A STUDY SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE B.SC.

RECREATIONAL TOURISM RESORT

PRESENTED BY:
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"BE STEADFAST: GOD DOES NOT LET THE REWARDS OF THOSE WHO DO GOOD TO GO TO WASTE"

HUD (115)
ABSTRACT:

The project is a Recreational resort uses the nature in relaxing, it depends totally on the ingredients of nature such as the water elements (lakes, waterfalls), mountains, trees ... etc, it’s also depends on it to create new ways to entertain tourists and to relax away from the technology and the stressful routine.

The project aims to rise the economic situation and presenting the different cultures.

The purpose of the project is trying to have a healthy society by keeping the tourists away from the work pressure and creating a quiet nature in the resort.

The project contains of many entertaining activates and residential zones.
DEDICATION:

I dedicate this thesis to my family with much love and appreciation. To my mom , my source of strength and perseverance , and to my Dad , my hero and role-model , who has always done more than he could to give us the best out of life. I can’t thank you both adequately for all what you have done to me , from loving me unconditionally , sacrificing and rising me up the right way. I could not ask for better. Only Allah will be able to reward you. A special feeling of gratitude to my sisters and brother who always added a joyful supportive flavour to my life. To my baby joe.

To my khosasa’ squad “sisters from another misters “, to the amazing Mazin and his box office , To those whom I’m blessed to know them and having them in my life ;shayma’, Jozouli , Tejo ,Snooki. a special dedication to my comfort zone the angelic Radwa . To you Ponokio .To my tears which cleared my vision seeing a brighter future full of challenges and goals .To my self , for every time I was ready to quit , but you didn’t let me and forever grateful. To my sleepless nights .

I also would like to dedicate this thesis to my many friends ,family and seniors who have supported me all the way through .
ACKNOWLEDGMENT

This project Thesis would not have been possible without the mercy of Almighty Allah. All praise and thanks are due to Allah.

First and foremost I have to thank my research supervisor Dr. Njat Osman El baroodi.

Also I want to extend my profound gratitude to

_Professor . SO’OUD SADIG .

_Administration of faculty of architecture and planning , sudan university of science and technology.

_My dear Mom and Dad .

_Finally , I want express my sincere appreciation to my classmates batch 19 .
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CHAPTER ONE

_PROJECT DEFINITION

_THE NEED FOR THE PROJECT

_AIMS OF THE PROJECT

_Public Aims .

_Personal Aims.

_THE IMPORTANCE OF THE PROJECT.

_PROJECT DIMENSIONS.

1. Functional Dimensions:
   social dimensions
   aesthetic dimensions.
   constructional dimension.

_CHALLENGES OF THE PROJECT.
ABOUT THE PROJECT

(1_1) PROJECT DEFINITION:
It is a recreational tourism project, it depends on the mountains nature and the associated activities, it provides residential services, social and the cultural services, entertainment, tourist services especially for the highlanders and mountaineers, in the best ways with an appropriate techniques.

(1_2) THE NEED FOR THE PROJECT:
*laying a side the daily routine and create a serenity.
*the rareness of such resorts.
*the amount of the wasted and non exploit tourist areas in Sudan.

(1_3) AIMS OF THE PROJECT:
• Public Aims:
  _Increasing the national economy.
  _Providing work opportunities and improving the labor force’s skills.
  _changing the architectural impression of western Sudan.
  _revitalizing the tourism sector.
• Personal Aims:
  _Applying the modern structural systems that suit the certain site.
  _achieving a personal vision of combining different activities & the nature.
  _designing a graduation project that leaves an inspirational print in this type of buildings.
  _strengthening the social bonds between the state’s residents.

(1_4) THE IMPORTANCE OF THE PROJECT:
*adding an architectural project to be a landmark and a new tourist destination.
*raising the urbanization level in the regions by such projects.
*developing the tourism concept.
*reducing the tourist concentration.
*diversifying the tourist patterns and not to limiting it in monuments and civilizations.
*Spread the concept of summering and the internal tourism to get rid of life’s pressures.
*having a project which attracts the tourists from inside & outside of Sudan and getting attention to areas with fabulous nature.
**PROJECT DIMENSIONS:**

1. **Functional Dimensions:**
   - Presenting a project with its functions and activities in a high class degree.
   - Drawing attention of the tourism investments.
   - Improving the tourism buildings.
   - Friction with nature and adopting a project goes in a line with it.

2. **Social Dimensions:**
   - Identifying the regions nature and the local cultures and traditions.
   - Preparing a society with a hospitality essence.

3. **Aesthetic Dimensions:**
   - Creating an attractive tourist spot.
   - Enjoying the contrary nature and climate of the area.

4. **Constructional Dimensions:**
   - Using modern construction methods which are more durable and least expensive.
   - Finding solutions to ensure overlapping the design with the topography.

**CHALLENGES OF THE PROJECT:**

- The flexibility of the design which allows an easily movement between the spaces with its different facilities.
- Creating a functional integration between different elements although keeping the privacy of each element.
- Spectacular and logical overlap between functions and scenes.
- Considering the aesthetic aspect as the main factor for attracting the tourists.
- Caring about the interior design of the building and create a sort of transparency between the internal and external elements.
- Getting the best design which integrates with nature using the modern techniques.
CHAPTER TWO

DATA COLLECTION SOURCES:

1. DESIGN AND PLANNING PRINCIPLES.
   - planning principles.
   - design principles.

2. CASES STUDY.

3. SITE SELECTION.

4. ABOUT TOURISM, TOURISM BUILDINGS IT’S TYPED AND COMPONENTS
DATA COLLECTION SOURCES:

(2_1) DESIGN AND PLANNING PRINCIPLES.

(2_1_1) PLANNING PRINCIPLES:

planning of recreational tourism resort is a distribution of a specific programs ,elements ,spaces on the chosen site that achieves proper and appropriate functional relations among the components of the project with different functions.

In addition to the recreational services provided by these resorts ,however, the resort must have special conditions to cover the investment needs which achieve a remarkable economic prosperity. This might be done by giving the resort a distinctive architectural character or creating a strong picture that will always remain in the memory of the tourist .

_ There are several important social factors affecting the planning and the design of most tourism resorts , including:

1. extreme calm.
2. laying a side the daily routine and create a serenity.
3. The possibility of communication with others and integration with them without the need to use names ,and to identify their customs and traditions .
4. The availability of places to exercise as an important recreational elements ,which is difficult to do in cities.
5. The rooms must have individual services to serve the individual and the family at the same time .
6. Provide business service area and telecommunications officials to meet all their requirements.

undoubtedly ,creating a photo or character of a tourism resort in the mind of tourist is an important design foundation,

this can be achieved in several ways including:

1. The maximum use of the site and it’s topography.
2. Having an action plan for the development of the village’s future.
3. Optimized Exploitation of available natural resources.
4. Perception of the available services through the site and climate.
5. Providing opportunities to communicate with the local people and exploring the cultural differences.
6. Integrating with mother nature:
   It might be visible as a panoramic terraced view or physically where giving the tourists the opportunity to touch the natural elements surroundings as plants, flowers and rocks. Often natural elements might permeate inside the resort, therefore, it should be subject to exploit the resort views, whether a park, sea, lake, water fall or a mountain.

(2_1_2) DESIGN PRINCIPLES:

Its placing facilities in the formation of anthropomorphic and integrated of buildings.

