief chapter content, for achieving result of the study we taking the various chapters for research as following:

- In chapter one general introduction to zoo as goals of project.
- In chapter tow historical preface and appearance of zoo.
- In chapter three criteria of standers for design of zoo park.
- In chapter four talking about case study like premingham zoo.
- In chapter five include project program and design philosophy.
- In chapter six site analysis.
- Appendix.

Chapter Two

Historical

Chapter 2

Historical

2.1 What is a Zoo?

2.2 Historical Preface.

2.3 Why do we Need Zoos?

2.4 Appearance.

2.5 Zoos Classifications.

2.6 Supplementary Activities in Zoos.

2.1 What is a Zoo?

A zoo is a permanent establishment where living, wild animals are kept for exhibition to the public for seven or more days a year, with or without Charge for admission. [1] This will include:

- Aquaria.
- Sanctuaries.
- Bird gardens including birds of prey.
- Safari parks.
- Any collections of living species on display to the public.

2.2 Historical Preface

The collections of living animals have existed since ancient times as we can learn from the history of Chinese and Aztec rulers, and Egyptian pharaohs, such collections had been established and owned by a number of rulers' dynasties all over the world till the 18th century, the history of today's Zoos started in the second half of the 18th century when the first Zoos were established in Vienna 1752and Pans 1793, then came London1826, after these a great number of Zoos originated worldwide .

2.3 Why do we Need Zoos?

Conservation of nature requires multiple efforts, the most important of them being education .Another one is the breeding of endangered species; both tasks can be tackled by Zoos, provided that they are designed appropriately.

[1] – www.zoolex.org

Zoos are important particularly for the inhabitants of big cities that have very few contacts with real nature or who lost such contacts totally.

2.4 Appearance

Most modern zoos keep animals in enclosures that attempt to replicate their natural habitats; many zoos now have special buildings for nocturnal animals, with dim red lighting during the day, so the animals will be active when visitors are there, and bright lights at night to ensure that they sleep.[2]

LA Petting Zoo

A petting zoo also called children's farms or children's zoos, petting zoos are extremely popular with small children, in order to ensure the animals' health, the food is supplied by the zoo, either from vending machines nearby.

Picture 2-1
A picture showing Petting Zoo
The Source: www.buenapark.com

[2] www.zoo.com

2 .Wild Animal Parks

Wild animal parks are far more sizeable than the classical zoo .The first of this new kind of animal park was Whipsawed Wild Animal Park opened in 1931 in Bedfordshire, England .This park owned by the Zoological Society of London covers 600 acres ($2.4km^2$)and is still one of Europe's largest wildlife conservation parks where animals are kept within sizeable enclosures.

Picture 2-2
A picture showing Wild Animal Parks
The Source: www.planetware.com

3 .Public Aquaria

Picture 2-3
A picture showing Public Aquaria
The Source: www.hawaiifeeling.com

2.5 Zoos Classifications[4]

A zoo differs in sizes :**large, medium, small** and **mini** .The following table is designed to show 4ifferent types of zoos and to help the designer choose what size zoo he would like to create.

Category of the Zoo	Large	Medium	Small	Mini
Area of the zoo in acres	More than 185 acres	125-185 acres	50-125 acres	Less than 50 acres
Number of Animals Exhibited	More than 750	500-750	200-499	200
Animals variety exhibited	More than 75	50-75	20-49	20
Number of endangered species exhibited	More than 15	10-15	5-9	Less than 5
Annual attendance of visitors per year	More than 750,000	500,000-750,000	200,000-500,000	Less than 200,000

Table 2.1 shows the different size of Zoo Park

The Source: www.zoolex.org

Zoo exhibits can be arranged and classified according to:

1. The concept of the one kind of animal, or correlation, here upon, all of the cats will be at one exhibit zone, the bears at another one, and so on.
2. Animal Geography
3. Animal Environment
4. Animal behavior
5. Animal popularity, some zoos desire to exhibit number of popular animals, according to the visitors interests in these animals.

[4] www.zoolex.org

2.6 Supplementary Activities in Zoos[5]

The currently accepted role of the modern zoo is the conservation of Biodiversity and its display for education purposes to members of the public.Many Zoos supplement this by providing hospitality and entertainment activities .

Typical examples include:

- Indoor and outdoor play areas.
- Rides involving tractor trailers, boats, and railways.
- Venture trails.
- Children's activities.
- Restaurants and bars.
- Entertainment such as fairgrounds and 'adrenalin' rides.
- Fishing lakes.

Although these activities are not included in this guidance, zoo operators Must consider any associated health and safety risks when drawing up their risk Assessment, and thereafter ensure suitable controls are in place.

[5] www.zooiex.org

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[5] www.zoolex.org

Chapter Three

Design of Zoo

Chapter 3

Criteria and standards for Zoo Design

3.1 Introduction.

3.2 Circulation at the Zoo.

3.3 Zoo Spaces.

- 3.3.1 Parking Area.
- 3.3.2 Entrance Plaza.
- 3.3.3 Pathways.
- 3.3.4 Exhibit Area.
  - 3.3.4.1 Design Factors.
  - 3.3.4.2 Exhibit Viewing.
  - 3.3.4.3 Illustrated Viewing Types.
  - 3.3.4.4 Barriers.
- 3.3.5 Service building.
- 3.3.6 Another spaces.
- 3.3.7 References.

3.1 Introduction

To have a successful visitor experience it is not enough to work at the level of each individual exhibit, but it is mandatory to organize visitor circulation for the whole zoo.

3.2 Circulation at the Zoo

There are infinite circulation configurations because each zoo has its own development history, mostly over a long period of time, with many small improvements, and without much planning .However, there are some basic schemes that tend to be repeated :those without hierarchy and those with some degree of hierarchy.

Analysis for different cases for circulation:

a. **Without Hierarchy**

This is the most common configuration of zoos that have been incrementally developed without appropriate planning .This presents multiple circulation options from a multitude of disparate distribution spaces .

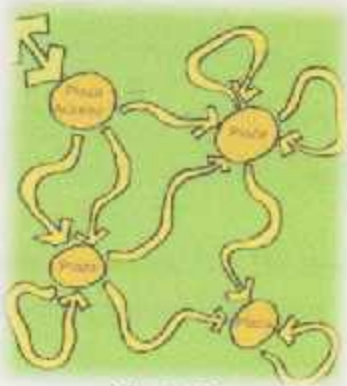


Figure 3-1

Without Hierarchy

The Source: www.buenapark.com

b. **With Hierarchy, unique *loop***

If we are to analyze circulation patterns that emphasize hierarchy, the simplest example is that which has one access, one distribution space and one loop through a complex of animal exhibits.

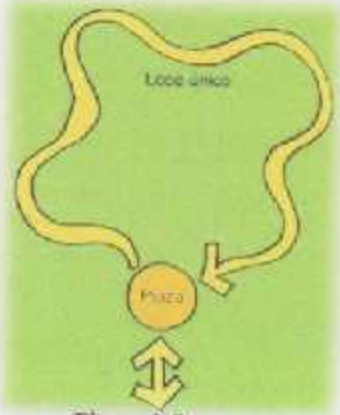


Figure 3-2

With Hierarchy, unique loop

The Source: www.zoolex.org/publication/collados

c .With Hierarchy, multiple *loops*

For the largest and most complex of zoos, the hierarchy can be extended to have several exhibit loops that begin and end at one distribution space. The visitors can select the zones they wish to visit and the sequence of visitation depending on the time and energy they have .

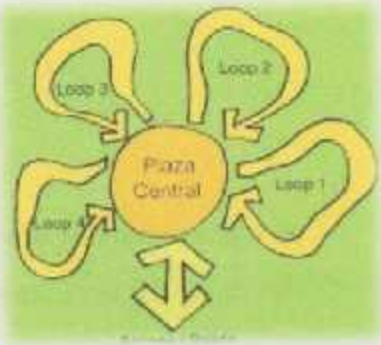


Figure 3-3
With Hierarchy, multiple loops
The Source:
www.zoolex.org/publication/collados

d .With Hierarchy, central main *loop*

A variation of the multiple loop type described above is a main loop that functions as the distribution space .This is typical for zoos that have an icon in the middle, such as a lake or a heritage structure, or a space that provides a traditional activity.

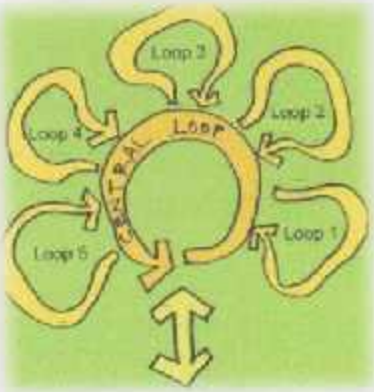


Figure 3-4
With Hierarchy, central main loop The Source:
www.zoolex.org/publication/collados

e .With Hierarchy, central axis

Another variation incorporates a main axis, or corridor, which functions as the distribution space .Its primary benefit is that it allows a long, distribution corridor that provides the opportunity for more loops originating from it and ending in it .

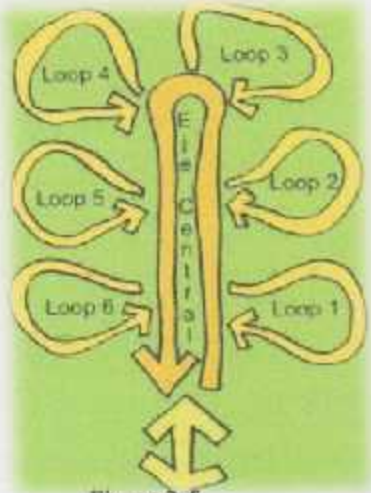
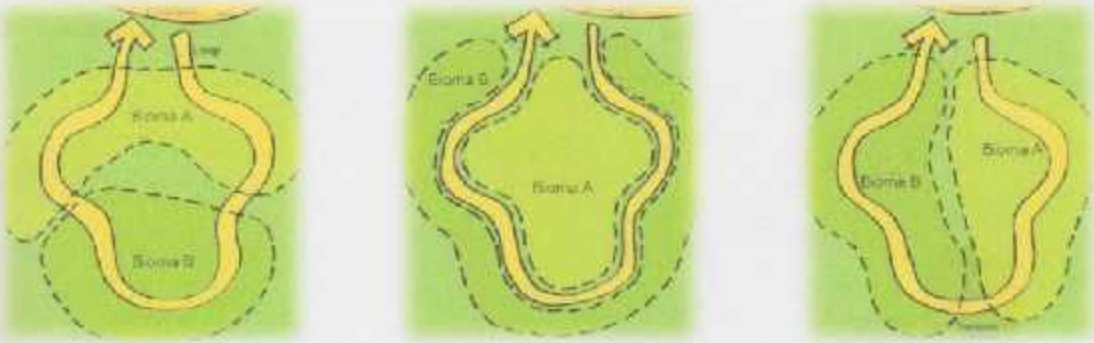


Figure 3-5
With Hierarchy central axis
The Source: www.zoolex.org/publication/collados

f. Sub Theme Zones

If we analyze the exhibit loops, the analysis would reveal sub themes within each theme zone .The principal challenge is to divide a themed loop into two sub theme.



Solution a Solution b

Figure 3-6

Sub Theme Zones

The Source: www.zoolex.org/publication/collados

3.3 Zoo Spaces

3.3.1 Parking Area

The designer must create the required space for parking areas in the zoo, where can serve the average maximum rate of the visits .**See Appendix 1**

3.3.2 Entrance Plaza

Picture 3-1
A picture showing Zoo Entrance
The Source: www.zsl.com

The main entrance of the zoo has window displays, cash desks and information kiosks, WCs, large parking areas for cash and coaches, stops for public transport, it is also usually the location for administrational departments serving the

public, function /Lecture rooms plus a high -dass restaurant overlooking the zoo area with separate entrances from outside for evening business [6].

3.3.3 Pathways

Main paths, 5-6 m wide, for the public should form loops linking the main buildings and animal enclosures, secondary routes, 3-4 m wide.[7]

Picture 3-2
A picture showing Zoo pathways
The Source: www.zoo-review.com

Public transport systems consider electric trolleys using the main paths, or miniature trains/cable railways with their own tracks or routes.

[6] www.zsl.com
[7] www.zoo-review.com

*** Classification of Pathways:**

1- Primary Pathways

Figure 3-8

Section at a Secondary Path

The Source: www.zsl.com

The secondary system is designed for more intimate viewing experiences and immersion within the natural habitat zone .Secondary paths will vary from 2.5-4m in width .No public services are located along these routes.[9]

Generally, no visible curbs or drainage structures will occur along these paths, but landscaping appropriate to the habitat will be tight to the path's edge and runoff will be locally absorbed.[10]

[9] www.zsl.com

[10] www.zoo-review.com

Picture 3-3

A picture showing Secondary Path example

The Source: www.zoo-review.com

3 -Tertiary Pathways

Figure 3-9

Section at a Tertiary Path

The Source: www.zsl.com

The tertiary system expresses the greatest harmony between exhibit, habitat zone and visitor .Here the most intimate relationship is gained along unobtrusive trails (1.5-2m) wide.[11]

no services or furnishings will be provided along these routes with the exception of interpretive elements .Materials will be natural, although all must stand the test of constant use in all types of weather and retain the character of the particular exhibit .[12]

No areas on tertiary paths will be provided for gatherings .Visitors will find a rock or log to sit on, or a tree to lean against if they wish to rest.

Picture 3-4

A picture showing a tertiary path

The Source: www.sacbee.com

[11] www.zsl.com

[12] www.zsl.com

3.3.4 Exhibit Area

No zoo today should be constructing out-of-date cages with heavy iron bars or brick and glass walled nocturnal-houses and that zoos are all moving towards the concept of open habitat zoos.[13]

Zoo areas should also include exhibits which help to explain the interrelationships between humankind and nature, bordering on the educational function of natural science museums.

3.3.4.1 Design Factors

The design factors that should be taken into consideration when designing the zoo exhibits:

A. size

It is determined by the animal size and potency, and as mentioned before there is many ideas for arranging animals in the exhibits.

Size may differ according to different factors, related to the exhibited animals themselves; each animal has its own criterions and a specific surrounding, which must be taken into consideration.

B. Location and orientation

Through planning process, exhibit zones must be located carefully, and must take into consideration many factors, such as, visitor's movement, the minimum

[13] www.saczoo.com

distance between the visitor and the animals, and estimating the quantity of required sunlight, and wind direction in open-air enclosures.

B. Native climate geography and social territorial needs of animals

The native dilate/geography and social/territorial needs of the animals must always be taken into account, although some acclimatization may Possible.

It is important to study zoology and find out all the natural needs and habitats that every animal requires, such as, temperature, media he lives in, kind of plants and trees, and so on .And to present them in their exhibits we may make an artificial environment to achieve the animal needs and requirements.[14]

Picture 3-5

A picture showing elephant exhibit

The Source: www.worldzootoday.com

Giraffes, whose height may exceed 4 1/2 meters (1 5.feet) obviously need buildings that provide proper headroom, and also outdoor enclosures where they can

[14] www.worldzootoday.com

Most reptiles and marine mammals require temperatures between (15 and 27 C). See Appendix C

3.3.4.2 Exhibit Viewing

The success of this landscape immersion depends entirely upon two factors :[15]

1-The completeness and correctness with which the characteristic landscape is projected.

2-The care and accuracy with which the viewpoints and views are located and composed, concealing barriers, enhancing perspectives, composing light and shadow and, most importantly, visually unifying animal space and visitor space.

- Insure that animals are seen as only a part of the surrounding landscape, which they occupy with the viewer.
- Provide selected views only into the exhibits[16].

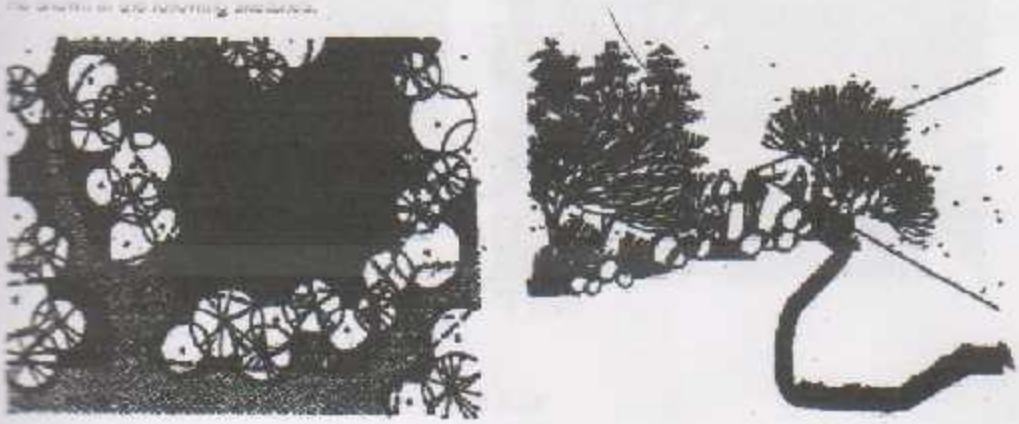


Figure 3-10

The Source: www.zoo.org

[15] www.worldzootoday.com
[16] www.zoo.org

- Augment the sense of anticipation by sequential staging of approach views before animals are actually seen.[17]
- Screen out cross-viewing of other people and exhibits.