Includes:

1. Site selection.
   - The fitting of site’s area with the number of buildings.
   - The topography of earth and diversity in the formation with avoiding difficult controlled elements.
   - The nature of the surroundings areas whether green areas, buildings with different forms and views.
2. Functional bonds.
3. Traffic, Roads and transportation.
   Corridors and internal transportation are affected by site topography and the various elements that linking them, and should provide several fundamental terms as:
   _The easy access any places of the site safety._
   _transportation network should be should be easy and simple so it helps the clarity of general structure of the design, therefore, be the basis of the study of site formation, it’s divided to:
      a. Pathways and walkways.
      b. Internal transportations routes.
4. The study of optical formation.
5. - Hotel components.
6. - Traffic paths.
7. - Entries and exits.
8. - the exterior and the interior views.
9. - Number of rooms
10. Scale.
11. It is the relationship between the dimensions of -part to all- giving the vacuum sense of small and big , unite and split.
12. The colours.
   It affects the psychology of the spaces users.
   Such as:
   - blue gives the feeling of roominess.
   - orange as atonic of digestion.
   - yellow gives the feeling of happiness...etc.
   - the colours that used in residential spaces are:
     Hot colours as maroon red , baigue and pink or cold colours as baby blue or grey .
13. Lighting.
   - natural lighting .
   - lighting fixtures.
(2_2) CASE STUDIES:

(2_2_1) MOUNTAIN BREEZE RESORT:

NATIONAL PROJECT:

Location: Latakia, Qlayla, Syria

Architect: arc. Kassam

Project’s area: 1.5 hectares (the built area).

Height: 950 m over the sea level.

30 km away from basil Elassad airport.

<table>
<thead>
<tr>
<th>THE ZONE</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Residential spaces</td>
<td>1360m2</td>
</tr>
<tr>
<td>Outdoor residential spaces</td>
<td>5280m2</td>
</tr>
<tr>
<td>Entertainment spaces</td>
<td>1938m2</td>
</tr>
<tr>
<td>Athletic spaces</td>
<td>195m2</td>
</tr>
<tr>
<td>Recreational spaces</td>
<td>1365m2</td>
</tr>
<tr>
<td>Services</td>
<td>1355.5m2</td>
</tr>
<tr>
<td>Business center</td>
<td>105m2</td>
</tr>
</tbody>
</table>

FIGURE (1) SHOWS AN EXTERIOR VIEW OF THE RESORT

TABLE (1) SHOWS THE RESORT ZONES AREAS
CONSISTS OF:

A Summer restaurant
B Tree walkway
C Boutique hotel
D Pine forest
E Cycling route
F Chalets

(2_2_1_1) THE GROUND FLOOR:

FIGURE (2) SHOWS THE RESORT MASTER PLAN

FIGURE (3) SHOWS THE GROUND FLOOR PLAN
Figure (4) shows pool view.

<table>
<thead>
<tr>
<th>SPACE</th>
<th>AREA</th>
<th>NUM. OF AREAS</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reception</td>
<td>500m²</td>
<td>1</td>
<td>500m²</td>
</tr>
<tr>
<td>Information Office</td>
<td>54m²</td>
<td>2</td>
<td>108m²</td>
</tr>
<tr>
<td>Spa</td>
<td>1200m²</td>
<td>1</td>
<td>1200m²</td>
</tr>
<tr>
<td>Laundry</td>
<td>56m²</td>
<td>1</td>
<td>56m²</td>
</tr>
<tr>
<td>Restaurant &amp; Pub</td>
<td>900m²</td>
<td>1</td>
<td>900m²</td>
</tr>
<tr>
<td>Kitchen</td>
<td>65m²</td>
<td>1</td>
<td>65m²</td>
</tr>
<tr>
<td>W.C.</td>
<td>30m²</td>
<td>1</td>
<td>30m²</td>
</tr>
<tr>
<td>Travel Agency</td>
<td>35m²</td>
<td>1</td>
<td>35m²</td>
</tr>
<tr>
<td>Net Cafe</td>
<td>35m²</td>
<td>1</td>
<td>35m²</td>
</tr>
<tr>
<td>Meeting Room</td>
<td>42m²</td>
<td>1</td>
<td>42m²</td>
</tr>
<tr>
<td>Classroom</td>
<td>63m²</td>
<td>1</td>
<td>63m²</td>
</tr>
<tr>
<td>Outdoor Pool ‘1’</td>
<td>1500m²</td>
<td>1</td>
<td>1500m²</td>
</tr>
<tr>
<td>Outdoor Pool ‘2’</td>
<td>525m²</td>
<td>1</td>
<td>525m²</td>
</tr>
<tr>
<td>Parking</td>
<td>17.5m²</td>
<td>33</td>
<td>577.5m²</td>
</tr>
<tr>
<td>Total Area</td>
<td></td>
<td></td>
<td>5636.5m²</td>
</tr>
</tbody>
</table>

Table (2) shows ground floor areas.
(2_2_1_2) THE FIRST FLOOR:

FIGURE (5) SHOWS THE FIRST FLOOR PLAN.

<table>
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<th>SPACE</th>
<th>AREA</th>
<th>NUM. OF AREAS</th>
<th>TOTAL AREA</th>
</tr>
</thead>
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<tr>
<td>SUITE</td>
<td>70m²</td>
<td>6</td>
<td>420m²</td>
</tr>
<tr>
<td>SUITE’2’</td>
<td>50m²</td>
<td>2</td>
<td>100m²</td>
</tr>
<tr>
<td>SERVICE ROOM</td>
<td>m220</td>
<td>3</td>
<td>60m²</td>
</tr>
<tr>
<td>W.C</td>
<td>3m²</td>
<td>4</td>
<td>12m²</td>
</tr>
<tr>
<td>ENTERTAINMENT HALL</td>
<td>375m²</td>
<td>1</td>
<td>375m²</td>
</tr>
<tr>
<td>TOTAL AREA</td>
<td>_</td>
<td>_</td>
<td>967m²</td>
</tr>
</tbody>
</table>

TABLE (3) SHOWS FIRST FLOOR SPACES AREA
(2_2_1_3) THE SECOND FLOOR:

Figure (6) shows the second floor plan.

<table>
<thead>
<tr>
<th>SPACE</th>
<th>AREA</th>
<th>NUM. OF AREAS</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROYAL SUITE</td>
<td>120m2</td>
<td>2</td>
<td>240m2</td>
</tr>
<tr>
<td>SUITE</td>
<td>50m2</td>
<td>2</td>
<td>100m2</td>
</tr>
<tr>
<td>SERVICE ROOM</td>
<td>20m2</td>
<td>1</td>
<td>20m2</td>
</tr>
<tr>
<td>GYM</td>
<td>150m2</td>
<td>1</td>
<td>150m2</td>
</tr>
<tr>
<td>INDOOR POOL</td>
<td>45m2</td>
<td>1</td>
<td>45m2</td>
</tr>
<tr>
<td>SERVICES</td>
<td>165m2</td>
<td>1</td>
<td>165m2</td>
</tr>
<tr>
<td>TOTAL AREA</td>
<td>_</td>
<td>_</td>
<td>740m2</td>
</tr>
</tbody>
</table>

Table (4) shows the second floor spaces.
(2.2.1.4) CHALETS:

There are two types of chalets:

a. Small chalet:
   1 bedroom, bathroom, living room and terrace.

b. Family chalets:
   2 bedrooms, 2 bathrooms, salon, living room and 2 terraces.