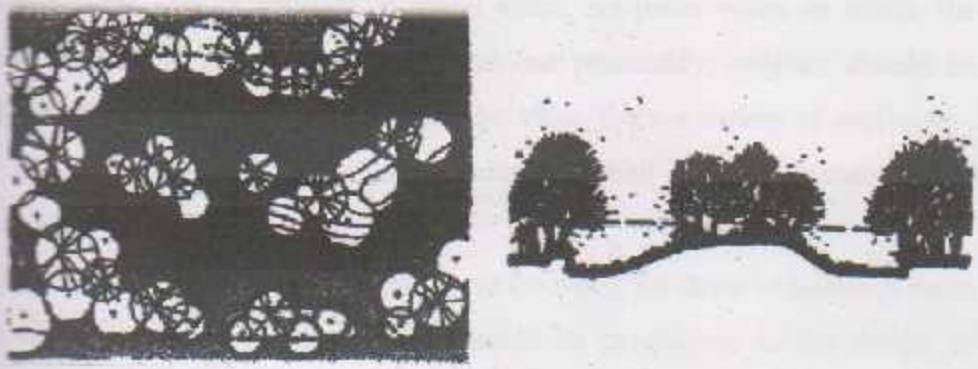


Figure 3-13

The Source: www.zoo.org

- Provide at least one major view location for interpretation of each exhibit; this must accommodate the special needs of all age groups and the handicapped.
- Avoid looking down directly on animals :they should be at or above eye level, the only exception being animals at or below the surface of water bodies .As shown in the following sketches:

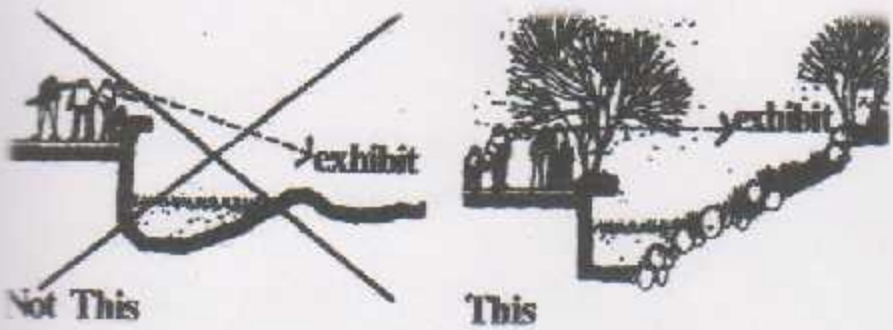


Figure 3-14

The Source: www.zoo.org

[17] www.zoo.org

- Eliminate views of animals from outside the zoo and from parking and entry areas.

- In summary, design exhibits to avoid static, set-piece views in which the entire extent of the animal area is obvious preferably, exhibits should be designed to unfold dynamically, view by view, from a variety of overlooks . In this way exhibits will appear continuous with their surroundings and indefinite.
- The wide range of viewer's height of eye (viewing for those in strollers, those in wheelchairs and those standing should be considered in the design of viewing areas[18].

[18] www.zoo.org

Mesh Enclosure

Entire enclosures of glass or wire mesh are used in exhibits for the animal whose leaping distance exceeds the practicality of moats or other partial barriers.[19] See appendix C

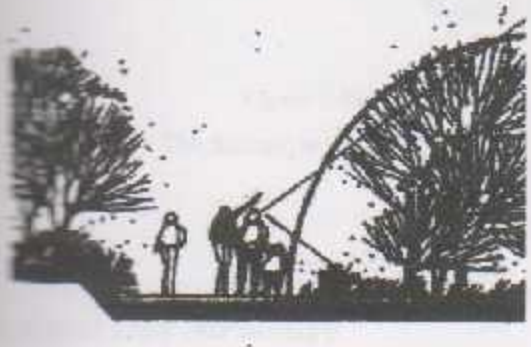


Figure 3-17
The Source:
www.zoo.org

Picture 3-8
A picture showing Mesh Enlarger
The Source: www.zoo.org

Shelter

Viewing shelters are used for major exhibits, in which visitors spend extended time .The structure will be in the character of the exhibit set against landforms and/or dense plant materials.

[19] www.zoo.org

Pictures 3-10

A picture showing Animal day structure

The Source: Photographed by research preparers (family zoological garden-Jerusalem)

Boardwalks

Boardwalks (generally)will be used in marsh and aquatic exhibits, Plant [illegible]'s appropriate to the exhibit will be used to camouflage the walk and the visitor from adjacent views, while allowing less dense areas for selected views of the exhibit.[21]

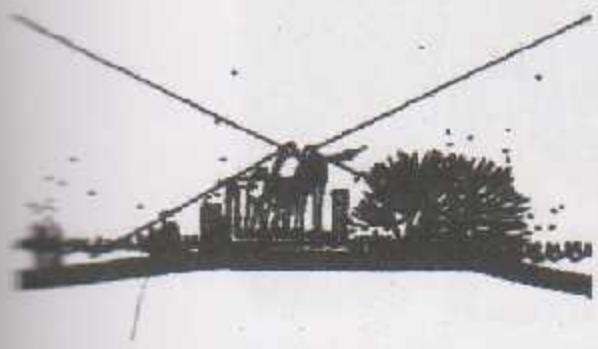


Figure 3-20

Boardwalk view

The Source: www.zoo.org

Picture 3-11

A picture showing Boardwalk view

The Source: www.michigan.org

[illegible].org

Covered Bridges

Covered bridges are used in connection with major exhibits where visitors may spend extended time at water-related exhibits.as shown in the sketch.[23]

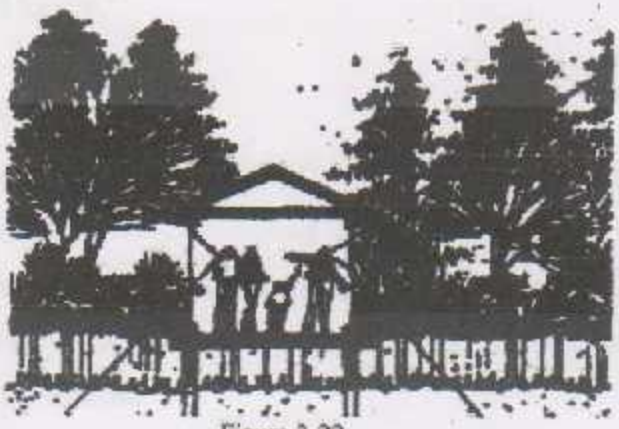


Figure 3-22

The Source: www.zoo.org

Underwater

Partial underwater viewing is especially exciting and informative when viewing water-loving animals such as bear, otter, tiger, jaguar and hippopotamus.

Pictures 3-13

A picture showing under water aquaria

The Source:

Photographed by research preparers

(family zoological garden-Jerusalem)

[23] www.zoo.org

3.3.4.4 Barriers

An important consideration is the means of separating the animals and public wire and steel netting black, chains, water-filled and dry ditches, glass and plastic barriers, electrified fences.[24]

Types of barriers:

- Physical barrier — to prevent the animal from escaping as well as to discourage visitors from attempting to enter the exhibit
- Visual barrier — to screen unwanted views of holding buildings, service areas, moats Visual connections —to focus visitor's attention on special views into the exhibit.

Methods" T" Provide Barriers

Method A

A. * **One-Sided Dry Moat**

These types of moats allow animal access, having a gently sloping interior edge.

Figure 3-23
One-Sided Dry Moat
The Source: www.zoo.org

[24] www.zoo.org

*** One Sided Water Moat**

Water moats are ideal for foreground barriers, for they can easily be made to resemble a varicty of water bodies ranging from sparkling mountain freshets to placid lily pools to nearly dry seasonal floodways.[25]

Figure 3-24
One Sided Water Moat
The Source: www.zoo.org

Method B
Wall

All walls that can be seen from public areas should resemble natural formations such as river -cut banks or rock outcroppings .In unseen areas, walls may be made of the most suitable construction.

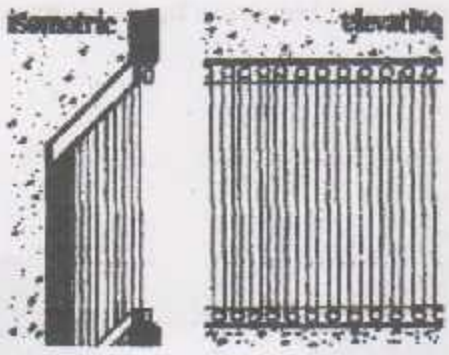
Figure 3-25
Wall
The Source: www.zoo.org

[25] www.zoo.org

Method C

Harp Wire

Closely spaced, ghtly tensioned vertical wire or fine cable can be used to restrain small mammals and birds and is much less visible than wire mesh



Picture 3-26

Harp Wire

The Source: www.zoo.org

Method D

Glass

Property designed and maintained, reinforced glass partitions can be the least visible solid beamers and have the advantage of preventing transmission of airborne disease organisms .However, severe problems of reflection can occur in improperly located windows, and desirable animal sounds and odors are restricted .Daily cleaning, inside and out, is required.[26]**See Appendix C**

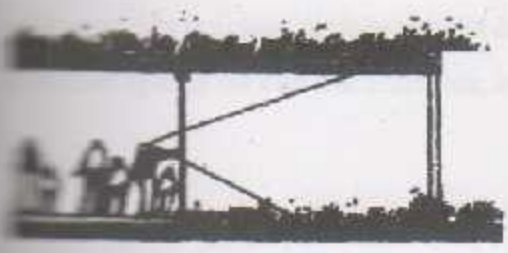
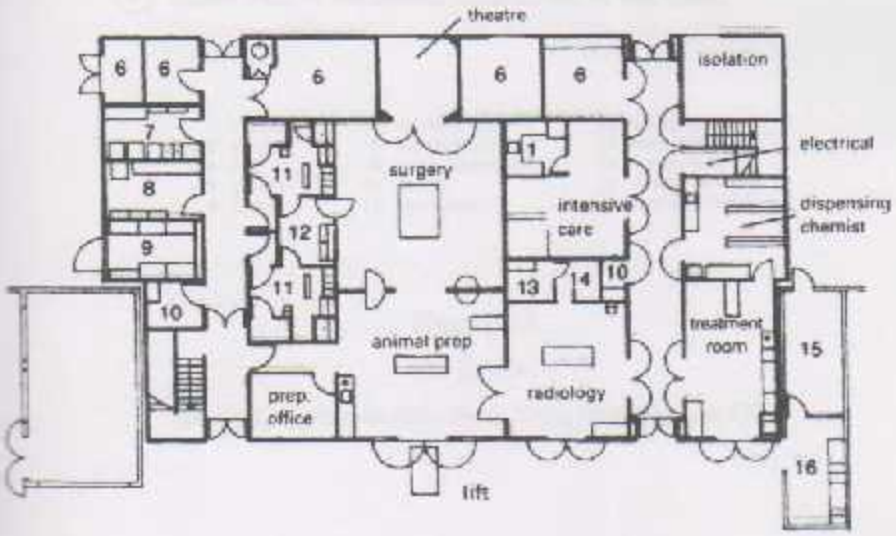


Figure 3-27

The Source: www.zoo.org

[26] www.zoo.org

- Research laboratories and lecture theaters for teaching animal medicine.
- Food store and feed preparation.
- Special personal rooms with disinfecting equipment.
- Air conditioning and ventilation with 12-15 air changes per hours(separate for quarantine rooms)
- Water treatment facilities and filters.
- Cleaning equipment (often using steam).[28]

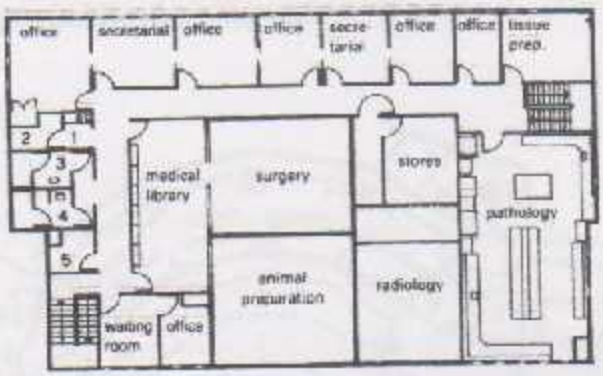


⑤ **Ground floor of** → ④

Figure 3-29

The Source: Neufert, Architects data: New York, Halsted press 474

[28] www.zoolex.org



(4) **Upper floor of the animal hospital zoo in San Diego**

1 kitchen	7 laundry	12 washroom
2 stores	8 sterilization	13 dark room
3.4 WC	9 deep freeze room	14 inspection
5 porter	10 porter	15 entrance store
6 stores	11 changing	16 entrance kitchen

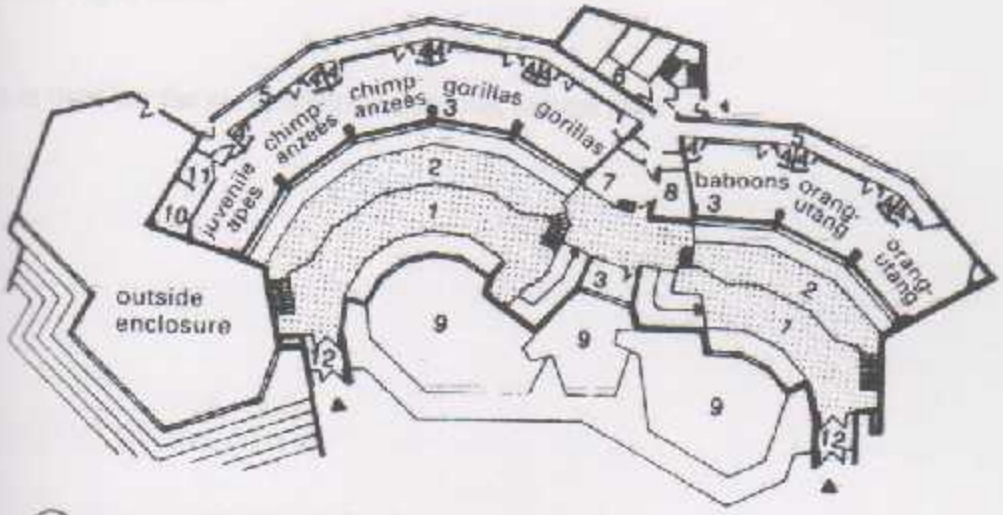
Figure 3-30

The Source:

Neufert, Architects data: New York, Halsted press 475

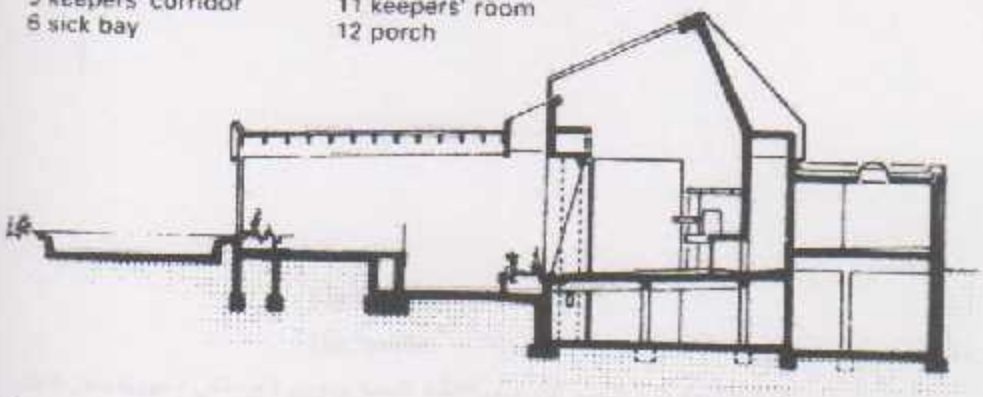
3 .Holdings

These structure usually support animal exhibit spaces, the following figure shows a section through a holding building and services.