<table>
<thead>
<tr>
<th>SPACE</th>
<th>AREA</th>
<th>NUM. OF AREAS</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chalets</td>
<td>220m2</td>
<td>8</td>
<td>1760m2</td>
</tr>
<tr>
<td>Family chalets</td>
<td>440m2</td>
<td>7</td>
<td>3520m2</td>
</tr>
<tr>
<td>TOTAL AREA</td>
<td></td>
<td></td>
<td>5280m2</td>
</tr>
</tbody>
</table>

TABLE (5) SHOWS THE CHALETS SPACES AREA

FIGURE (7) SHOWS CHALETS PLANS

FIGURE (8) SHOWS THE CHALETS VIEWS
(2_2_1_5) THIRD FLOOR:

**TABLE (6) SHOWS THE THIRD FLOOR SPACES AREA.**

<table>
<thead>
<tr>
<th>SPACE</th>
<th>AREA</th>
<th>NUM. OF AREAS</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERRACE RESTAURANT</td>
<td>576m2</td>
<td>1</td>
<td>576m2</td>
</tr>
<tr>
<td>KITCHEN</td>
<td>63m2</td>
<td>1</td>
<td>63m2</td>
</tr>
<tr>
<td>W.C</td>
<td>12m2</td>
<td>2</td>
<td>24m2</td>
</tr>
<tr>
<td>TOTAL AREA</td>
<td></td>
<td></td>
<td>663m2</td>
</tr>
</tbody>
</table>

FIGURE (9) SHOWS THE THIRD FLOOR PLAN AND THE TREE WALKWAY (HANGED WALKWAY).

FIGURE (10) SHOWS THE TREE WALKWAY.
(2_2_1_6) STRUCTURAL SYSTEM:

_The used foundations are spread foundations.

_ The building is from steel frame (columns) and slabs are made of precast concrete.

_ The roof top restaurant’s structure is a steel columns on a trussed roof.

(2_2_1_7) ZONING:

(2_2_1_7_1) GENERAL ZONING:

FIGURE (11) SHOWS THE GENERAL ZONING

(2_2_1_7_2) GROUND FLOOR ZONING:

FIGURE (12) SHOWS THE GROUND FLOOR ZONING

- Residential zones
- Athletic & recreational zones
- entertainment zone
- Business center
- ADM Zone
- Landscape
- Ent. & Reception
- Parking
- Services
(2_2_1_7_3) FIRST & SECOND FLOOR ZONING:

FIGURE (13) SHOWS 1ST AND 2ND FLOORS ZONING

(2_2_1_7_4) ZONING IN SECTIONS:

FIGURE (14) SHOWS ZONING IN SECTION A-A

FIGURE (15) SHOWS ZONING IN SECTION B-B
(2_2_1_7_5) PROS AND CONS OF THE PROJECT:

<table>
<thead>
<tr>
<th>PROS</th>
<th>CONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>_THE PROJECT is in line with the surrounding environment.</td>
<td>_The entrance is unclear.</td>
</tr>
<tr>
<td>_The best use of the view of both chalets and suites.</td>
<td>_so many wasted areas and landscape.</td>
</tr>
<tr>
<td>_The spa was located in a place so it achieves the reassurance.</td>
<td>_separating the recreational zone from the entertainment zone with the services.</td>
</tr>
<tr>
<td>_the restaurant located in the roof top which achieves the best use of the view.</td>
<td>-The services located in the “air flow path” (kitchen &amp; laundry).</td>
</tr>
<tr>
<td>_the integration between the function, nature and personal needs in one project.</td>
<td>_The un use of the PINE forest</td>
</tr>
<tr>
<td></td>
<td>_The residential spaces is not enough for the tourists.</td>
</tr>
</tbody>
</table>

TABLE (7) SHOW THE PROS AND CONS OF THE PROJECT
(2_2_2) *UBUD RESORT ( bali hanging gardens ):

Location: GYANIAR, UBUD, BALI, INDONESIA


Project’s area: 5.1 hectares

The height of the project is 110 vertical meters from the bottom to the top.

Ubud resort was built on the fast AYUNG flowing river; the reason behind the breathtaking views.

(2_2_2_1) Master Plan:

**ZONES:**

1. Residential (Chalets)
2. Recreational (Spa, Yoga, Restaurants & Coffee Shops)
3. Administration.
4. ATRHELETIC (Pools).
(2_2_2_2) Residential Spaces:

(2_2_2_2_1) **Chalet Types:**

- **Small chalets:** Bedroom & bathroom and indoor bathroom.
- **Royal chalet:** bedroom, indoor bathroom, outdoor bathroom, terrace and pool.
- **Bunk house:** bedrooms, big terrace, indoor bathrooms & pool.

(2_2_2_2_2) **Structure:**

The used structure is steel frame covered with:

- concrete walls
- internal finishes.
  - plaster
  - porcelain.
  - wicker roof hanged on dispensers.
- external finishes:
  - jalousie roofs.
  - paint (on walls).

Figure (19) shows a room interior.

Figure (18) shows a section and a cutaway section for chalets.

Figure (20) shows the chalet plan and section.
(2_2_2_3) RECREATIONAL SPACES:

FIGURE (21) SHOWS THE RECREATIONAL SPACES SHOWN IN THE VIEW

FIGURE (22) SHOWS A PANORAMIC SECTION OF THE RESORT WITH THE ENTRANCE AND SPA SHOWN.

<table>
<thead>
<tr>
<th>Space</th>
<th>Area</th>
<th>Num. Of Spaces</th>
<th>Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spa</td>
<td>108m²</td>
<td>2</td>
<td>216m²</td>
</tr>
<tr>
<td>Restaurant &amp; Café’s</td>
<td>560m²</td>
<td>1</td>
<td>560m²</td>
</tr>
<tr>
<td>Total zone’s area</td>
<td></td>
<td></td>
<td>776m²</td>
</tr>
</tbody>
</table>

TABLE (8) SHOWS THE AREAS OF THE RECREATIONAL SPACES.

(2_2_2_4) HEALTHY AND ATHLETIC SPACES:

There are two infinity pools in different levels and a Jacuzzi.