⑥ **Anthropoid enclosure, Wuppertal Zoo**

1 visitor level 1
2 visitor level 2
3 inside enclosure
4 sleeping booths
5 keepers' corridor
6 sick bay
7 feed kitchen
8 keepers' room
9 ponds
10 juvenile apes' sleeping area
11 keepers' room
12 porch



⑦ **Section** ›⑥

Building Department, Wuppertal

Figure 3-31

The Source:

Neufert, Architects data: New York, Halsted press 473

3. Staff services

This area is apart from the services building, and the following figure shows a staff services area. **See Appendix 5**

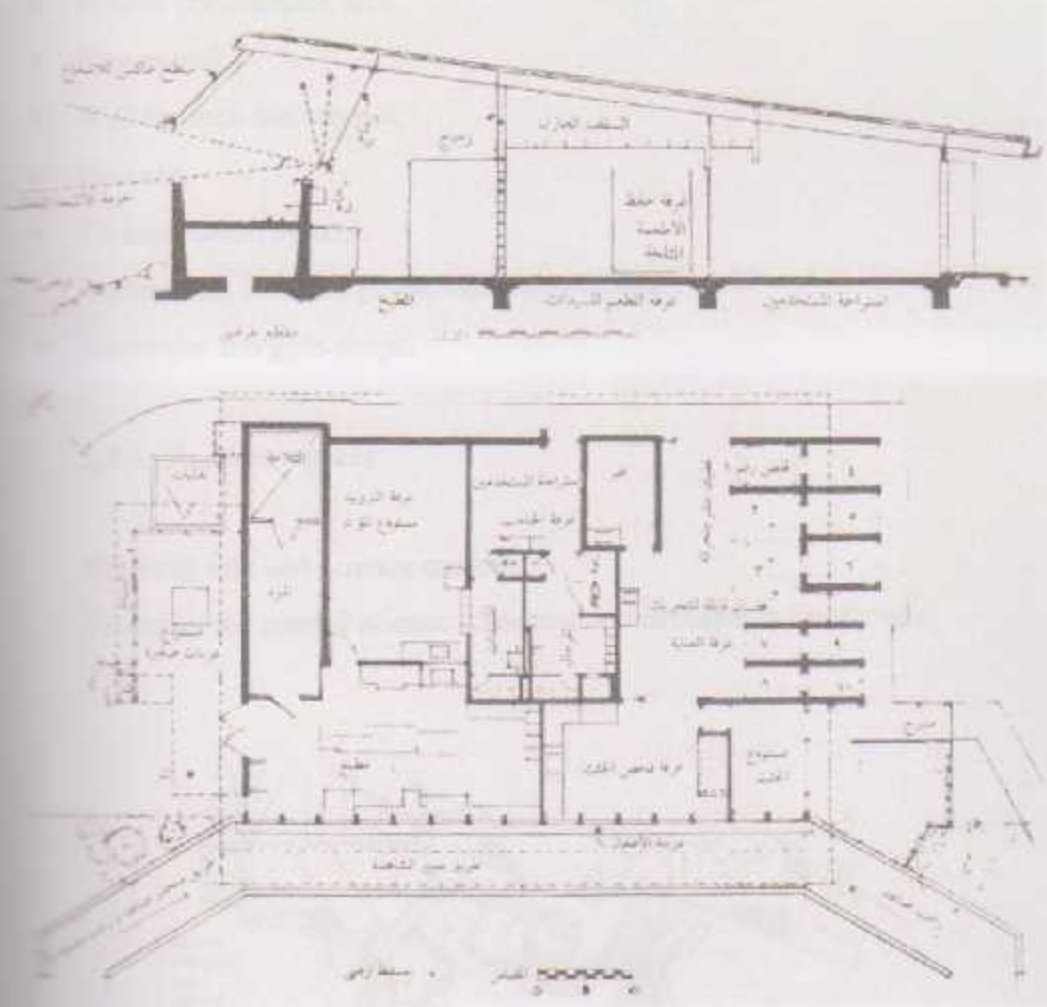


Figure 3-33

The Source:

ارنست نيوفرت ، عناصر التصميم والانشاء المعماري،ربيع الخرسفاني ، سوريا ، دار الايتام ، ٣٦٥

4. Maintenance, warehousing and horticulture

5. Guest services

Includes:

- Entry plaza/ticketing
- Special presentation area.
- Playground.
- W.C for men and women.
- First aid.
- Transportation system.
- Restaurants, café and plaza, market and plaza.
- Souvenirs and gifts shops.

3.3.6 Another spaces

Research unit and science museum

Example: the natural science museum/ zoo entrance in Osnabruck.

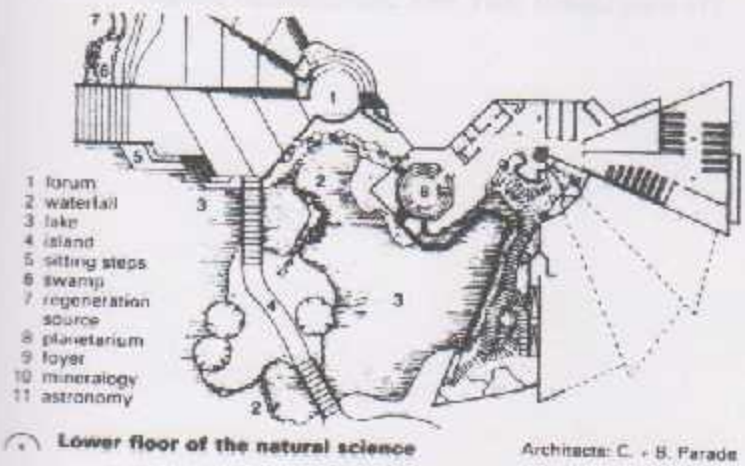


Figure 3-34

The Source:

Neufert, Architects data: New York, Halsted press 475

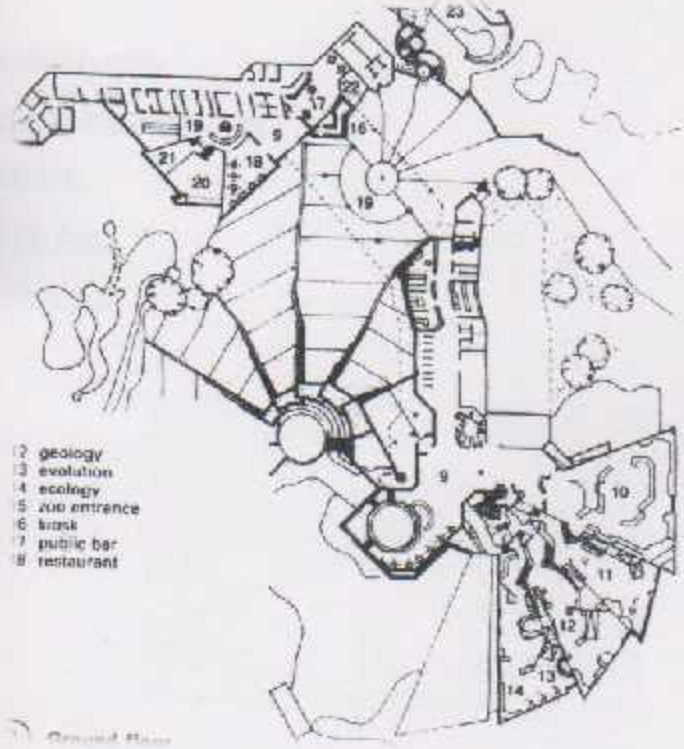


Figure 3-35

The Source:

Neufert, Architects data: New York, Halsted press 473

Chapter 4

Case Studies

4.1 The Birmingham Zoo.

4.2 Design of *an animal hospital* at Potawatomi Zoo
United States of America.

4.3 Potter Park Zoo.

4.1 The Birmingham Zoo

Birmingham, Alabama

Project Data:

Master plan completed :March 1994

Area : 300 acres

Client :Birmingham Ecological Association

The Birmingham Ecoplex is a concept for a "fourth generation" zoo conservation park on over 300 acres of undeveloped prime property .It is designed to provide the space and topographic opportunity to develop an Interactive -sequence of habitats, where animals roam from habitat to habitat as part of a daily rotation sequence.[29]

Picture 4-1

Photo show zoo entrance

The Source: www.birminghamzoo.com

The Ecoplex was supplied by major corporate and municipal leaders, looking to improve the existing Birmingham Zoo and bring their City to the forefront of Conservation Education/Research.

[29] www.birminghamzoo.com

MASTER PLAN PROGRAM[31]

- **ZOO VILLAGE**

A.1 Parking.

A.2 Ticketing Plaza.

A.3 Ticketing/Guest Services.

A.4 Administration Offices.

A.5 Village Gift Bazaar.

A.6 Group Entry.

A.7 Entry Plaza.

A.8 Train Depot.

A.9 Tram Station.

A.10 Village Ice Cream/Cookies.

A.11 Stroller/Cart Rental.

A.12 Zoo Event Meadow.

- **ECOLOGY TRAIL**

B.1 Sea Mammal Cove.

B.2 Ecology Education Center.

B.3 Garden Maze.

B.4 Waterfowl Marsh.

B.5 Reptiles/Amphibians.

B.6 Demonstration Theater.

B.7 Primate Forest.

- **AMERICAN TRAIL**

C.1 Woodland Trail & Meadow.

C.2 Alabama Farm.

C.3 Alabama Swamp.

E.3 Visitor Paths.
E.4 Hiking Trails.
E.5 Landscape Areas.
E.6 Graphics/interpretive.
E.7 Restrooms.

- **ZOO SERVICE**

F.1 Animal Health.
F.2 Commissary
F.3 Quarantine/Holding
F.4 Are housing/Office
F.5 Maintenance/Horticulture

[31] www.ursainternational.org

Birmingham zoo Site concept:

Figure 4-2

Site concept of The Birmingham Zoo

The Source: http//:www.ursainternational.org

Birmingham zoo Siteroads:

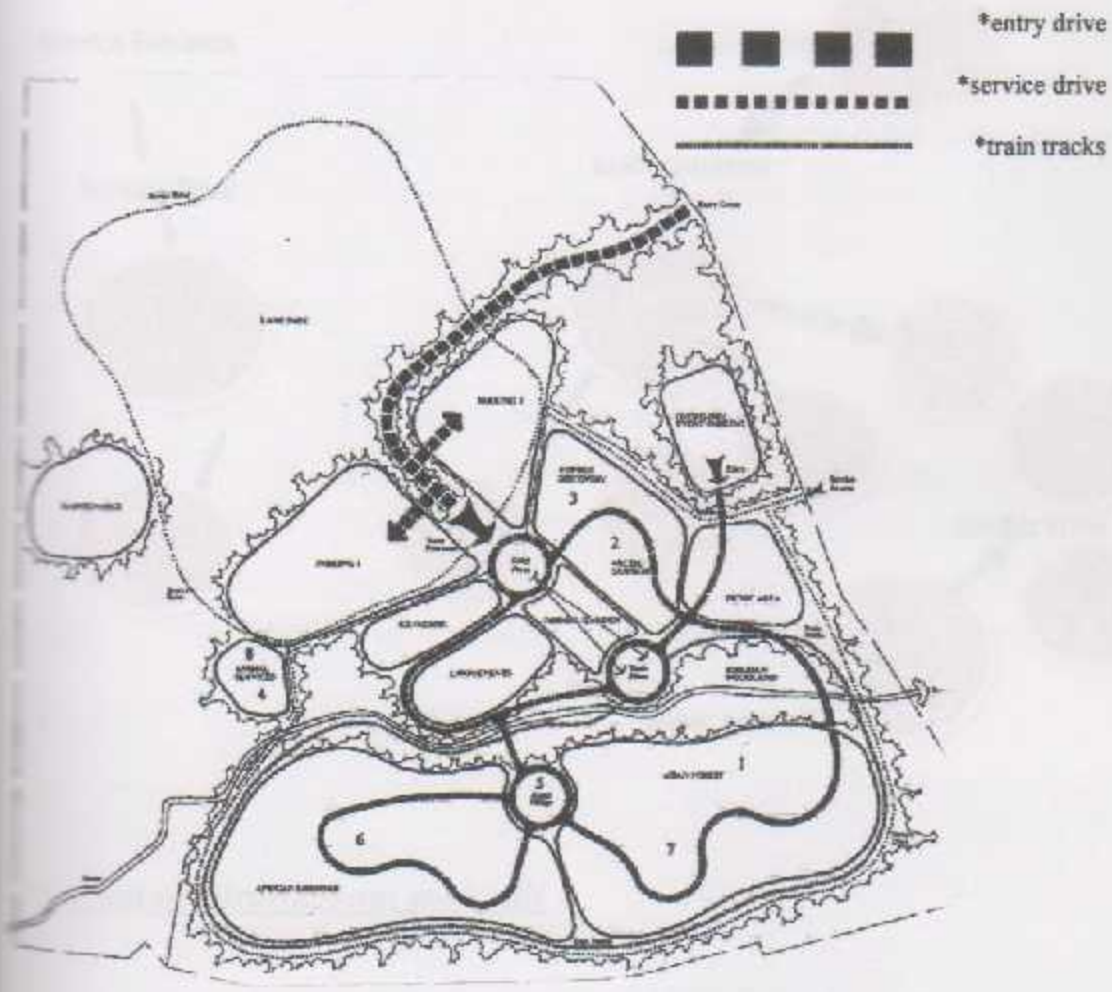


Figure 4-3

Site roads of The Birmingham Zoo

The Source: http//:www.ursainternational.org

4.3 Potter Park Zoo

Introduction

The follow is an inventory and analysis of the Potter Park Zoo in Lansing Michigan. This study examines the physical assets, constraints and opportunities of the zoo site and prepares a foundation upon which programming and master planning for the zoo is built.

The analysis that follows examines the ecological and urban context the zoo lies within, the existing organization and visitor experience of the zoo, and the physical condition of its exhibits, buildings public spaces and amenities, within the analysis are recommendation for how identified needs should be met in the master plan, and the analysis findings are summarized at the conclusion of this document.

Figure 4-5

Potter Park Zoo

The Source: www.google.com/earth

Master plan over view

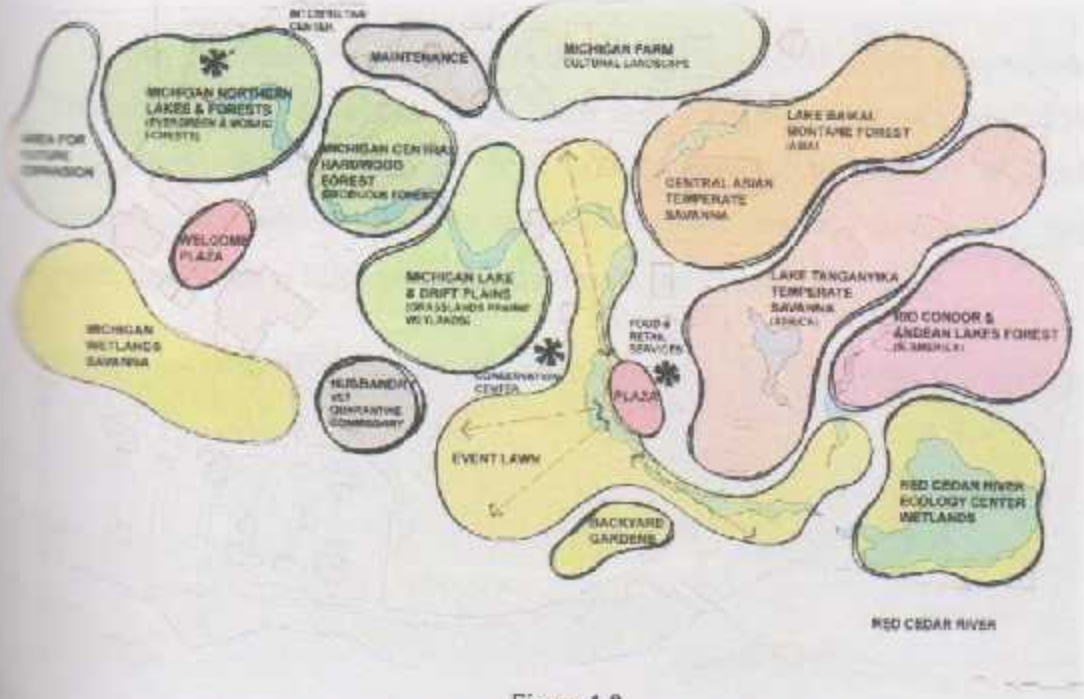


Figure 4-8

Master plan over view

The Source: essay prepared by Jones & Jones Architects and Landscape Architects, Ltd.

History

Established in 1915, the Potter Park Zoo occupies approximately 30 acres (including parking) within the context of 85 acre Potter Park; Begun with an animal population of Elk, the Zoo now houses over 110 species, primarily land mammals from regions of North and South America, Africa, Asia and Australia.

The zoo has evolved from continuous development of exhibits. With a large number of its buildings, the zoo has developed a new entry complex, administration building, education facilities, and concessions.[32]

[32] essay prepared by Jones & Jones Architects and Landscape Architects, Ltd.

iii. Site characteristic

Potter Park Zoo lies within the Southern Michigan Drift Plains Eco region. This region spans the center of the State from Lake Michigan on the west to Lake Huron and Lake Erie on the East, Characterized by glacially sculpted landforms and deposits such as moraines, kames, drumlins and kettles, this rolling landscape is filled with lakes, wetlands and rivers.

Picture 4-5

Photo show heavy wood forest

The Source: essay prepared by Jones & Jones Architects and Landscape Architects, Ltd.

iv. Surroundings

The land surrounding Potter Park Zoo to the north and west is residential, to the north, the neighborhoods are separated from the zoo by railroad tracks, and to the west by the non-fee portion of Potter Park which provides parking, picnic areas, play equipment, restrooms, an open-air shelter, rolling topography and a mature tree canopy, primarily consisting of white oak.