FIGURE (23) SHOWS THE TWO POOLS PLANS.
<table>
<thead>
<tr>
<th>SPACE</th>
<th>AREA</th>
<th>NUM. OF SPACES</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swimming pool ‘1’</td>
<td>255m²</td>
<td>1</td>
<td>255m²</td>
</tr>
<tr>
<td>Terrace</td>
<td>274m²</td>
<td>1</td>
<td>274m²</td>
</tr>
<tr>
<td>Swimming pool ‘2’</td>
<td>45m²</td>
<td>1</td>
<td>45m²</td>
</tr>
<tr>
<td>Terrace</td>
<td>168m²</td>
<td>1</td>
<td>68m²</td>
</tr>
<tr>
<td>Yoga hall</td>
<td>144m²</td>
<td>1</td>
<td>144m²</td>
</tr>
<tr>
<td>Terrace</td>
<td>51m²</td>
<td>1</td>
<td>51m²</td>
</tr>
<tr>
<td>Total zone area</td>
<td></td>
<td></td>
<td>937m²</td>
</tr>
</tbody>
</table>

*TABLE (9) SHOWS ATHELETIC SPACES AREA*

(2_2_2_5) ZONING:

- Entrance & parking
- Landscapes & Cycles
- Path
- ATHELETIC & healthy spaces
- Residential spaces
- Recreational spaces
- ADM. Spaces

*FIGURE (24) SHOWS THE ZONING*
**PROS AND CONS:**

<table>
<thead>
<tr>
<th>PROS</th>
<th>CONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>THE PROJECT is in line with the surrounding environment.</td>
<td>the services ain’t enough (no daily needs shops…etc s)</td>
</tr>
<tr>
<td>The best use of the view.</td>
<td>so many wasted areas and landscape.</td>
</tr>
<tr>
<td>The spa was located in a place so it achieves the reassurance.</td>
<td>irregular planning of the residential units.</td>
</tr>
<tr>
<td>the usage of the volcanic stones and retaining walls helped in both aesthetic and construction purposes.</td>
<td>some of the residential units are so far from the other zones.</td>
</tr>
<tr>
<td>the integration between the function, nature and personal needs in one project.</td>
<td>the un use of the fast AYUNG flowing river in some entertaining/athletic activities.</td>
</tr>
</tbody>
</table>

**TABLE (10) SHOW THE PROS AND CONS OF THE PROJECT**
(2.3) SITE SELECTION AND ANALYSIS:

(2.3.1) SITE SELECTION:

SITE PHILOSOPHY:

Site's location should fulfill the recreational and tourism activities with the best use of the view.

1st proposal:
Red Sea mountains
North east sudan
AREA: 10 Hectares

2nd proposal:
Kassala Mountain
Eastern sudan
AREA: 8 Hectares

3rd proposal:
Marrah Mountain
Western sudan
AREA: 5.4 hectares

Figure (25) RED SEA Mountains
Figure (26) Kasala Mountains
Figure (27) Marrah Mountains
<table>
<thead>
<tr>
<th></th>
<th>Jabal Marrah</th>
<th>Kassala mountains</th>
<th>Red sea mountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seclusion from city congestion</td>
<td>9</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Access to site</td>
<td>8</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>The view</td>
<td>10</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Climate &amp; function relevance</td>
<td>10</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Environmental elements (water falls &amp; lakes)</td>
<td>8</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>the contour gradient</td>
<td>9</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Ground and soil diversity</td>
<td>8</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Tourist activity of the area</td>
<td>8</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td><strong>TOTAL RATES</strong></td>
<td>70</td>
<td>59</td>
<td>50</td>
</tr>
</tbody>
</table>

*TABLE (11) SHOWS THE COMPARISON BETWEEN THE THREE SITES*

_**Jabal Marrah is the chosen site.**_

**(2_3_2) LOCATION:**

*(2_3_2_1) LOCATION:*
- It’s located in western Sudan, south east Darfur.
- It’s 1312 km away from Khartoum, 120 km away from the nearest airport (Neyala’s airport).
- & 120m away from the main road.

*(2_3_2_2) THE TOPOGRAPHY:*
- **Coordinates:**
  - MAREDIANS:
    - Between 22,27 east.
  - LATITUDES:
    - Between 10,16 north.
- **Soil:**
  - A volcanic rocky soil.
- **Height:**
  - Highest point on it is 2400 m of sea level rise, starts at 1400 m of the sea level rise.
- **Terrain:**
  - The contour is 2200m.
  - The vertical height is between 2-10m.
SUDAN

WESTERN DARFUR

MARRAH MOUNTAIN

FIGURE (28) SHOWS DARFUR

FIGURE (29) SHOWS DARFUR MAP

FIGURE (30) SHOWS WESTERN DARFUR MAP

FIGURE (31) SHOWS MARRAH MOUNTAIN

FIGURE (32) SHOWS THE SITE IN MARRAH MOUNTAIN

RECREATIONAL TOURISM RESORT
(2_3_3) SITE ANALYSIS:

(2_3_3_1) Arrival:

Nearest main ELMA’BED road is 80 KM eastern Marrah mountain it is 120 km away from the nearest airport (Neyala’s airport).

Result:
The site’s entrance is from east side.

(2_3_2_2) Neighborhood effects site in:

The lake is an attraction factor.

Result:
The activities that needs water surfaces or water views should face it or to be located next to it.

FIGURE (33) SHOWS A VIEW OF THE SITE

North west wind

Main road
Sub road
By mountain road

South east wind

FIGURE (34) SHOWS SITE ANALYSIS

(2_3_3_3) View points:

The most attractive two views are the deriba lake in the west and the waterfall in north east.

(2_3_2_3) WIND:
The state is in the effect of north west wind in DECEMBER To MARCH (50_61 KM/H)

(2_3_3_4) temperature and seasons:

DIAGRAM (1) TEMPERATURE AVERAGES

Summer starts on JUNE to AUGUST.

Highest temperature rate is on JULY (>40 C).

A rainy winter starts on OCTOBER to APRIL.

Temperature can get till (<-15 C) on JANUARY.

Highest rainfalls is: on JUNE up to 100 mm.

Lowest rainfall is in DEC, JAN up to 10-20 mm.
(2_4) ABOUT TOURISM, TOURISM BUILDINGS, IT’S TYPES AND COMPONENTS:

(2_4_1) THE MAIN ACTIVITIES OF THE PROJECT:-

(2_4_1_1) FIRSTLY: THE TOURISM ACTIVITY:-

(2_4_1_1_1) TOURISM DEFINITION:-

the tourism is the act of a people leaving where they live, to another place temporarily for a visit.

(2_4_1_1_2) TYPES OF TOURISM:-

1. the international tourism:- it means that a group of people leaves out of their country zone another country.

2. the local tourism:- its mean that a group of people leaves in the zone of their Country from town to town.

(2_4_1_1_3) TOURIST DEFINITION:- is that person who leaves his country or his town to another town, for more than 24 hour and in a distance more than 80 km away from his home.

(2_4_1_1_4) TYPES OF TOURISTS (PLACES):-

1. international tourist.

2. the local tourists who came from outside the country or from another states.

3. the local tourists.

(2_4_1_1_5) THE TOURISM AFFECTED BY:-

A. GEOGRAFICAL FACTORS:-

1- The area of the country and the climate.

2- providing tourist product.

3- population distribution

4- rivers and beaches.

B. EASY TRANSPORTATION.

C. ECONOMIC FACTORS:-

1- the diversity of the tourism and providing the environment For tourists.

2- to be aware about tourism.

D. ENVIRONMENTAL IMPACTS:- There has to be natural environment, and natural views.
(2_4_1_1_6) TYPES OF TOURISM:

1. Environmental tourism.
2. Sea tourism.
3. Tourism for conferences.
4. Shopping tourism.
5. Sports tourism.
7. Tourism to visit the religious places.
8. Tourism to visit the cultural places.

(2_4_1_1_7) THE TOURISM COMPONENTS:

1. The tourists.
2. Tourism places.

TOURISM IN SUDAN:

Sudan has a lot of tourism components, and it’s different because of the different environmental geography, the different histories and cultures.

(2_4_1_1_8) Historical background about tourism in Sudan:

The first tourist organization was established in 1959, and it had the name of the arena.

In 1966, it was transformed into a social reformer.