* The Lansing River Trail provides access to the Zoo from other regions of the city, plus access from the Zoo into the natural habitat of the Red Cedar River.

* The Red Cedar River provides an opportunity for Potter Park Zoo to teach

about and promote conservation of Michigan's ecology.

Figure 4-9
Potter Park Zoo location for Red Cedar River
The Source: www.google.com/earth

Climate

Lansing Michigan experiences a typical Midwest climate characterized by hot summers and cold winters. Summer high temperatures average around 80 degrees F and winter low temperatures average around 30 degrees F. Precipitation averages 30" to 38" per year falling as rain in temperate seasons and snow in winter.

Visitation

Potter Park Zoo has grown to annual visitation of 160,000 visitors through the gate in 2008 in addition to numerous school and group visits. Approximately 20,000 to 25,000 students are educated by the zoo annually by on-site and off -site outreach. Membership in 2008 was approximately 2800 families totaling 10,000 people.

The zoo is open 364 days per year, and peak attendance is during summer months, with significantly lower attendance in the winter months, the peak single day attendance at the zoo is about 13,000 Visitors, but on average is about four hours.

Existing Exhibit Organization

Figure 4-11

Photo show existing condition plan

The Source: essay prepared by Jones & Jones

Architects and Landscape Architects, Ltd.

Circulation Plan

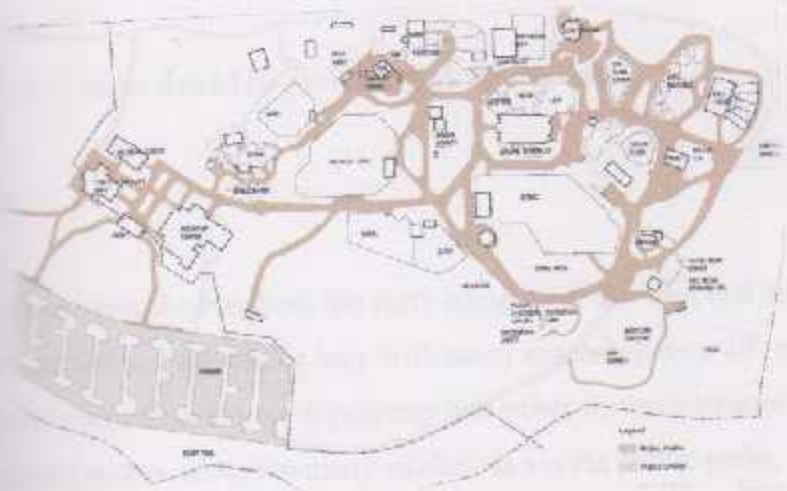


Figure 4-12

Photo show Circulation plan

The Source: essay prepared by Jones & Jones

Architects and Landscape Architects, Ltd.

Circulation in zoo paths:

Vehicular

Most guests arrive by private automobile or by school bus if part of a group tour, Approximately 500 parking spaces are available in a public parking lot that is used by both visitors and staff, using an estimate of 4 people per car turnover rate of 1.5, daily visitation of approximately 3000 can be accommodated, on peak visitation days, over flow parking is provided on lawn areas in Potter Park.

Public Transit

Public transportation to the zoo is available via Pennsylvania Ave.

Bicycle & Non-motorized

Bicycle access to the Zoo from downtown, Michigan State University, East Lansing, and surrounding neighborhoods is available via Pennsylvania Avenue and a pleasant ride on the Lansing River Trail which borders the south property of the zoo.[33]

* Bicycle racks should be provided near the zoo entry.

Pedestrian

Visitors enter the zoo from the entry complex at the west end and proceed to the zoo exhibits, Path widths vary with many extending over 20' wide, one dedicated road along the north property line exists for maintenance and operational access, access to many exhibits is via the public paths.

---

[33] www.potterpark zoo.com

Picture 4-7

Photo describe Exhibit path hierarchy illustration (wide primary path leading to more narrow Secondary path)

The Source: www.potterpark zoo.com/publish/photo.

Picture 4-8

[illegible] exhibit paths are oversized

The Source: www.potterpark zoo.com/publish/photo.

Picture 4-9

Lansing River Trail to the southeast of Potter Park Zoo

The Source: www.potterpark zoo.com/publish/photo.

Chapter Five

Program of Project

5.1 Design Philosophy

Our core philosophy first acknowledges that "The Earth is Our Client." With regard to zoo design, we must affirm this commitment by creating natural habitats for zoo animals, respecting the land, and engaging both the aesthetic and intellectual sensibilities. We must discover and reveal the fundamental structure of nature, both in process and form, and the values that emerge in that interaction must dictate the design.

A Zoo should be integrates five priorities:

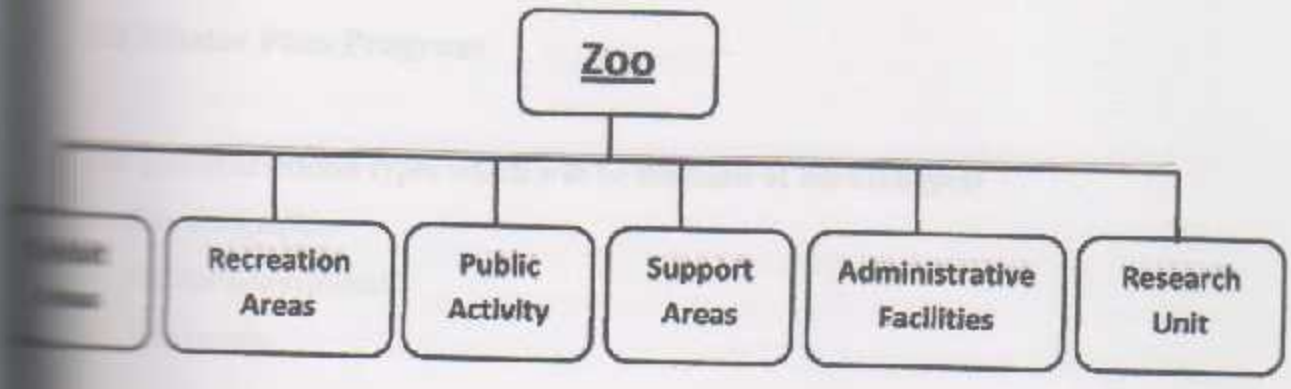
1. Ethics
2. Conservation
3. Entertainment
4. Education
5. Research

5.2 Programming

The Uses that should be allocated to a Zoo:

1. Exhibit Areas
2. Recreation Areas
3. Public activity
4. Service and Support areas
5. Administrative Facilities
6. Research Unit

See Table 5.1



No	Use	Percentage area	Area By m^2
	Exhibit Areas	40%	30000
	Recreation Areas	27%	20250
	Public Activity	3%	2250
	Support Areas	20%	15000
	Administrative Facilities	2%	1500
	Research Unit	8%	6000
		100%	50000

Table 5.1: Percentage Areas for Zoo Uses

Areas (m2) is approximated depending on the suggested total area of the site which is about 75000 m2

5.3 Master Plan Program

The potential exhibit types which will be the basis of the zoological

- Zoo-Geographic:
- Habitat Eco regional.
- Taxonomic.

Master Plan Program

A. Parking Area

B. Zoo Main Plaza

B1 Ticketing Plaza. 700m2

B2 Ticketing Guest Services. 15m2

B3 Administration Offices. 40m2

B4 Group Entry. 15m2

B5 Entry Plaza. 890m2

B6 Village Ice Cream/Cookies. 40m2

B7 Stroller/Cart Rental. 50m2

C Ecology Research Unit

C1 Ecology Education Center. 1500m2

C2 Garden. 700m2

C3 Natural Science Museum. 800 m2

C4 Demonstration Theater. 1000m2

D National Garden (Palestinian Animals) 950m2

Chapter Six

Site Analysis

Chapter 6

Site analysis

6.1 The geographical location to the land cut up the proposed.

6.2 City of Hebron and her importance

6.2.1 The site importance and the naming

6.2.2 Hebron across the date.

6.2.3 Topography of the city of Hebron

6.2.4 The climate in the city of Hebron.

6.3 Importance the proposed signed land.

6.4 Site analysis

6.4.1 The physical aspects.

6.4.2 The geographical aspects.

6.5 Reasons of choice signed

6.5.1 City

6.5.2 Site.

6.6 The sources and the returns

6.1 The geographical location to the land cut up the proposed:

City of Hebron falls land plot the proposed for the study in Palestine on lands which south of West Bank falls in from big cities of Palestine is area then area 22.8 [km ²] [1].

Choice piece of the land in area was complete "kanar" the incident in south the city, and far 8km about center city of Hebron, and line of length 39 falls on '28 °31 and rotating after 11 '06 °35 and falls self-trough, of number falls the site in cutting the land " 14274"(and habituation for royal one alshreef family), lines advance level 750[m] and 815[m] above sea level on the basis of native maps from Dora municipality , the land fall the right side of the street which match between Dora and(senger) zone ,the total area of the site purposed about 75(donom).

Dora extends himself from east to (valley of Nizar) will pull west and from (valley of wood) northward to (valley almaajwr) and (khursa)south.

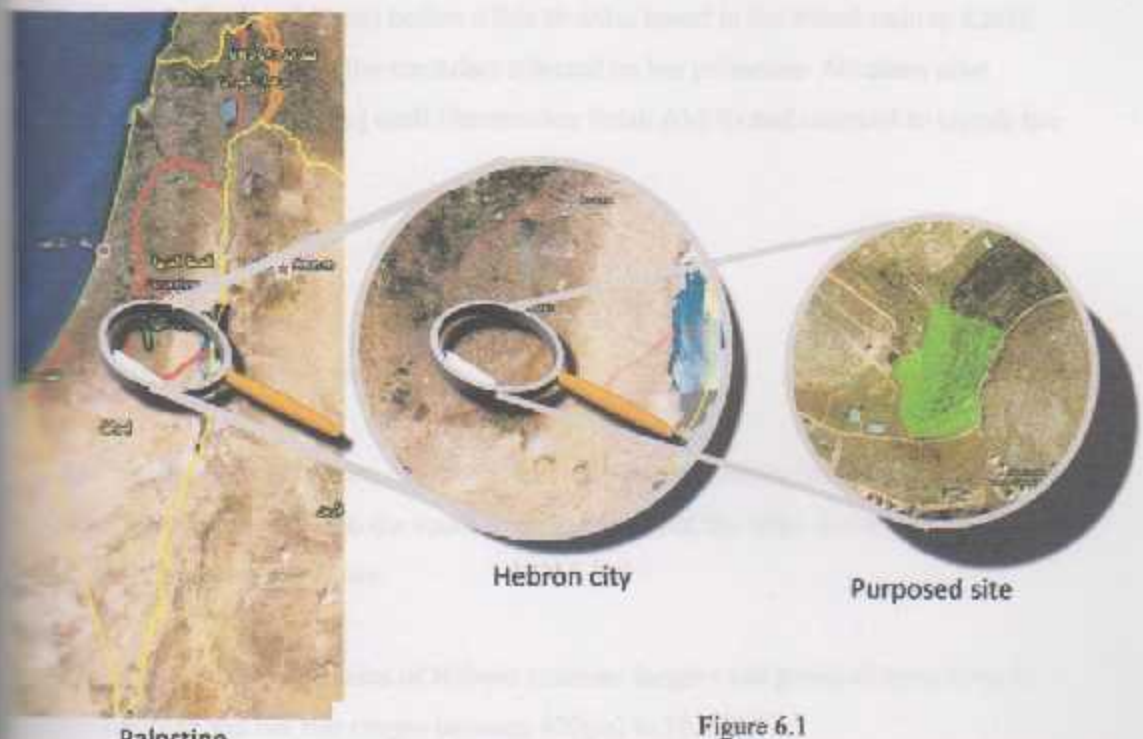


Figure 6.1

Site of the land the proposal in the graduation, Hebron, Palestine

Source: Photographed by research preparers (family zoological garden-Jerusalem)

6.2 City of Hebron and its importance:

6.2.1 The site naming and the importance

City of Hebron in site straightens for its distinguished characteristics contributed in origin of the city and developed it and growth, then Hebron in south falls west of West Bank northern meeting the *linear length '31', 29* and *'23', 31* northward and two *width line*]4', *35* and'0', 25.

The site for the friend raved medium genealogical in the ratio for Palestine, and the capital Jerusalem become far about 35[km] south big cities of Palestine. And the total population of Hebron is about 161376. (Statistical general 2007).

The Canaan on this city released name village of four ratio to hers the Canaan four and poisonous after her [Hbron] before Allah Ibrahim brand in the friend ratio to Khalil peace be upon him, and leads the crusaders released on her poisonous Abraham after occupation *her general 1099[m] until liberates* her Salah Al-Din and returned to brands her Hebron.

6.2.2 Topography of Hebron:

The mountainous nature on city of Hebron won and intervenes her some laxative and valleys and neighbors her to the south from her desert of the veils and her topography varies of reliefs in what follows:

The mountains: Mountains of Hebron consider lengths and group of mountains in Palestine expands and her rise ranges between 420[m] to 1028[m}.

The valleys: Movement waters of the rains penetrates conservative lands big group from the valleys on heights of Hebron and part from high Jerusalem and end in the medium waters in or the dead sea.

6.2.4 The climate in city Hebron:

The wind

Custom area of Hebron faced west wind in autumns and the spring, and this west wind resulted from medium Mediterranean sea in speed from 10[km] for each hour in the day to [km] for each hour in the night. The winter fulfilled the winds start a lot from the south-west area quickly already arrives to 35[km] for each hour.

for the winds so she changes in city of Hebron on the coming manner as follow:

In winter:

- The west wind accompanying for the air depressions and custom starts in the middle of the day and loaded formation in the dust.
- *The eastern winds cold which strong storm and dry was formed downpour of the rains* precedes special in first the winter and the last fall, in summer quarter:
  - North West wind .
  - The north east - dry - hot and hereafter monthly of August start in and September.

Chart 6.1

Average speed of the winds

The Source: Central Bureau of Statistics Palestinian, climatic conditions in the Palestinian territories, the annual report for 2004, edition of April 2005

Temperature :

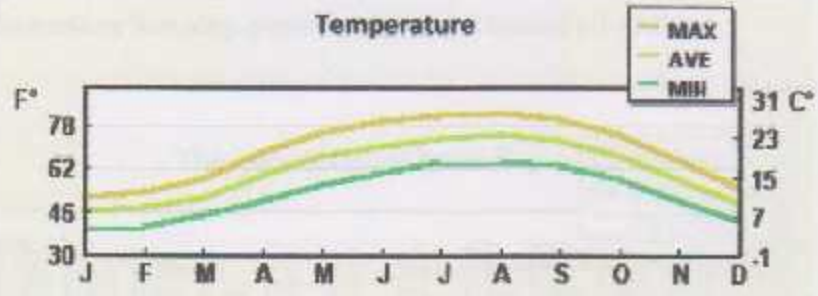


Chart 6.2

Temperatures

The Source: Central Bureau of Statistics Palestinian, climatic conditions in the Palestinian territories, the annual report for 2004, edition of April 2005

Figure 6.2: The annual average to the heat in West Bank graded by Central Bureau of Statistics

The genealogical humidity(H)

Affords the medium humidity genealogical annual around 60 - 70%.

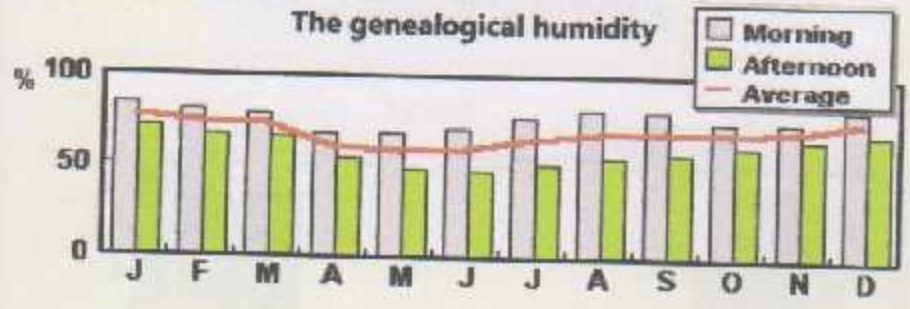


Chart 6.3

The genealogical humidity in West Bank.

The Source: Central Bureau of Statistics Palestinian, climatic conditions in the Palestinian territories, the annual report for 2004, edition of April 2005

Figure 6.3: The annual average for the genealogical humidity keeps me West Bank by Central Bureau of Statistics

Annual quantity the down ranges what between 1027 [mm] acquainted in the years damp, and decreases to arrives to 200[mm] acquainted in the years dry, and the triumphant downpour December and February is between.

The average of rain day extends from 40 - 60 day in Sunnis, and average downpour of the rains arrives between [400 - 500mm] annual [year2007].