- The second part of 1966 it has become an interest to the Department of Transport and Traffic.
- From 1971 it was combined with the interest of the arena and hotels in order to collect the activity of the coast and exploitation of wealth in the country.
- In 1983 the Ministry of the arena was established.
- In 1985, the arena was reorganized to become a second pillar of the military rule.

(2_4_1_1_9) HIGH LANDS IN SUDAN:

The land of Sudan is a low-lying, low-lying silver plains, with a low plains, it has for different provinces.

1. Red Sea hills in the East.
2 – Jabal Marrah at the west
3 – Alamatong mountains.

The Nile represents as the most important phenomenon and is about 1788 km long and about 285 million
(2_4_1_1_10) THE TOURISM PLACES IN SUDAN:
- Dinder garden in the East.
- Red Sea State – Swakin. -The beaches of the Nile and its ridge and the islands located at the top Shawwal al-Shabla.

(2_4_1_1_11) THE EFFECTS OF THE TOURISM IN SUDAN:
- The historical effects and the country’s history.
- The good location and the different cultures in Sudan.

(2_4_1_1_12) TOURISM CONSTRAINTS IN SUDAN:
- The constructions of the tourism areas weren’t finished.
- There wasn’t enough workers.
- Lack of awareness of the concept of the arena in Sudan.
- The distance between the centre and the tourism areas is too far.
- High cost of the field trip
- Travel to the arena by the railways and vehicles need long hours.

(2_4_1_2) SECONDLY-ENTERTAINMENT (RECREATIONAL) SECTION:

(2_4_1_2_1) THE DEFINITION OF THE ENTERTAINMENT:
It means the facilitates that help us to be entertained and to spend a good time away from the pressure of work.

(2_4_1_2_2) TYPES OF ENTERTAINMENT:
1 – Tourism entertainment:
- General Motors - Parks - Financial - Resorts
2 – Cultural entertainment:
- Such as the Art Galleries and the Art Forum.
3 – Commercial entertainment:
- Trade Centres - Duty Free - Exhibitions - Exhibitions
4 – Sports entertainment.

(2_4_1_2_3) PROBLEMS FACING LUXURY IN SUDAN:
- The low level of living makes the basics of the life more important.
- There is no enough rules to arrange tourism activities.
(2_4_1_2_4) CALCULATING TOURISTS IN JABAL MARRAH:-

**DIAGRAM (2) SHOWS THE TOURISTS PRECENTAGES IN DIFFERENT SUDAN STATES.**

**TOURISTS CALCULATIONS:**

- Increasing rate average is 7.73
- Total tourist census of sudan = 2664994.8
- Tourists rate of Jebel marrah is 9.7% of the total rate = 258504.8
  - High tourism season rate = 258504.8 * 69% = 59481 tourist = 265 tourist per day.

**LOCAL VISITORS:**

- Western Darfur population is 132932 person.
  - Local visitor's rate = 132932 * 20% = 26586.4.
  - Local visitors per day = 73.9 visitor

* Total users of project = 340 person per day.

(2_4_2) THE COMPONENTS OF THE RESORT:-

The resort is generally composed into 4 main components:

1 / hotel building:

It provides comfort, accommodation, a place to stay in, and food for the tourists, it should be located near the rivers, seas or the mountains, and it should have gym, pools, and playgrounds, big halls for the special occasions.

2 / chalets:

It is a group of buildings separated from the hotel and has a direct view to the sea.

3 / gyms

4 / the outdoor surfaces

5 / Children playground

6 / Services:

Restaurants / Mosque / Water courses / First Aid Centre / Shops/ etc.
CHAPTER THREE

1. PROJECT ANALYSIS:
   a. Project Components:
      - Activities component.
      - Human component.
      - Spatial component.
   b. Spaces study.
   c. Spaces / Areas table.
   d. Functional diagrams:
      - Bubble diagrams.
      - Matrix diagrams.
   e. Movement schemes.

2. INDICATORS, DETERMINANTS AND DECISIONS.

3. THE ZONING.
(3_1_1) PROJECT COMPONENTS:

ACTIVITIES COMPONENT

HUMAN COMPONENT

SPATIAL COMPONENT

(3_1_1_1) ACTIVITIES COMPONENT:

Diagram (3) Shows Activities Components Diagram
(3_1_1_1_1) BASIC ACTIVITIES

Diagram (4) Shows Basic Activities Components Diagram

(3_1_1_2) BASIC ACTIVITIES

Diagram (5) Shows Supportive Activities Components Diagram
(3.1.1.2) **HUMAN COMPONENT:**

The project is being used by five types of users.

**Diagram (6) Shows Human Components Diagram**

**Diagram (7) Shows Visitors Diagram**

**Diagram (8) Shows Lodgers Diagram**
Diagram (9) Shows Administrators Diagram

Diagram (10) Shows Technicians Diagram

Diagram (11) Shows Workers (Labour) Diagram
(3_1_1_3) SPATIAL COMPONENT:

It's divided into two mainly spaces according to activities.

a. BASIC SPACES.

b. SUB SPACES.

Diagram (12) Shows Basic Spatial Components Diagram

Diagram (13) Shows Supportive Spatial Components Diagram
(3_1_1_3_1) BASIC SPACES

RESIDENTIAL SPACES
- *INTERNAL LODGES:
  - Single rooms.
  - Deluxe rooms.
  - Suite.
  - Royal suite.
  - Apartments.
- *EXTERNAL LODGES:
  - Chalets.
  - Royal chalets.

ENTERTAINMENT SPACES
- Restaurants
- Cafe’s
- Camps
- Gondola station
- Cinema
- Open spaces

HEALTHY & ATHLETIC SPACES
- *INDOOR SPACES:
  - Gym
  - Indoor swimming pool
  - Triple sport hall
  - Spa
  - Yoga hall
- *OUTDOOR SPACES:
  - Climbing training center
  - Outdoor swimming pool

CULTURAL SPACES
- Multi-purpose hall
- Galleries

Diagram (14) Shows Basic Spatial Components Diagram

(3_1_1_3_2) SUPPORTIVE SPACES

COMMERCIAL SPACES:
- Hyper market
- Clothes shop
- Gift shop
- Hunting equipment shop
- Swimming equipment shop
- ATM
- Travel agency

ADMINISTRATIVE SPACES
- General manager office
- Secretary
- Sectors managers offices
- Human resources manager office
- PR Manager office
- Accountant offices
- employees offices

SERVICE SPACES
- Service rooms
- Electricity control room
- Workshop
- Landscapes
- The central laundry
- Central kitchen
- Stores
- Guarding rooms
- Praying room (masjid)
- Water cycles
- Parking
- Emergency clinic
- Workers rest rooms

Diagram (15) Shows Supportive Spatial Components Diagram
**(3_1_2) SPACE STUDY**

**(3_1_2_1) RESIDENTIAL SPACES:**

**(3_1_2_1_1) ROOMS:**

a. **SINGLE ROOM:**
   
   It contains a single bed, cupboard, a table, and single sofa.

b. **DELUXE ROOM:**
   
   It's prepared for two people, it contains a twin bed, a sofa, a cupboard, a desk, a dining table for two with a terrace.

c. **VIP ROOM:**
   
   It's prepared for two people as well, it contains:
   
   a queen bed, a cupboard, a desk, a table, dining table in a small dining room.