Chart 6.4

The annual average of rainfall in West Bank graded

The Source: Central Bureau of Statistics Palestinian, climatic conditions in the Palestinian territories, the annual report for 2004, edition of April 2005

Table (6 - 1): Quantity of the rain in the Palestinian lands according to of the month and site of the station [year2004]

Rainfall Quantity in the Palestinian Territory by Month and Station Location, 2004 (mm)

Month	Station Location								مواقع المحطة	
	غزة Gaza	الخليل Hebron	أريحا Jericho	رام الله Ramallah	نابلس Nablus	طولكرم Tulkarm	ميثالون Meithalun	جنين Jenin	الشهر	
January	149.7	182.6	29.8	112.0	230.0	240.8	199.5	175.9	كانون الثاني	
February	68.3	97.7	23.1	122.5	136.2	89.3	127.0	94.6	شباط	
March	22.2	24.1	8.6	15.4	24.2	17.8	14.1	8.1	آذار	
April	11.5	1.8	1.7	3.2	11.1	6.0	6.0	15.1	نيسان	
May	0.4	0.0	2.1	3.1	1.2	0.5	0.0	1.0	أيار	
June	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	حزيران	
July	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	تموز	
August	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	آب	
September	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	أيلول	
October	0.1	4.2	7.6	12.8	0.4	3.0	0.0	0.0	تشرين الأول	
November	104.0	211.2	26.0	179.2	162.8	127.1	138.9	88.2	تشرين الثاني	
December	52.1	49.2	29.6	76.1	82.6	82.8	37.8	43.9	كانون الأول	
Total	408.3	570.8	128.5	524.3	656.5	567.3	521.3	424.8	المجموع	

Figure 6.4: The annual average for quantity of the rains fall in West Bank by Central Bureau of

On the generality there are two manners from the climate in city of Hebron:

1. Climate of Mediterranean Sea: Who most of conservative areas reign and who be distinguished that he rain fully, warm genealogical winter and hot dry summer.
2. The desert climate: Who the eastern slopes and the south slopes and coast the Dead Sea and who the warmth be distinguished in winter and the high heat and the dryness is summer.

Importance the signed land the proposed

region:

near Hebron, and it's called as (alkunnar),

which full of eyes of water have fertile land and also plants in beef eaters , have charming beauty of the natural theoretician ,and pleasantness of the waters interior.

6.4 Site analysis

6.4.1 The physical aspects

1. **The surrounding streets:**

* Relationship signed in the surroundings that fall around him the site is distinguished by low level of building height.

* The contributing arrival to piece the land and the streets:

Indeed the area connected in streets subsidiary on relationship in the main street which connect between (senger) street and the main street which match the Dora center, and of which the site distinguishes in several about points of the occupation which south of the area in speech spreads on (Alfawwar Junction), and this give the site kind of Autonomist dent areas.

Figure 6.5

Shows the relationship of the proposed location of buildings around and the streets leading to it

The Source: Photographed by research preparers

Surrounding uses the lands in the site:

The area surrounding the street between Street Singer and the main route for central a role, have witnessed urban growth in both the commercial and residential in the southern region and therefore the services that reach the region's good in all respects as electricity, water and sanitation and others, and in general, the land around the area is agricultural on three sides except the South, and the proportion of construction around the region 17%, mostly residential buildings.

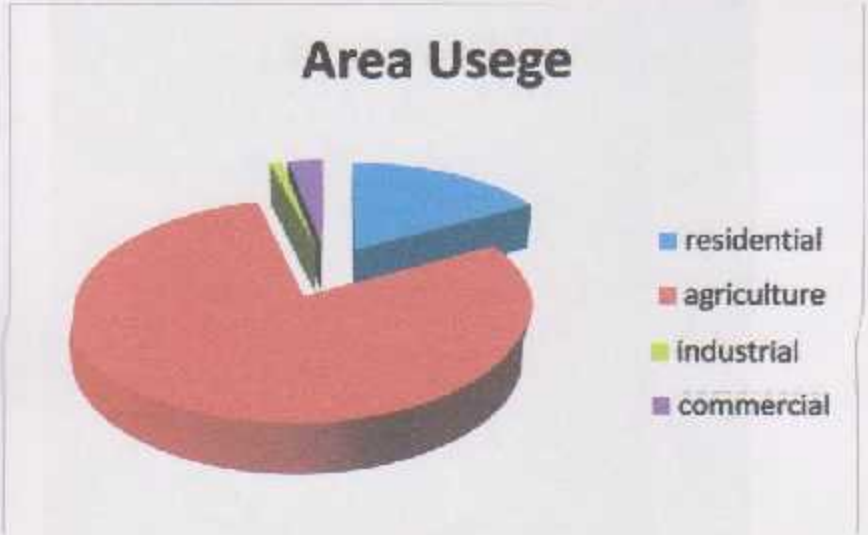


Chart 6.5

Area Usage

The Source: Central Bureau of Statistics Palestinian, climatic conditions in the Palestinian territories, the annual report for 2004, edition of April 2005

Appearance in the site (view):

The proposed project's land is the land of steep slope and this makes the most beautiful panoramic to the north side of the earth, and the eastern side there are no buildings, providing calm for the park goers, therefore, this overview will be fairly good and weaken somewhat this overview in a southerly direction towards the south

Noises

The site is distinguished that it does not stick to buildings and most buildings are close are residential buildings and there were only voices echo ELTINAY produced from the southern foot of the mountain, as these votes be made spread throughout the valley, in addition to the voice of the excavation on the north side of existing roads result in valley, so we must keep the project blocks on the street (away from the noise and pollution), by the cultivation of forest trees, which fence working windbreaks and help to reduce noise and reduce pollution.

Picture 6.1

The noise that is exposed to him the surrounding site from the excavation.

The Source: Photographed by research preparers

6.4.2 The geographical aspects

Topography of site

*The proposed piece of land characterized by mountainous terrain, the land as a farm where there are olive trees, grape vines and we try to maintain the largest amount of the trees during the design process because the olive trees and grapes from the most important characteristics of the city, which famous for them.

*The site slope up when we went to the north, where it passes the contour lines from 750[m] to 775[m] above sea level, that is means difference between the first point and the last point 25-meter in the ground, according to maps of the municipality of Dora.

* The role when studying the topography of the land, we must take advantage of the tendency, and not to change the parameters the Earth's natural as possible, and the representation of the building environment-friendly, in addition to the beauty of the project lies in respecting the land contour.

*Large number of caves within the earth that were formed by time, and sion, and extend along one of the caves to more than [15m], and could benefit us in the design that exploit the blanks as museums, research centers and insects e and others.

Drainage waters of the rains

Picture 6.6

Slope of Site Direction

The Source: Photographed by research preparer

Figure 6.9

Drainage waters of the rains

The Source: Photographed by research preparers

Drainage of the waters on-site and Decline of the land Is the work of storm water drainage infrastructure network in the design process, both in the discharge of rainfall or drainage systems, and taking into account the tilt of the Earth at the design greatly assist in the discharge process, particularly the ground contour somewhat .

Average downpour of the annual rains

We have studied the change in the city of Hebron and the rate of annual precipitation and we knew the amount of rainfall at 480 mm per year and 50 days per year, (we mentioned that in a climate of Hebron), and we must be aware of this to be an important factor in the design of the Site's infrastructure,

Movement of the winds on site

The wind Affect significantly during the design process, but the fact that the land is located within two mountain ,This reduces the influence of Western North wind somewhat, as the wind and directly affect the buildings they carry a horizontal impact on the walls of buildings and therefore has a structure in addition to the wind loaded with dust and sand lead to the process of erosion ,in other hand the most important effect of wind on the zoo animals and visitors directly, so the wind must be taken into account in the design.

Figure 6.10

Movement of the winds

The Source: Photographed by research preparers

Movement of the sun

The sun's energy is desirable and should be relied upon(يعتمد عليها) to guide the design, particularly for animals that characterized her love for the sun and stay in the sun like turtle, tigers, lions, so that you can take advantage of this energy, particularly in winter, but the sun should be used properly so as not to adversely affect the animals.

after analysis of the land proposed, the southern and eastern exposed to the sun dramatically in the early morning hours so we need to get rid of the green belts of the sun's harmful rays, where most of the day moving on the ground, but for the buildings they proposed are likely to be within the caves within the earth so it will reliance on natural sunlight somewhat in order to decrease the use of artificial light.

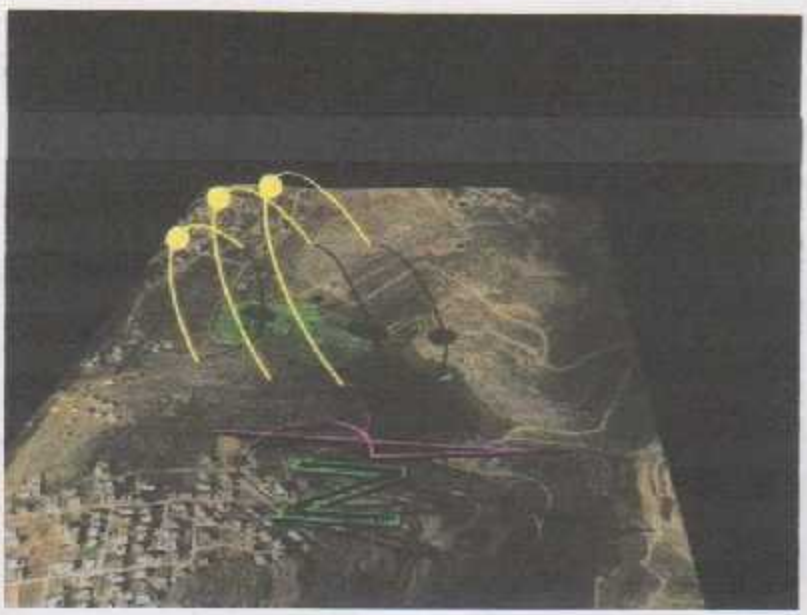


Figure 6.11

Movement of the sun on site

The Source: Photographed by research preparers

Earth is currently empty of any existing building only a small ...ilding of the guard in site, and most of the existing land is ...ricultural land, including greenhouses and open agriculture.

Picture 6.7

Plastic house in the land

...rce: Photographed by research preparers

Picture 6.8

The south residential building

The Source: Photographed by research preparers

Picture 6.9

The East elevation

...rce: Photographed by research preparers

Picture 6.10

The South elevation

The Source: Photographed by research preparers

Picture 6.11

West Elevation

The Source: Photographed by research preparers

Picture 6.12

North Elevation

The Source: Photographed by research preparers

The buildings bordering on a piece of land is the buildings mostly of altitudes between 1-3 floors (mostly residential building) and there are no high-rise buildings in the area frequently.

Frequently the process of building housing in the southern region that appearance being available overlooking the valley.

The design must be considered when building heights respect for the right neighborhood in the height, and the fact that the project is a park in the large piece of land, the highs will reach to no more than If there is a building in the ground beside the caves.

6.5 Reasons choice of site:

Reasons for selecting the site for:

6.5.1 City:

Hebron, Palestine's largest city square and the most number of people, suffer from a lack of recreational areas in which we have chosen the city for the project in which to serve all the people, in addition to the fact that the archaeological and historical city this will serve the tourism sector, In addition to that the project proposal in the municipality of Hebron.

6.5.2 Site:

1. Confluence of the city of Hebron and the town of Dura, in other words, the site links between the city and south of Hebron.
2. Easily accessible, with beautiful view overlooking the area is the fact that the summer driving to it.
3. Natural and geographical features of the site, which includes the eyes from water and green spaces.
4. Location quiet and far from the noise and inconvenience .

Picture 6.13

The site and surrounding area

The Source: Photographed by research preparers

The sources and the returns:

- http://ar.wikipedia.org/wiki/hebron
- Google Earth , Palestine , Hebron
- A group of authors, the site is written (website). URL address: http://forum.maktoob.com/t913246.html
- The Palestinian Central Bureau of Statistics. . URL address: http://www.pcbs.gov.ps
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Chapter Seven

Design of Project

Chapter 7

Design of project

- The idea of project.
- Bubble diagram show zoo spaces of project.
- The distribution of events.

7.1 The main idea of the design:

Adopted where the main idea of the exploitation of natural resources, location are as follows:

1- A major focus of the nature of water (springs), which is the center of indirectly in the project so that an optical axis and is directed mainly to the movement in the project.

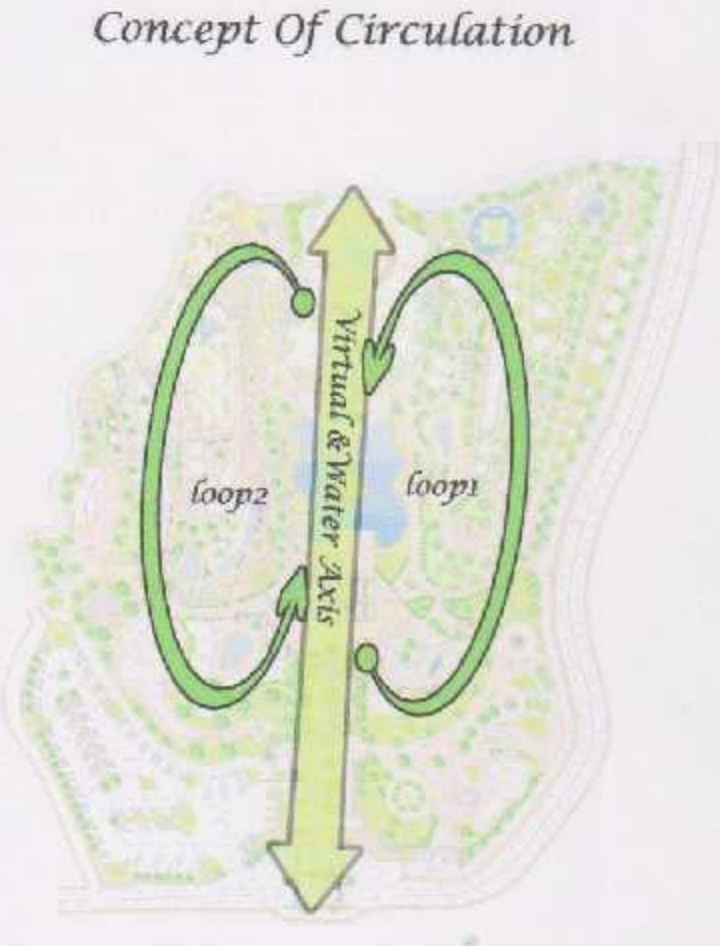

Figure 7.1
The site circulation

Figure 7.2
The site condition

Figure 7-3

The distribution of events

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- A group of authors, the site is written (website). URL address: http://www.paldf.net/forum/showthread.php?t=360595.
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- Central Bureau of Statistics Palestinian, climatic conditions in the Palestinian territories, the annual report for 2004, edition of April 2005.

Appendix

Landscape design

Littlewood

is a landscape architect and a consultant

CI/SfB 998
UDC 712

space between buildings is as important as that

equipment

spaces outside and between buildings,
public or private, covers a wide variety of
considerable knowledge of the location,
construction. All too often parsimony results in
are unsatisfactory both aesthetically and

dimensions

of people outside buildings are generally
scale as illustrated in Chapter 2. A family group
or terrace occupy a rough circle 2 m
people (the largest convenient simple group) the
6 m, which is the minimum useful size.

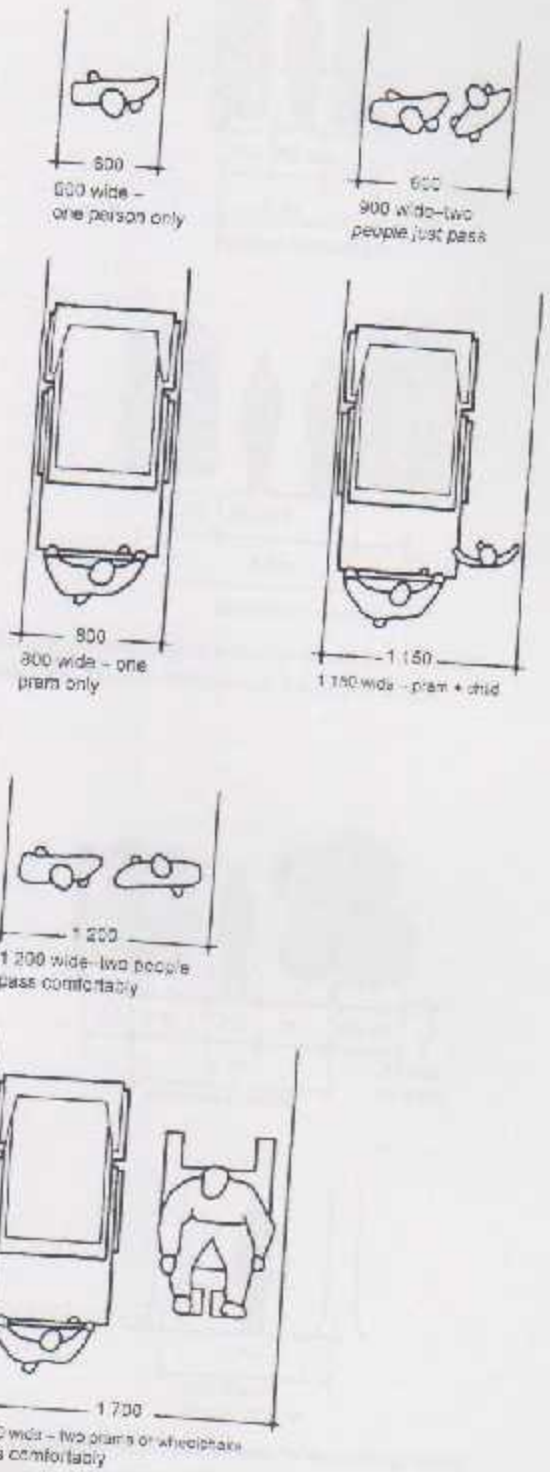
is a temporary condition. Most people become
at some time, perhaps carrying shopping or
a sprained ankle; a dizzy spell; a broken high-
the normal course of ageing. Circulation routes
bearing this in mind, integrating a design that is
aesthetically pleasing, rather than adding on
disabled'

should follow desire lines as directly as

of secondary importance if the connections are
should be chosen by analysing and responding
site. One way of achieving this is not to
created landscape scheme but to wait
tracks and then to pave these. Routes
rather than dead ends, incorporating places to
should be coordination between parking,
entries, etc. with adequate seating.

2.03 Widths of pedestrian routes

These vary with the purpose of the route, the intensity of use and with the situation. As a general rule of thumb, provide 600 mm width for each pedestrian walking abreast which suggests 2 m minimum for public walkways. The requirements of others than



6.1 *Characteristics of various footway widths*

...that use these paths must also be considered, **6.1**. ...quirements between walls or fences are shown in **6.2**. ...s a path over open ground. Other situations are shown ...6.6.

...typically do not use the entire width of footpaths. ...acent to a kerbed roadway about 75 m wide tends to ...e is the 0.5 to 0.75 m width directly alongside a ...6.7. Only under conditions of congestion would these ...used.

...ture such as trees, bollards, direction signs, parking ..., litter bins, fountains, sculpture and kiosks can ...footpath effective width. They should preferably be ...the avoidance zones.

...6.8 provide longitudinal and cross-slope criteria for ...under various circumstances. Longitudinal slope criteria ...are based on user abilities and design objectives ...criteria are based on the need for positive drainage ...g material). Porous paving, for instance, does ...need of a cross-slope for drainage as does a non-...ing material.

...ing

...of the footpath and its intensity of use will determine ...material and its thickness. Some paths are also ...vehicles and should be designed accordingly, ...edge details. Several factors influence the ...

durability of paving materials; even high-quality materials can wear out or disintegrate if subjected to extremes of heavy traffic or inadequate maintenance. Surfacing irregularities should be minimized.

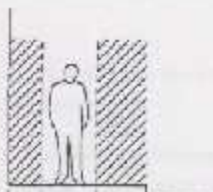
Some footpaths or walkways are required to have high traction ratings for safety use. Highly textured surfacings usually require steeper slopes for drainage (i.e. 2 per cent minimum) but every footpath must seek to achieve its design purpose in all weather conditions. A multitude of design patterns is now possible with the current wide range of unit pavers. Colour affects the degree to which heat and light are absorbed or reflected, and requires consideration.

The edges of a footpath play an extremely important part in both its appearance and function. Flexible materials such as macadam or sprayed chippings particularly need the support of an edging; so do unit paving blocks and bricks.

2.06 Tactile warning strips

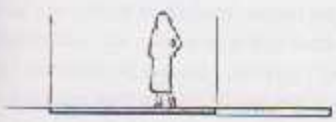
These are used to give advance notice to people with impaired sight of abrupt grade changes, vehicular areas, dangerous exits, pools or water fountains, and the like **6.10**. They are recommended at the top and bottom of steps and in front of doors that lead to hazardous areas. However, such warnings should not be used at emergency exits, as they can inhibit their proper use.

Street furniture, including trees, should be located within a defined zone along the outer edge of walkways, leaving a clear path without obstruction. A linear tactile warning strip can define this zone. **6.11** shows a blind person using a white stick.

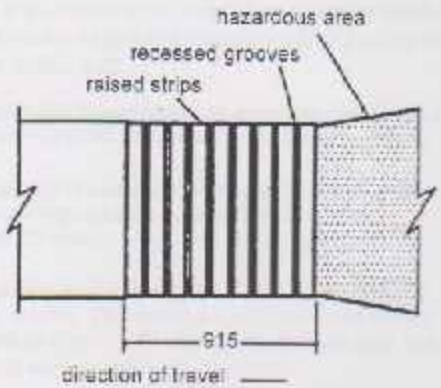


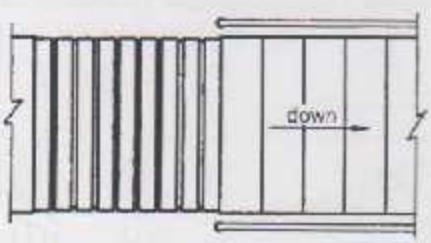
...ded by pedestrians

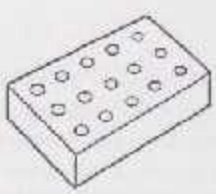
...along a longitudinal slope: up to 3 per cent ...ally 5 per cent maximum, 5–10 per cent ...ding on climate. Between 5 per cent and 8 per ...considered to be ramps



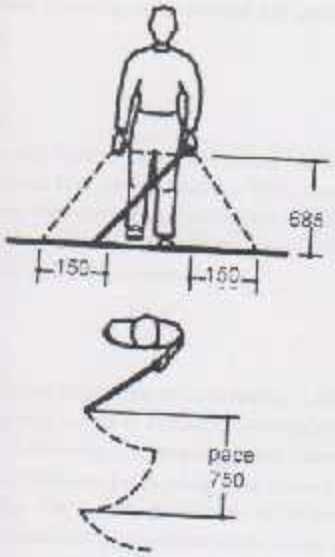
...cross-fall: 1 per cent maximum for drainage, ...material of finish; 2 per cent is typical. 3 per cent ...



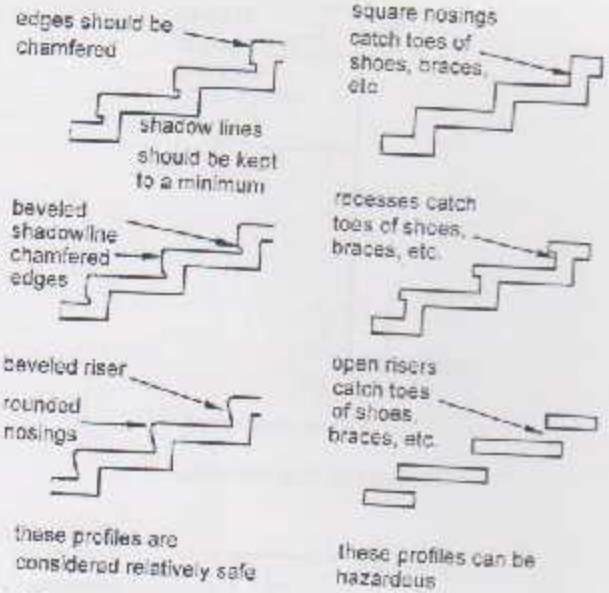




6.10 Tactile warning pavings. These have value as devices to warn visually impaired people of hazards. They need to be in strips or areas large enough to be detectable.



impaired person walking. The Typhlo cane is by those with limited vision. It will detect objects specific range. Nothing should project into a above a height of 680 mm.



6.12 *Various tread profiles*

opportunities for creating character and drama. They can be divided into three main

which are sculptural as they have been literally the ground: earth or rock

are part of an element or structure; a retaining wall usually a *plinth* – eg *the steps of St Paul's,*

kind, sometimes no more than a ladder

materials of steps should aim to reinforce the site. However, steps constitute a formidable hazard for those with visual or mobility per cent of all accidents to visually at level changes. Locate any unexpected of the main line of pedestrian traffic. single step in a walkway, except for kerbs flights of at least three steps, their presence should conspicuously, with visual and textural warnings at

shadow line profiles

often included in steps for reasons of appearance. dangerous if large enough to catch the toes of Nosings can also catch toes unless they are

various nosing and shadow line profiles some of particularly to disabled people, and are recommended. The nose of each step should be easy by confusing surfacing patterns. Treads should from one another. Open treads and shadow line tripping and should be used with discretion.

a flight of steps has a crucial influence on its

tread/riser ratio, although some guidance can be provided. Interior standards such as given in Chapter 2 should not be used externally; steps with those ratios become precipitous when descending. Also, people tend to move faster outdoors than they do indoors.

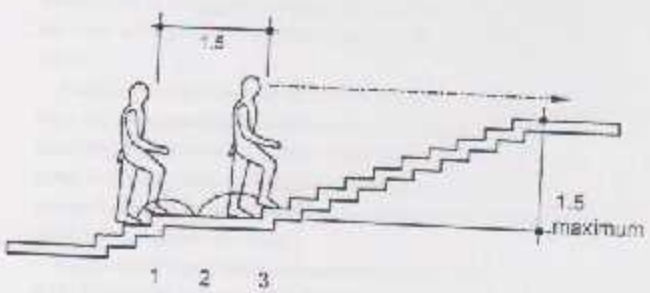
Inherent to a particular tread–riser ratio is the ease at which the steps can be used in relation to the person's natural pace and his or her sense of rhythm, **6.13**.

In dimensionally tight situations an appropriate tread–riser ratio has to be determined that will allow a given number of steps (including landings if necessary) to fit the available space. Risers for outdoor stairways should be a minimum of 112 mm, a maximum of 175 mm.

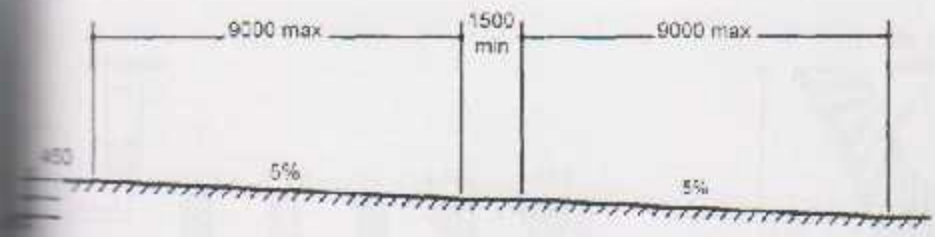
Most examples show a more generous tread–riser than that achieved by formula. The steps to the Acropolis in Athens are 494 mm tread (going) · 173 mm rise, the Spanish Steps in Rome are 400 · 150 mm.

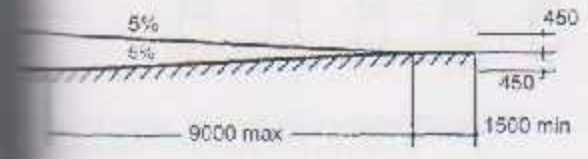
3.05 Surfacings

Textured materials are most suitable for treads as they provide a grip in wet and icy weather. It is also an advantage if they are in



6.13 *Stair height and landing proportions, at least two, preferably three steps to be provided. Longer flights should preferably be in multiples of five treads to alternate the feet. Landings should be long enough to allow an easy cadence, at least three strides. Longer landings should be to multiples of 1.5 m. The rise between landings should not exceed 1.5 m so that the next landing is visible, greater heights are psychologically uninviting. If it unavoidable, provide a landing*





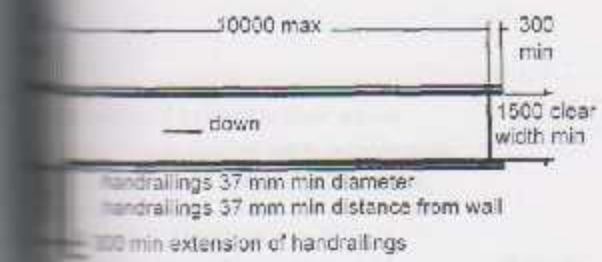
ramps, straight and dog-leg

determined according to type and intensity of use. One- requires a minimum width of 900 mm clear, whereas needs 1500 mm. **6.18** Where turns occur at space for manoeuvring wheelchairs must be

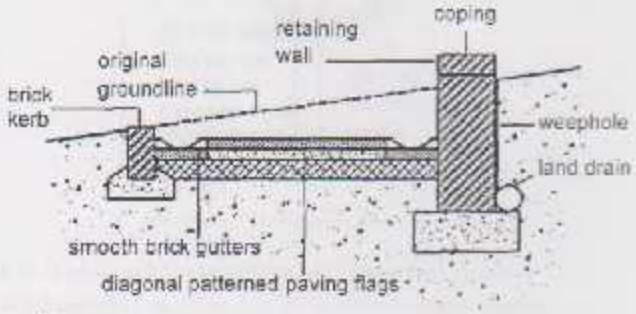
both sides of a ramp will be higher or lower than ground. Where the side is lower than the ground, there or a retaining wall. The base of a bank will need kerbing.
ramp is higher than adjacent ground, guarding will be Section 5 of this chapter for details.

the ramp depends on its slope and location. A suitable where the use is minimal and the slope is In an urban situation with steep slopes, a tarmac with chippings rolled in would be more In extreme slopes bricks or blocks can be used, drainage channels and gullies. A useful form of in **6.19**.
should have grip, with low kerbs (at least 50 mm edges of ramps and landings for detection by

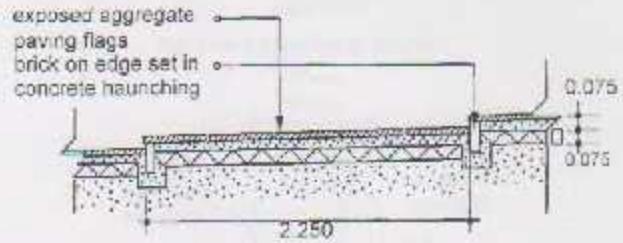
rainwater will run rapidly down a ramp: landings the flow. Gullies should be placed where they to people or wheels. Linear drains are bottom of a ramp.



criteria for a two-way ramp for wheelchairs. the minimum width is 900 mm



6.19 *Diagonally ribbed slabs can be used to pave a ramp surface. This provides grip, and rainwater drains to the side*



6.20 *A perron, or stepped ramp. May be used where prams, pushchairs and trolleys are expected but not suitable for most wheelchair users*

4.07 Ramped steps or perrons

These can be useful for long hills where a ramp would be too steep. They are not suitable for wheelchairs. 50 mm risers can be negotiated by prams and buggies. Allowing three paces on each tread (2.2m) an overall gradient of 7 per cent can be achieved. **6.20**

5 HANDRAILS

5.01

Handrails should be provided to all stairways and ramps, and may also be installed along paths to assist less mobile people. They are important for safety, for support and for guidance of those with visual difficulties.

In recreational settings, ropes with periodic knots have been used as location devices enabling the visually impaired to enjoy areas and places which were previously inaccessible.

Handrails should not be an afterthought, or seen purely as a safety factor. It is preferable to provide handrails on both sides of a stairway or ramp because some people have one-sided strength. Extra-wide stairways should have centre railings no more than 6 m apart.

The ends of railings should extend beyond the top and bottom steps of stairways by 300 to 450 mm. They should be continuous across intermediate landings and should be capable of supporting 114 kg of mass. Handrails should be easy and comfortable to grip, **6.21**. There should be no sharp or protruding ends, edges or fixings. When fixed to walls they can be trude or be inset, **6.22**.

users require places to stop and rest off the
, and somewhere to set packages. These should be
benches for their friends and carers.
ering should be designed for easy maintenance and
materials should resist vandalism. Surfaces should
shed water, but weep holes should not drain onto
where wetness or ice may constitute a hazard.

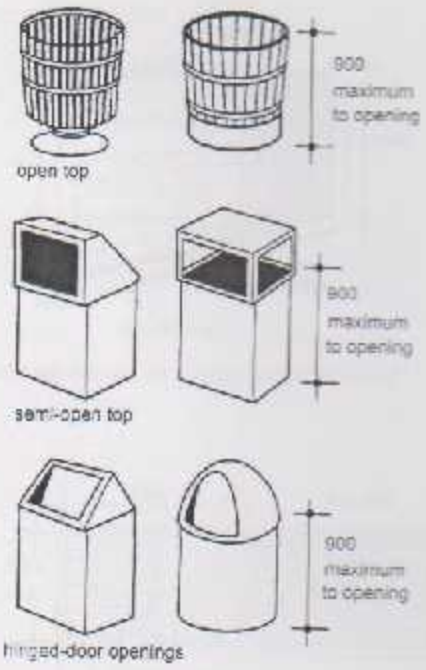
for sitting on are typically 400–450 mm wide, and
and 550 mm in height; 400 mm being most common.
elderly, a greater height is preferred.

FURNITURE

should be carefully organised for safety and easier
those with visual impairments. Elements should be
by care, either in themselves or by way of a
A linear textured surface can be used to separate a
ture from clear walking space.

ures 6.27

that are usable by disabled people. 6.27 Open-top
the easiest but allow snow and rain to collect. Semi-
ent entry of snow and rain and are relatively easy to
ed-door varieties prevent entry of snow and rain, but
find them difficult to use.