**FIGURE (37) SHOWS SINGLE ROOM**

**FIGURE (38) SHOWS DELUXE ROOM**

**FIGURE (39) SHOWS VIP ROOM**

**TABLE (32) SHOWS ROOMS AREAS**

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Room</td>
<td>16m²</td>
</tr>
<tr>
<td>Deluxe Room</td>
<td>28.7m²</td>
</tr>
<tr>
<td>Terrace</td>
<td>10m²</td>
</tr>
<tr>
<td>VIP Room</td>
<td>35m²</td>
</tr>
<tr>
<td>Terrace</td>
<td>10m²</td>
</tr>
</tbody>
</table>

RECREATIONAL TOURISMORT
(3_1_2_1_2) SUITES:

It's also prepared to hold two people but provided with food preparing area, changing rooms and a wider living room. It's area escalates up to 160 m².

<table>
<thead>
<tr>
<th>Space name</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Bedroom</td>
<td>20m²</td>
</tr>
<tr>
<td>Bathroom</td>
<td>9m²</td>
</tr>
<tr>
<td>Changing Room</td>
<td>6m²</td>
</tr>
<tr>
<td>Bed Room</td>
<td>30m²</td>
</tr>
<tr>
<td>Living Room</td>
<td>40m²</td>
</tr>
<tr>
<td>Bathroom</td>
<td>4.5m²</td>
</tr>
<tr>
<td>Kitchenette</td>
<td>12m²</td>
</tr>
<tr>
<td>Balconies</td>
<td>20m²</td>
</tr>
</tbody>
</table>

FIGURE (40): SUITE PLAN AND ITS CONTENTS

TABLE (13): SHOWS SUITES AREAS

FIGURE (41): SUITE INTERIOR VIEW
(3.1.2.1.3) METHODS OF DISTRIBUTING ROOMS:

a. Rooms on one side of the corridor:

![Figure 42: Distributing Rooms on One Side of Corridor]

b. The corridor between two sides of rooms:

![Figure 43: Distributing Rooms on Two Sides of Corridor]

(3.1.2.1.4) STORIES PLANNING ACCORDING TO CORRIDORS POSITION AND SERVICES ROOMS:

1. Linear Room Arrangement:
   ![Figure 44: Shows Linear Rooms Arrangement and T Shape Arrangement]  
2. T Shape Room Arrangement:
3. L SHAPE ROOM ARRANGEMENT:

4. RECTANGULAR ROOM ARRANGEMENT:

FIGURE (45) SHOWS L SHAPE ROOMS ARRANGEMENT AND SQUARE SHAPE ARRANGEMENT.

5. CIRCULAR ROOM ARRANGEMENT:

FIGURE (46) SHOWS CIRCULAR SHAPE ARRANGEMENT

(3_1_2_1_5) CHALETS:

It is a small buildings separated from the motel/hotel with more privacy, joy and a breath taking views.

a. CHALET FOR TWO PEOPLE:

Its prepared to accommodate two people, newly married couples an any couples, its area escalates up to 58m².

<table>
<thead>
<tr>
<th>Space name</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedroom</td>
<td>16m²</td>
</tr>
<tr>
<td>Living room</td>
<td>15m²</td>
</tr>
<tr>
<td>Bathroom</td>
<td>5m²</td>
</tr>
<tr>
<td>Open kitchen</td>
<td>6m²</td>
</tr>
<tr>
<td>Terrace</td>
<td>18m²</td>
</tr>
</tbody>
</table>

TABLE (14) SHOWS CHALETS SPACES
RECREATIONAL AND TOURISM SPACES:

a. RECREATIONAL SPACES:
Including landscapes, playgrounds, outdoor games, camps and track.

- **Landscapes:**
  - should be planned in a harmonious way so it gives the feeling of joy and comfort.

b. OUTDOOR GAMES AND PLAYGROUNDS:

- **Tennis Court:**
With a 600m² area as a separated space near the main plaza so it has a central access.

(3_1_2_2_1) **Camping Spaces:**

<table>
<thead>
<tr>
<th>CAMPING TENT</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>For two people</td>
<td>3m²</td>
</tr>
<tr>
<td>For three people</td>
<td>4.5m²</td>
</tr>
</tbody>
</table>

Tent For Three People With Luggage Space: 13.8m²

TABLE (16) SHOWS TENT AREA
(3.1.2.2.2) **RESTAURANTS:**

It is a space prepared for serving/eating different types of food at different times during the day. Whether it's an indoor or an outdoor restaurant the person effective area is 2 square meters per person.

![Figure (51) Shows Effective Dimensions Of Restaurants](image1)

(3.1.2.2.3) **CLIMBING ZONE:**

It is a simulated contour gradient, used for creating type of entertainment while climbing it, were built from cement with reasonable heights to avoid dangerous accidents.

![Figure (52) Shows A Tourism](image2)

![Figure (53) Shows Simulated Mountain Types](image3)
(3.1.2.2.4) **GYMNAZIUM**:  
It contains:  
-Reception and waiting area.  
exercising sectors with coaches and exercising machines and sports equipments.  
-Aerobics section.  
-Changing rooms and water cycles.  
Each sector absorbs 40 up to 45 person with a 250 m².  
-Rest room with lockers.  

![Gym Plan](image)

*Figure (54) Shows Gym Plan*

(3.1.2.2.5) **SPA**:  
Consists Of:  
a. **Sauna**.  
b. **Beauty salon**.  
c. **Massage spaces**.  

*Figure (55) SHOW A GYM’S INTERIOR VIEW*
a. **SAUNA:**

It is a bath that uses dry heat to induce perspiration, and in which steam is produced by pouring water on heated stones. A bathhouse or room is usually made of wood, equipped for such a bath. It's built in the form of steps. The heat might increase up to 80°C.

<table>
<thead>
<tr>
<th>Spaces Name</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing Rooms</td>
<td>8m²</td>
</tr>
<tr>
<td>Sauna (sector)</td>
<td>7m²</td>
</tr>
<tr>
<td>Showers</td>
<td>5.29m²</td>
</tr>
<tr>
<td><strong>Total area</strong></td>
<td><strong>46.75m²</strong></td>
</tr>
</tbody>
</table>

**TABLE (17) SHOWS SAUNA AREAS TABLE**

b. **BEAUTY SALON:**

It is an area dedicated to cosmetic purposes for both genders, the area is estimated at 200 m².

**FIGURE (56) SHOWS SAUNA PLAN**

**FIGURE (57) SHOWS BEAUTY SALON PLAN**
c. **MASSAGE SPACES:**

Massage is the therapeutic practice of manipulating the muscles and limbs to ease tension and reduce pain. It can be effective for reducing the symptoms of disorders or pain in the muscles and nervous system, and it is often used to reduce stress. Will specify 4 rooms for traditional massage, 1 room for Thai massage and one for mud treatments.

![Figure (58) shows massage room plan](image1)

![Figure (25) shows massage room interior view](image2)

(3.1.2.2.6) **Pool spaces consists of:**

- The Infinity Swimming pool with different depths.
- Changing rooms, showers and lockers.

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swimming Pool</td>
<td>150m²</td>
</tr>
<tr>
<td>Changing rooms</td>
<td>40m²</td>
</tr>
<tr>
<td>Showers</td>
<td>7m²</td>
</tr>
<tr>
<td>Toilets</td>
<td>12m²</td>
</tr>
<tr>
<td>Pathways (20%)</td>
<td>8m²</td>
</tr>
</tbody>
</table>

*Table (18) shows pool spaces area*
_ THE JACUZZI is a swimming pool with a certain pump to pump water into circular waves that help relaxing.