Litter bins

barriers are

Privacy ..
Safety

definition

control

modification – climate, noise.

8.02

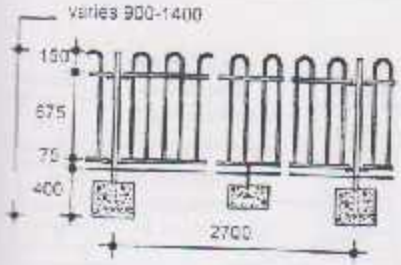
The type, size and the materials will largely be determined by the prime purpose (see Table 1). The site and local character should influence the style, especially if it is not level. The design should also consider scale, proportion, rhythm, colour and texture. Practical matters, such as Building Regulations, accurate boundary surveys, easements, fire and safety access as well as economic factors, construction methods and maintenance, must not be overlooked.

8.03 Posts and bollards

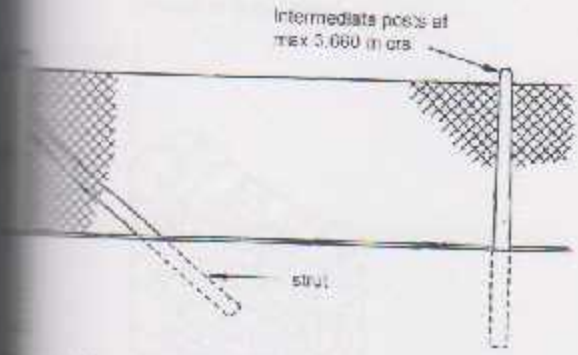
These are mainly used to prevent vehicles encroaching on pedestrian areas. They should preferably not be placed in the main line of pedestrian travel and should allow free pedestrian movement. **6.28.**

				Windbreak	To	Durability		Climbable	Permanence	Remarks
Physical	Visual	Noise								
	barrier (security)	barrier (privacy)	define space							
	✓	✓	✓	✓		✓				
	✓	✓	✓(i)	✓		✓	High	X	High	
	✓		(i)			✓	High	X	High	(i) If properly placed and fixed
	✓					✓	Low	✓(ii)	Low	(i) If properly placed and fixed
	✓					✓	Med	✓(i)	Med	(i) Depending on design
	✓	-	-	-		✓	High	✓	Med	
		X	-	-			High	✓(i)	High	(i) Depending on design
	✓	✓(i)	-	-		✓	Med	✓(ii)	Med	(i) Woven wire can be a directional visual barrier, e.g. glare factors on motorway
	✓			✓(i)		✓		✓		(ii) Chain link if large mesh
	✓	X					Med	✓	Med	
	✓(i)						Med		Low	(i) Only for the law abiding
	✓	✓		✓(ii)		✓	Med		Med	(i) Unless very high
		✓(i)								(ii) If high enough
		X		✓		✓	High	✓	Low	
	(i)	-	-	-		-	High		High	(i) For animals
	(i)						Med		Med	(i) If spiky, e.g. hawthorn

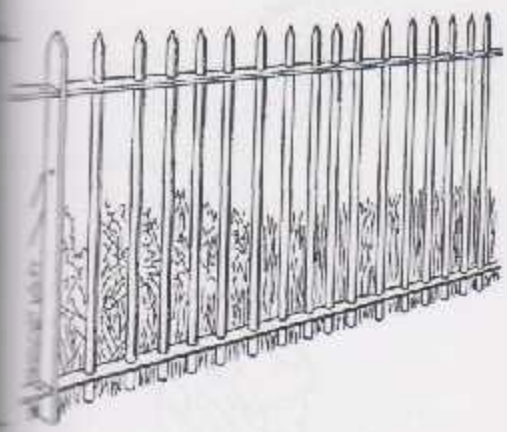
palisade fence



railings, hairpin top



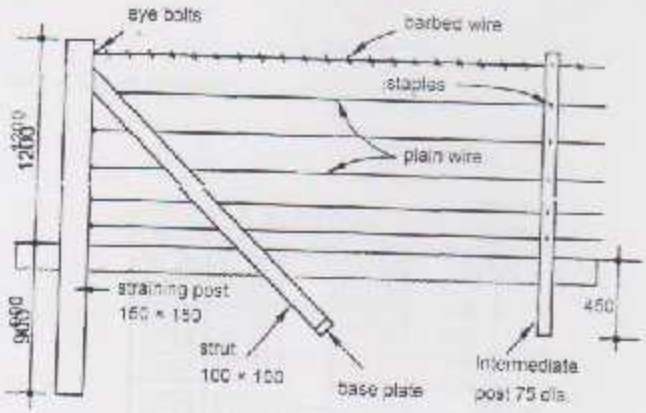
fencing on precast concrete posts



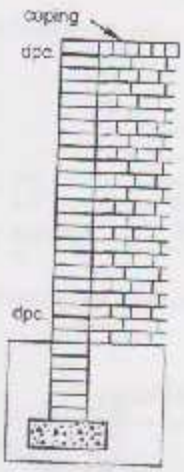
round bar fencing

Table III Heights of fencing

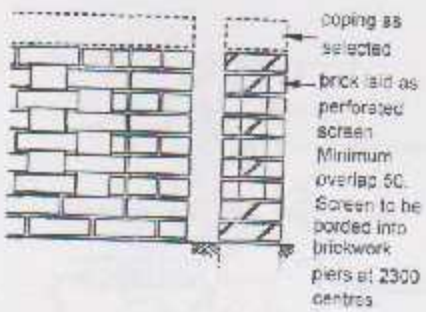
Type	Height in (m)
House garden fronts and divisions	0.9
Minimum for children's playgrounds, general agricultural	1.2
House gardens, playing fields, tennis on grounds,	1.8 3.6
highways, railways	
Common of property	
Industrial security fencing	1.8
	2.1



6.39 *Strained wire fence, end and corner posts braced*



6.40 *Brick wall (showing various bonds and pointing details)*



6.41 *Brick perforated screen wall*

free-standing, retaining or screen, can be built *m-*
concrete blocks, bricks, stone, timber and even
their own or in combination. Table IV and 6.40 to
types.

detail is necessary for pleasing appearance.
Damp-proof courses and copings must be

not exceed the safe limits given in Table V,
strength zones in 6.49. Piers at intervals along unit required. Since any large area would become boring, an open
capacity to withstand wind, but staggering screen is usually more successful when used sparingly as a

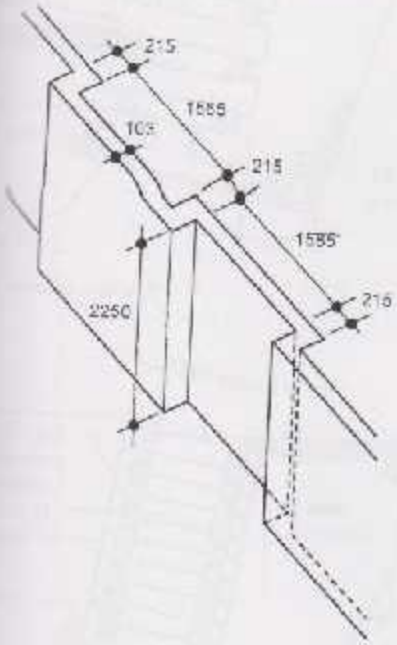
the wall as in 6.50 is more efficient. By this method a half-brick wall can be built up to 2.25 m high in Zone 1

8.08 Open-screen walls

Scale, texture and pattern should decide the type of open-screen

...ights of masonry garden walls (from D.o.E. leaflet *Your garden walls*)

...ness ↓	Maximum height (mm)			
	1	2	3	4
...mm)	525	450	400	375
...mm)	1400	1500	1175	1075
...ick (330 mm)	2400	2175	2000	1925
...	400	350	325	
...	925	850	775	
...	1825	(cm)	1525	



...ed brick wall

...walls

...methods of stone wall construction are dry wall and ... stone walls have no mortar, the stones are ... and the stones are laid flat. Mortar-laid stone ... footings (and therefore are stronger and can ... require fewer stones than dry walls.

...stones

...e random rubble or ashlar. The former has the ... or cut by the mason in the field, while for the latter ... pre-cut and dressed before delivery to the site. ... should be similar in size, or, if in a variety of ... should be evenly distributed to give a balanced ... the wall.

... is fortunate in having a variety of styles for stone ... geographical regions. For new walls it is best to ... character.

...d hedge banks

... are built with two faces of battered rubble stonework ... grass sods, with the centre filled with rammed ... a stone hedge disappears behind naturalising ... construction of a hedge bank follows the same ... hedge but using turf instead of stone to form ... height and so a simple post and wire fence is ... when stock has to be contained.

... devices for separating formal gardens from ... brick or timber with a link barrier and the opposite ground graded to a 33 per cent slope.

9 RETAINING WALLS

9.01

These are used to make an abrupt change of level where there is insufficient room for a slope. Table V shows the principal types. In general they require careful structural design combined with an efficient drainage system.

9.02 Reinforced earth

This is a recent innovation consisting of a geotextile membrane tied back into the soil with anchors, **6.51**.

9.03 Masonry

Masonry structures for retaining ground can be constructed in many materials, both on their own or reinforced with steel bars:

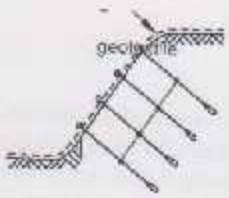
- *In situ* concrete, **6.52**
- •• Concrete blocks
- Precast concrete
- Brickwork
- ••
- Natural stone
- •

9.04 Concrete crib

This is constructed of precast reinforced concrete units laid in interlocking stretchers and headers to form vertical bins which are filled with crushed stone or other granular material, **6.53**. They are a particularly utilitarian solution for retaining fills in situations where excavation is not necessary. Reinforced projecting lugs on the headers are typically used to lock the headers and stretchers together.

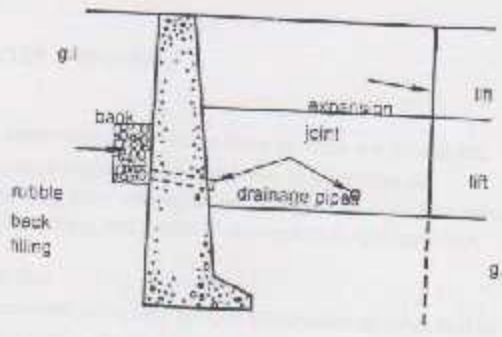
9.05 Timber crib

Crib walls may be built of timber when a more natural appearance of wood is desired, **6.54**. All units should be pressure-treated with a preservative. Used railway sleepers were commonly used in

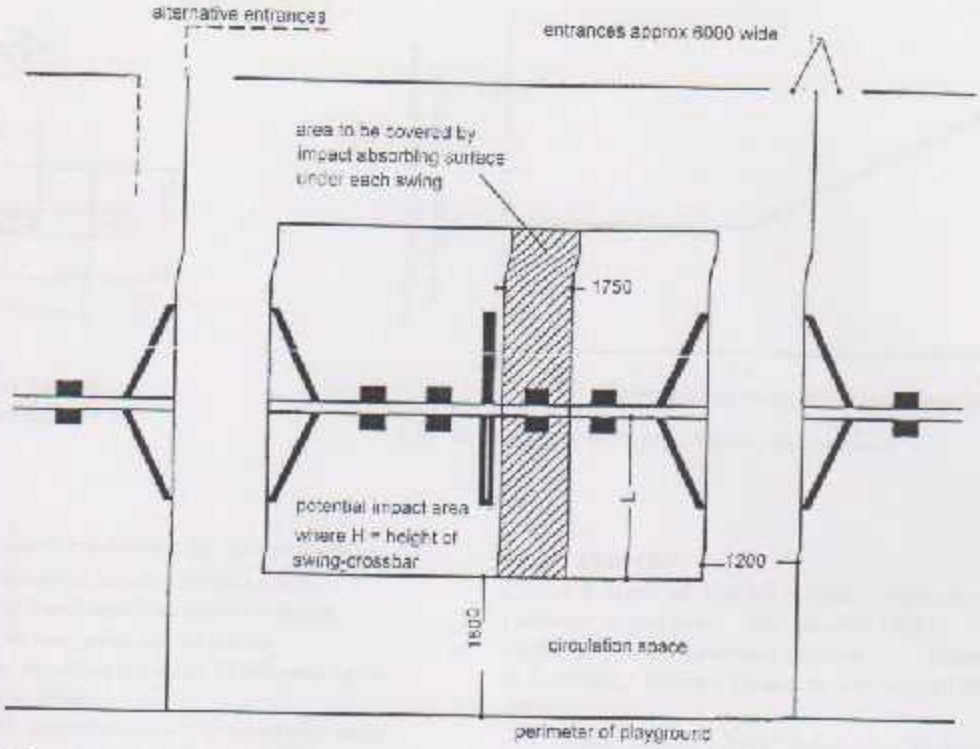


anchor spacing varies with slope

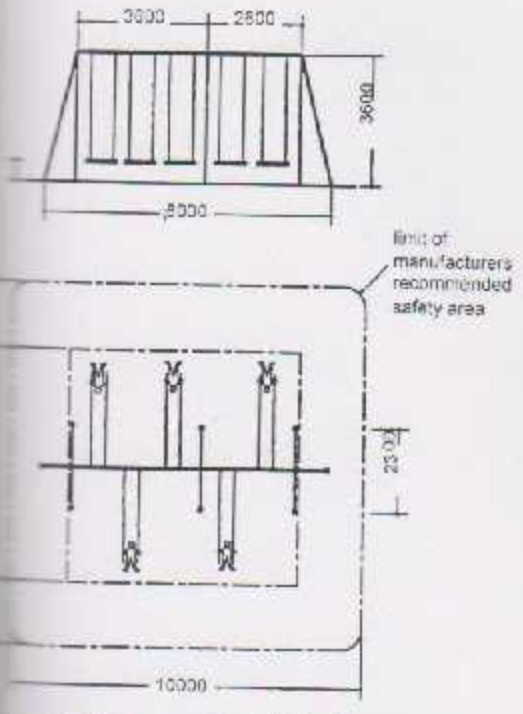
6.51 *Reinforced earth retaining structure*



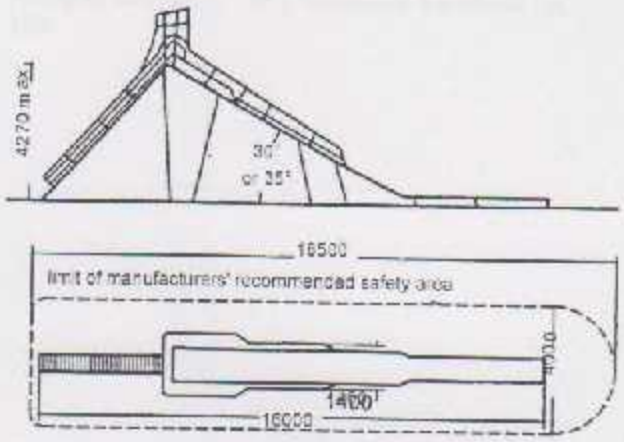
6.52 *Mass concrete retaining wall. Note rubble backfill and ... pipes to facilitate drainage. Failure can occur if water*



6.63 Arrangement of barriers and impact absorbing surface for children's swings. L = (0.866 × distance from swing pivot to swing seat) + 1.75



... of full-size swing in a park. Smaller sizes are

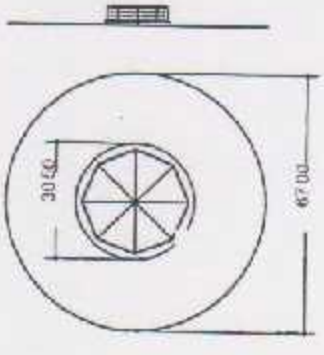


6.65 Large slide for park. These are now normally installed on an earth mound to reduce the risk of falls

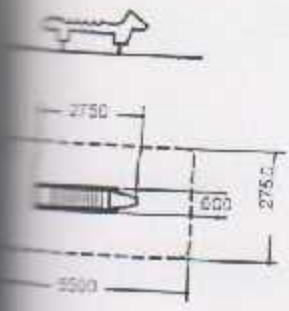
...S PLAY EQUIPMENT

... suppliers of play equipment whose design ... changed dramatically over the last ten years. ... not changed is the need for the safety of ... around the equipment.