FIGURE (59) SHOWS INFINITY POOL

FIGURE (60) SHOWS INFINITY POOL DIFFERENT DEPTHS.

FIGURE (61) SHOWS JACUZZI TUB DIMENSIONS.

FIGURE (62) SHOWS JACUZZI TUB DETAILS.

FIGURE (63) SHOWS JACUZZI TUB VIEW.

RECREATIONAL TOURISM RESORT
(3.1.2.2.7) TELEPHERIQUE STATION:

A Telepherique is a cabled carts used for transporting people and raw materials in the highlands, mountains and mountain resorts. The speed of the telepherique starts from 40 km/h and escalates.

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity room</td>
<td>25m²</td>
</tr>
<tr>
<td>Maintenance room</td>
<td>36m²</td>
</tr>
<tr>
<td>Storages</td>
<td>20m²</td>
</tr>
<tr>
<td>Life guards office</td>
<td>20m²</td>
</tr>
<tr>
<td>Telepherique cart (per person)</td>
<td>0.8m²</td>
</tr>
</tbody>
</table>

TABLE (19) SHOWS TELEPHERIQUE STATION AREAS

FIGURE (64) SHOWS A SECTION OF THE TELEPHERIQUE STATION

FIGURE (65) SHOWS THE TELEPHERIQUE CART DIMENSIONS AND THE MECHANICAL EQUIPMENTS DIMENSIONS.
### (3_1_3) Summerized Space’s Tables

#### (3_1_3_1)Residential Spaces:

<table>
<thead>
<tr>
<th>Residential spaces (basic space)</th>
<th>Area</th>
<th>Number of spaces</th>
<th>Total area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single room</td>
<td>28.7m²</td>
<td>12</td>
<td>344.4m²</td>
</tr>
<tr>
<td>Terrace</td>
<td>10m²</td>
<td>12</td>
<td>1200m²</td>
</tr>
<tr>
<td>Deluxe room</td>
<td>35m²</td>
<td>80</td>
<td>4240m²</td>
</tr>
<tr>
<td>Terrace</td>
<td>10m²</td>
<td>80</td>
<td>800m²</td>
</tr>
<tr>
<td>Suite</td>
<td>60m²</td>
<td>20</td>
<td>1200m²</td>
</tr>
<tr>
<td>Royal suite</td>
<td>90m²</td>
<td>10</td>
<td>900m²</td>
</tr>
<tr>
<td>Apartment ‘1’</td>
<td>120m²</td>
<td>10</td>
<td>1200m²</td>
</tr>
<tr>
<td>Apartment ‘2’</td>
<td>160m²</td>
<td>8</td>
<td>1280m²</td>
</tr>
<tr>
<td>Chalet</td>
<td>58m²</td>
<td>10</td>
<td>580m²</td>
</tr>
<tr>
<td>Royal chalet</td>
<td>72m²</td>
<td>15</td>
<td>1080m²</td>
</tr>
<tr>
<td><strong>TOTAL ZONE AREA</strong></td>
<td>_</td>
<td>_</td>
<td><strong>12824.5m²</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>SPACE AREA</th>
<th>NUMBER OF SPACES</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Name</td>
<td>Area</td>
<td>Number of Spaces</td>
<td>Total Area</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Entrance</td>
<td>600m²</td>
<td>1</td>
<td>600m²</td>
</tr>
<tr>
<td>Breakfast hall</td>
<td>625m²</td>
<td>1</td>
<td>625m²</td>
</tr>
<tr>
<td>Central kitchen</td>
<td>550m²</td>
<td>1</td>
<td>550m²</td>
</tr>
<tr>
<td>Laundry</td>
<td>315m²</td>
<td>1</td>
<td>315m²</td>
</tr>
<tr>
<td>Service room</td>
<td>20m²</td>
<td>16</td>
<td>320m²</td>
</tr>
<tr>
<td><strong>TOTAL ZONE AREA</strong></td>
<td>_</td>
<td>_</td>
<td>2410m²</td>
</tr>
</tbody>
</table>

*Total residential zone =12824.5 +2410 = 15234.5m²*

**TABLE (20) SHOWS RESIDENTIAL SPACES AREA TABLE**

(3_1_3_2) **ENTERTAINMENT SPACES TABLE:**

<table>
<thead>
<tr>
<th>Space Name</th>
<th>Area</th>
<th>Number of Spaces</th>
<th>Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main restaurant</td>
<td>850m²</td>
<td>2</td>
<td>1700m²</td>
</tr>
<tr>
<td>Café’s</td>
<td>225m²</td>
<td>3</td>
<td>675m²</td>
</tr>
<tr>
<td>Portable café</td>
<td>94.50m²</td>
<td>4</td>
<td>378m²</td>
</tr>
<tr>
<td>Cinema</td>
<td>300m²</td>
<td>2</td>
<td>600m²</td>
</tr>
<tr>
<td>Camps</td>
<td>2.4m²</td>
<td>50</td>
<td>120m²</td>
</tr>
<tr>
<td>Gondola</td>
<td>282m²</td>
<td>1</td>
<td>282m²</td>
</tr>
<tr>
<td><strong>TOTAL ZONE AREA(indoor)</strong></td>
<td>_</td>
<td>_</td>
<td>2975m²</td>
</tr>
<tr>
<td><strong>TOTAL ZONE AREA (outdoor)</strong></td>
<td>_</td>
<td>_</td>
<td>780m²</td>
</tr>
<tr>
<td><strong>TOTAL ZONE AREA</strong></td>
<td>_</td>
<td>_</td>
<td>3755m²</td>
</tr>
</tbody>
</table>

**TABLE (21) SHOWS ENTERTAINMENT SPACES AREA TABLE**

RECREATIONAL TOURISMORT
### (3_1_3_3) HEALTHY & ATHLETIC SPACES TABLE:

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>SPACE AREA</th>
<th>NUMBER OF SPACES</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GYM</td>
<td>300m²</td>
<td>2</td>
<td>600m²</td>
</tr>
<tr>
<td>Indoor Swimming Pool</td>
<td>1230m²</td>
<td>1</td>
<td>1230m²</td>
</tr>
<tr>
<td>Outdoor swimming pool</td>
<td>496m²</td>
<td>1</td>
<td>496m²</td>
</tr>
<tr>
<td>Sauna</td>
<td>484m²</td>
<td>2</td>
<td>968m²</td>
</tr>
<tr>
<td>Yoga hall</td>
<td>120m²</td>
<td>1</td>
<td>120m²</td>
</tr>
<tr>
<td>Massage rooms</td>
<td>15m²</td>
<td>10</td>
<td>150m²</td>
</tr>
<tr>
<td>Triple sport hall</td>
<td>1215m²</td>
<td>2</td>
<td>2430m²</td>
</tr>
<tr>
<td>Training spaces</td>
<td>405m²</td>
<td>2</td>
<td>810m²</td>
</tr>
<tr>
<td>Climbing training centre</td>
<td>225m²</td>
<td>1</td>
<td>225m²</td>
</tr>
<tr>
<td>Hunting training centre</td>
<td>216m²</td>
<td>1</td>
<td>216m²</td>
</tr>
<tr>
<td>TOTAL ZONE AREA (indoor)</td>
<td>_</td>
<td>_</td>
<td>6749m²</td>
</tr>
<tr>
<td>TOTAL ZONE AREA (outdoor)</td>
<td>_</td>
<td>_</td>
<td>496m²</td>
</tr>
<tr>
<td>TOTAL ZONE AREA</td>
<td>_</td>
<td>_</td>
<td>7245m²</td>
</tr>
</tbody>
</table>