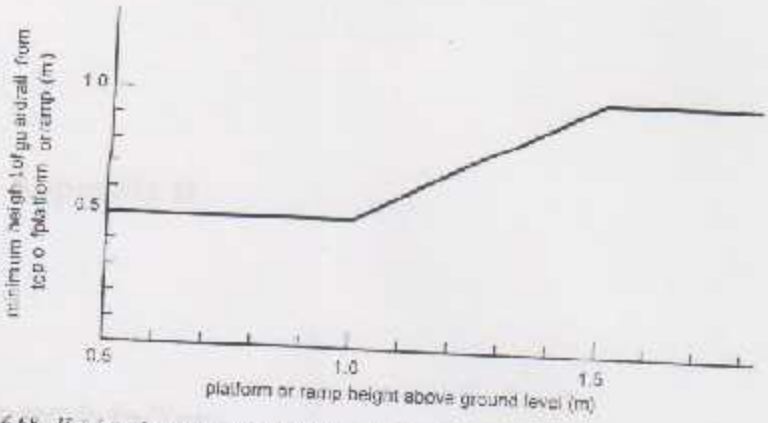
... show the distances required for safety around ... All equipment should have impact-



6.66 Roundabout



horse. Only safe
device may now be



6.68 *Heights of guardrails for children's play equipment*

surfaces wherever a child can fall. To a small child,
a distance of no more than 150 mm can be fatal.
variety of impact-absorbing surfaces available,
materials, resin rubbers, etc., but each has
Many are subject to damage by deliberate vandal-
are prone to fouling.
possible, guardrails should be provided even where
absorbing surface is used. 6.68 gives the recommended
such guardrails.

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Introduction

Addra Gazelle*Gazella ruficollis*

STATUS: Critically endangered	**HABITAT:** arid areas with sparse vegetation	**DIET:** herbs, shrubs, coarse desert grasses
ACTIVE: diurnal	**LIFESPAN:** Captive: 13 yrs. Wild:10-12 yrs.	**OFFSPRING:** single young per birth
LENGTH: 55-66 in (140-168 cm)	**WEIGHT:** 88-187 lb. (40-85 kg)	**RANGE:** Sahara desert, from Sudan to Mauritania

African Crested Porcupine

Hystrix africaeaustralis

STATUS: Least Concern	**HABITAT:** forest, rocky areas, deserts	**DIET:** bark, roots, tubers, nuts, fruits, insects, small vertebrates
ACTIVE: nocturnal	**LIFESPAN:** Captive: 20 yrs. Wild: 20 yrs.	**OFFSPRING:** 1-2 per litter
LENGTH: 22-37 in (60-93 cm)	**WEIGHT:** 22.1-66.1 lb. (60-93 cm)	**RANGE:** northern Africa

African Elephant

Loxodonta Africana

STATUS: Endangered	**HABITAT:** deep forest, open savannas, river valleys, thorn bush, wet marshes, semi-desert scrub	**DIET:** grasses, leaves, branches, roots, fruits, tree bark
ACTIVE: diurnal	**LIFESPAN:** Captive: Up to 70 yrs. Wild: Up to 70 yrs.	**OFFSPRING:** single young per birth (twins are possible)
LENGTH: male: up to 12 ft. (3-75 m) female: up to 9 ft. (3 m)	**WEIGHT:** male: up to 14,000 lb. (6,350 kg female: 9,000 lb. (4,082 kg)	**RANGE:** central and east Africa, south of the Sahara

African Leopard *Panthera pardus*

STATUS: Stable	**HABITAT:** savanna, woodlands, tropical forest	**DIET:** other mammals, birds, arthropods
ACTIVE: nocturnal	**LIFESPAN:** Captive: 21-23 yrs. Wild: 7-9 yrs.	**OFFSPRING:** 1-3 young per litter
LENGTH: 60-75 in (150-190 cm)	**WEIGHT:** 66-155 lb. (30-70 kg)	**RANGE:** sub-Saharan Africa, southern Asia; scattered populations in north Africa and Arabia

African Slender-Snouted Crocodile

Crocodylus cataphractus

STATUS: Endangered	**HABITAT:** Rivers with dense over hanging vegetation, lakes	**DIET:** Insects, crabs, fish, frogs
ACTIVE: Diurnal	**LIFESPAN:** Captive: 45-50 yrs. Wild: Unknown	**OFFSPRING:** 13-27 eggs per clutch
LENGTH: 10-13 ft. (2.5-4.2 m)	**WEIGHT:** 275-716 lb. (125-325 kg)	**RANGE:** Central and West Africa, from Mauritania and Senegal to North Angola east to Zaire, Zambia, and East

Bog Turtle

Clemmys muhlenbergii

STATUS: Threatened	**HABITAT:** wetland	**DIET:** seeds, berries, insects, slugs, worms, crayfish, frogs, snakes, snails, carrion
ACTIVE: Diurnal	**LIFESPAN:** Captive: 21 yrs. Wild: 8-9 yrs.	**OFFSPRING:** 2-5 eggs per clutch
LENGTH: up to 4 in. long (10 cm)	**WEIGHT:** 5 ounces (1.5 g)	**RANGE:** -

Chimpanzee
Pan troglodytes

STATUS: Endangered	**HABITAT:** tropical rain forests, other forest types, savannah-woodlands	**DIET:** leaves, fruits, nuts, insects, eggs, meat
ACTIVE: Diurnal	**LIFESPAN:** Captive: up to 60 yrs. Wild: up to 50 yrs.	**OFFSPRING:** single young occasionally twins
LENGTH: 2-4 ft. (70-100 cm)	**WEIGHT:** 100-185 lb. (45-84 kg)	**RANGE:** western and central Africa

Cheetah
Acinonyx jubatus

STATUS: Vulnerable	**HABITAT:** savannas, semi desert, open grasslands, thick bush, dry forest	**DIET:** small to medium sized ungulates, birds, hares, small mammals
ACTIVE: Diurnal	**LIFESPAN:** Captive: up to 19 yrs. Wild: 10-16 yrs.	**OFFSPRING:** 1-8 per litter
LENGTH: 44-59 in (112-150 cm)	**WEIGHT:** 77-158 lb. (35-72 kg)	**RANGE:** isolated populations in sub-Saharan Africa, mainly eastern and southern

Helmeted Guinea Fowl

Numida meleagris

STATUS: Least concern	**HABITAT:** open savannas, woodland, dry scrub	**DIET:** seeds, roots, sedge tuber and insects
ACTIVE: Diurnal	**LIFESPAN:** Captive: 12 yrs. Wild: unknown	**OFFSPRING:** 6-12 eggs per clutch
LENGTH: 20-25 in (50-63 cm)	**WEIGHT:** 2.5-3.5 lb. (1-1.6 kg)	**RANGE:** -

Lesser Kudu

Tragelaphus imberbis australis

STATUS: Lower Risk / Conservation Dependent	**HABITAT:** dry, flat, and densely thicketed areas, woodlands and hilly land	**DIET:** twigs, leaves, fruits, grasses
ACTIVE: nocturnal	**LIFESPAN:** Captive: up to 23 yrs. Wild: 7-8 yrs.	**OFFSPRING:** single young per birth
LENGTH: 43-55 in (110-140 cm)	**WEIGHT:** male: 202 - 238 lb. (92-108 kg) female: 123 - 154 lb. (56-70 kg)	**RANGE:** -

African Lion

Panthera leo

STATUS: Vulnerable	**HABITAT:** open woodland and mixed areas of thick bush, scrub and grass	**DIET:** medium to large ungulates (hoofed animals)
ACTIVE: nocturnal	**LIFESPAN:** Captive: up to 30 yrs. Wild: 15-16 years	**OFFSPRING:** 1-6 young per litter
LENGTH: male: 5.5-8 ft. (1.5-2.5 m) female: 4.5-6 ft. (1.4-2m)	**WEIGHT:** male: 330-550 lb. (150-250 kg) female: 264-400 lb. (120-181 kg)	**RANGE:** sub-Saharan Africa, mostly eastern and southern

Long-Eared Owl

Asio otus

STATUS: Least Concern	**HABITAT:** Open woodlands, thickets, forest edges	**DIET:** Voles, mice, small mammals, some birds
ACTIVE: nocturnal	**LIFESPAN:** Captive: 10 yrs. Wild: Up to 27 yrs.	**OFFSPRING:** 2-10 eggs per clutch (usually 4-5)
LENGTH: 13.75-15.75 in (35-40 cm) wingspan: 35-39.5 in (90-100 cm)	**WEIGHT:** 9-10 oz. (259-282 g)	**RANGE:** -

RANGE:

Ostrich

Struthio camelus

STATUS: Common	**HABITAT:** open woodlands, savanna, arid shrub land, desert, grasslands	**DIET:** green grass, browse on shrubs, succulents, seeds, few insects
ACTIVE: diurnal	**LIFESPAN:** Captive: up to 40 yrs. Wild: 20-30 yrs.	**OFFSPRING:** clutch averages 13, multiple females lay in the same nest for incubation
LENGTH: male: 6.5-8 ft. (2-2.5 m) female: 5-6.5 ft. (1.5-2 m)	**WEIGHT:** male: 242-330 lb. (110-150 kg) female: 198-242 lb. (90-110 kg)	**RANGE:** Africa, north and south of equatorial forest belt

Plains Zebra

Equus burchellii

STATUS: Lower risk	**HABITAT:** grasslands	**DIET:** grasses
ACTIVE: diurnal	**LIFESPAN:** Captive: 35-40 yrs. Wild: 15-20 yrs.	**OFFSPRING:** single young per birth
LENGTH: up to 59 in (1.5 m) at shoulders	**WEIGHT:** 500-800 lbs. (227-363 kg)	**RANGE:** eastern and southeastern Africa

Red Fox
Vulpes vulpes

STATUS: Common	**HABITAT:** edges of forest, field	**DIET:** small animals - rodents, earthworms, birds
ACTIVE: nocturnal and crepuscular	**LIFESPAN:** Captive: up to 13 yrs. Wild: 3-4 yrs.	**OFFSPRING:** 1-13 per litter
LENGTH: 35-41 in (90-103 cm)	**WEIGHT:** 7-15 lb. (3.5-7 kg)	**RANGE:** most of North America and Eurasia, southern Australia, north Africa

Snowy Owl
Bubo scandiacus

STATUS: Least concern	**HABITAT:** tundra, where mounds or rocks present	**DIET:** lemmings, rabbit, waterfowl
ACTIVE: diurnal	**LIFESPAN:** Captive: 28 yrs. Wild: 9 yrs.	**OFFSPRING:** 3-11 eggs per clutch
LENGTH: male: 22-25.5 in (52-65 cm) female: 23-26 in (59-66 cm)	**WEIGHT:** male: 22-25.5 in (52-65 cm) female: 23-26 in (59-66 cm)	**RANGE:** high Arctic in summer, ranging into southern Canada, Russia, and northern U.S. in winter

Southern White Rhino

Ceratotherium simum simum

STATUS: Endangered	**HABITAT:** dry savanna	**DIET:** grasses
ACTIVE: diurnal	**LIFESPAN:** Captive: 40 yrs. Wild: 35 yrs.	**OFFSPRING:** single young per birth
LENGTH: 118-150 in (300-380 cm)	**WEIGHT:** male: up to 6,000 lb. (2,721 kg) female: up to 4,500 lb. (2,041 kg)	**RANGE:** South Africa

Resources:

- www.oklandzoo.org
- www.zsl.org
- www.marylandzoo.org

Animal enclosure wire mesh

Small birds Aviary

Photographed by research preparers (family zoological garden-Jerusalem)

http://www.steelropemesh.com

Big Birds Aviary

Photographed by research preparers(family zoological garden-Jerusalem)

http://www.steelropemesh.com

Safety Factors

Health and safety inspections

The purpose of a HSW(Health and Safety at Work).

- Act inspection is to enable the enforcing authority to Satisfyit that hazards have been identified, and risks suitably and sufficiently controlled .
- Inspections to determine compliance with the HSW Act differ from inspections under the Zoo Licensing (Act 1981)as amended .

Health and safety policy

- It is a legal requirement that employers have a health and safety policy for zoos with five or more employees must also have a written statement that includes safe operating procedures and an action plan to deal with emergencies
- The zoo safety policy statement will need to be revised regularly and specifically when there is a change to the zoo or its operation .

Safety issues

Slips and trips

- Slips and trips15-17 are currently the main cause of accidents in the workplace .Both zoo employees and the visiting public are potential victims.
- Regulations require measures to be taken to avoid risks from slips and trips as Wellas to provide safe means of entry and exit for the public.
- **Slips can be caused by, or by a combination of:**

*Incorrect selection of floor, path or walkway surfaces.

*Worn out or badly maintained surfaces.

*The presence of water, grease or other substances which reduce friction.

*Inappropriate footwear something you have little control over with members of the public.

- **Trips(سقوط) may be caused, or contributed to, by:**

*Uneven floors, paths or walkways.

*Obstructed work areas or accesses, including areas where debris (حطام) has accumulated.

* Low fences or walls.

*Poor, including badly designed, lighting.

*Badly sited distractions e.g. a sign above an uneven surface or low wall.

Falls from height

- An accident involving a fall from height18 could result in death or major Injury, this hazard may be more significant in zoos with outdoor displays where people/animal separation is achieved by moats or ditches, or where walkways are provided over enclosures .Appropriate fencing, walls or other barriers must be provided to prevent the risk of falls .Such barriers should be designed to discourage people from climbing and have appropriate signage .Where steps or stairs are provided, they must comply with the relevant legislation and, if necessary, be fitted with a secure handrail.(See Appendix 1).
- Zoo employees involved in the following activities may be at particular risk of falling from height:

*Arboriculture (tree work).

*Construction or maintenance of cages, aviaries, fences or glasshouses.

*Construction or maintenance of features within the enclosures such as play equipment;

*Handlers feeding from high platforms etc.

*Roof work.

- A risk assessment on fall from height activities should consider why the work

is being done at height in the first place .If work at height is unavoidable, the following should be considered:

*How the work is to be planned and organized (including rescue).

*The competence of those involved;

*Defined systems of work;

*Safe access routes;

*Selection, use and inspection of work equipment.

*Barriers or harness rails for areas that are accessed regularly.

- Work from ladders is particularly hazardous, especially in areas to which animals have access, in restricted spaces, or where the ground is uneven .Ladders should generally be used only for short duration (15-30 minutes) , light work. Ladders must be of an appropriate design and suitable for work conditions .They must be examined before each use, and properly maintained .Staff must be trained in their use.

Vehicle safety

- As an employer you are required to manage vehicle activities to ensure the safety of your staff and people who visit your zoo.20 Accidents resulting from the use of vehicles in workplaces include:

*Vehiclescolliding (تصادم) with staff or visitors;

*Vehicles reversing into staff or visitors;

*Vehicles colliding with buildings or animals, especially large ones;

*Vehicles overturning.

- Vehicles used in a zoo include:

*Tractors, with or without trailers (عربة مقطورة).

*Lift trucks and other types of mechanical plant;

*Delivery, patrol or other utility vehicles; and

*Cars and coaches in visitor car parks.(See Appendix 2).

Young people and volunteers

- The Education Act 1996 and the Education)Scotland (Act 1980 place limitations on the type of work that school students can do on a placement .In this section, a **young person** is someone who **has** reached the minimum school leaving age)MSLA (of 16 but is still under 18 years of age.
- A **child** is someone who **has not** yet reached the MSLA .Your local educationauthority can give you further details.
- Zoos can employ young people or offer them work experience as students or volunteers .You do not need to get parental consent to employ a young person; Children under the age of 13 **cannot** be employed in a zoo .Older children (14-15) may be employed to do certain work, but their duties and hours of work are strictly controlled, often through local by-laws .You have to register such employment, normally with your local education authority where you will obtain the advice you need.
- Children (14-15)may also work with you on work experience placements. This will be under strictly controlled circumstances following a specific risk assessment .Work experience arrangements must **not** involve children or young people working in ways that are specifically prohibited for young people under the age of 18 years, eg working with dangerous machinery or high-risk lifting equipment.
- Zoos attract volunteers of all age groups, however it should be noted that the HSW Act provides the same protection for volunteers as it does for employees.
- Further guidance regarding young people and volunteers can be found in the following HSE publications:

* Young people at work :A guide for employers;39
* Charity and voluntary workers :A guide to health and safety at work;40
* Managing health and safety on work experience :A guide for organizers.41

78 The Working Time Regulations 1998)as amended (apply to students on work experience placements .

- The gates controlling entries and exits from large drive-through enclosures should operate safely .In a busy zoo, the operation might be performed mechanically by trained employees who would need:

*A safe, protected workstation from which to operate the remote control of the gates .This should allow good visibility of the area surrounding the gate.

*Protectionfrom adverse weather conditions.

*Easy access to drinking water and sanitary accommodation.

*A visible waiting area for vehicles, clear of vegetation and obstructions which could potentially assist animals in an attempted escape.

*An appropriate means of communication to report danger and summon Assistance.

*A system to ensure that the gates can be operated safely in the event of mechanical or power failure.

Source

Managing healthand safety in zoos

Secretary of State's Standards of Modern Zoo Practice Available online at www.defra.gov.uk

Appendix E

Friend Zoo of Jerusalem

Appendix E

Saline Park is located in West Jerusalem, and owned by the Jews for this reason was getting very little information and we could not get the non-horizontal plan This is in addition to some of the information we received from a telephone conversation held with the zoo keeper, and were taken based upon some information that will help us to design in the subsequent phase, and these things, including:

*Total area of the garden of 55 acres.

*Overall capacity of the park about 50 thousand citizens.

*The possibility of receiving more than 5000 Moatmn that one.

*At peak times and holidays to accommodate more than 900000 inhabitants.

Master plan of friend zoo/Jerusalem.