**TABLE (22) SHOWS ATHLETIC SPACES AREA TABLE**

### (3_1_3_4) CULTURAL SPACES TABLE:

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>SPACE AREA</th>
<th>NUMBER OF SPACE</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi purpose hall</td>
<td>600m²</td>
<td>2</td>
<td>1200m²</td>
</tr>
<tr>
<td>Heritage exhibition</td>
<td>400m²</td>
<td>2</td>
<td>800m²</td>
</tr>
<tr>
<td>TOTAL ZONE AREA</td>
<td>_</td>
<td>_</td>
<td>2000m²</td>
</tr>
</tbody>
</table>

**TABLE (23) SHOWS CULTURAL SPACES AREA TABLE**
(3_1_3_5) COMMERCIAL SPACES TABLE:

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>SPACE AREA</th>
<th>NUMBER OF SPACES</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super market</td>
<td>240m²</td>
<td>1</td>
<td>240m²</td>
</tr>
<tr>
<td>Gift Shop s</td>
<td>30m²</td>
<td>2</td>
<td>60m²</td>
</tr>
<tr>
<td>ATM</td>
<td>7m²</td>
<td>5</td>
<td>35m²</td>
</tr>
<tr>
<td>Clothes shop</td>
<td>50m²</td>
<td>3</td>
<td>150m²</td>
</tr>
<tr>
<td>Hunting equipment shop</td>
<td>25m²</td>
<td>1</td>
<td>25m²</td>
</tr>
<tr>
<td>Climbing equipment shop</td>
<td>25m²</td>
<td>1</td>
<td>25m²</td>
</tr>
<tr>
<td>Travel agency</td>
<td>45m²</td>
<td>1</td>
<td>45m²</td>
</tr>
</tbody>
</table>

TORAL ZONE AREA _ 580m²

TABLE (24) SHOWS COMMERCIAL SPACES AREA TABLE

(3_1_3_5) ADMINISTRATION SPACES TABLE:

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>SPACE AREA</th>
<th>NUMBER OF SPACES</th>
<th>TOTAAL SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>General manager office</td>
<td>42m²</td>
<td>1</td>
<td>42m²</td>
</tr>
<tr>
<td>sectors managers offices</td>
<td>36m²</td>
<td>7</td>
<td>252m²</td>
</tr>
<tr>
<td>Secretary office</td>
<td>25m²</td>
<td>8</td>
<td>200m²</td>
</tr>
<tr>
<td>Employees office</td>
<td>20m²</td>
<td>16</td>
<td>320m²</td>
</tr>
<tr>
<td>Archive</td>
<td>16m²</td>
<td>8</td>
<td>128m²</td>
</tr>
<tr>
<td>Receptions</td>
<td>42m²</td>
<td>8</td>
<td>42m²</td>
</tr>
</tbody>
</table>

TORAL ZONE AREA _ 984m²

TABLE (25) SHOWS ADMINISTRATION SPACES AREA TABLE
SERVICES SPACES TABLE:

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>SPACE AREA</th>
<th>NUMBER OF SPACES</th>
<th>TOTAAL SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosque</td>
<td>57.6m2</td>
<td>6</td>
<td>345.6m2</td>
</tr>
<tr>
<td>Clinic</td>
<td>100m2</td>
<td>1</td>
<td>100m2</td>
</tr>
<tr>
<td>Employees rest rooms</td>
<td>50m2</td>
<td>4</td>
<td>200m2</td>
</tr>
<tr>
<td>workers rest rooms</td>
<td>50m2</td>
<td>2</td>
<td>100m2</td>
</tr>
<tr>
<td>Water cycles</td>
<td>3m2</td>
<td>30</td>
<td>90m2</td>
</tr>
<tr>
<td>Parking</td>
<td>17.5m2</td>
<td>150</td>
<td>2625m2</td>
</tr>
<tr>
<td>TOTAL ZONE AREA</td>
<td>_</td>
<td>_</td>
<td>6560m2</td>
</tr>
</tbody>
</table>

TABLE ( 26 ) SHOWS SERVICES SPACES AREA TABLE

GONDOLA STATION SERVICE:

<table>
<thead>
<tr>
<th>SPACE NAME</th>
<th>SPACE AREA</th>
<th>NUMBER OF SPACES</th>
<th>TOTAL SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity station</td>
<td>25m2</td>
<td>2</td>
<td>50m2</td>
</tr>
<tr>
<td>Maintenance workshop</td>
<td>72m2</td>
<td>1</td>
<td>72m2</td>
</tr>
<tr>
<td>Stores</td>
<td>40m2</td>
<td>1</td>
<td>40m2</td>
</tr>
<tr>
<td>Rescue team office</td>
<td>30m2</td>
<td>2</td>
<td>60m2</td>
</tr>
<tr>
<td>Workers rest room</td>
<td>50m2</td>
<td>1</td>
<td>50m2</td>
</tr>
<tr>
<td>Control room</td>
<td>16m2</td>
<td>2</td>
<td>32m2</td>
</tr>
<tr>
<td>Water cycles</td>
<td>2.5m2</td>
<td>4</td>
<td>10m2</td>
</tr>
<tr>
<td>Cafeteria &amp; entertainment hall</td>
<td>225m2</td>
<td>1</td>
<td>225m2</td>
</tr>
<tr>
<td>TOTAL ZONE AREA</td>
<td>_</td>
<td>_</td>
<td>539m2</td>
</tr>
</tbody>
</table>

*Total services zone = 6560 + 539 = 7099m2

TABLE ( 27 ) SHOWS TELEPHERIQUE STATION SPACES AREA TABLE
(3_1_3_7) ZONES TOTAL AREA:

<table>
<thead>
<tr>
<th>ZONE</th>
<th>INDOOR AREA</th>
<th>OUTDOOR AREA</th>
<th>TOTAL AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESIDENTIAL ZONE</td>
<td>15234.5m²</td>
<td>-</td>
<td>15234.5m²</td>
</tr>
<tr>
<td>ENTERTAINMENT ZONE</td>
<td>2975m²</td>
<td>780m²</td>
<td>3755m²</td>
</tr>
<tr>
<td>HEALTHY&amp; ATHELETIC ZONE</td>
<td>6749m²</td>
<td>496m²</td>
<td>7245m²</td>
</tr>
<tr>
<td>CULTURAL ZONE</td>
<td>2000m²</td>
<td>-</td>
<td>2000m²</td>
</tr>
<tr>
<td>COMMERCIAL ZONE</td>
<td>580m²</td>
<td>-</td>
<td>580m²</td>
</tr>
<tr>
<td>ADMINISTRATION ZONE</td>
<td>984m²</td>
<td>-</td>
<td>984m²</td>
</tr>
<tr>
<td>SERVICES ZONE</td>
<td>7099m²</td>
<td>2625m²</td>
<td>6560m²</td>
</tr>
<tr>
<td><strong>TOTAL AREA</strong></td>
<td><strong>26172.5m²</strong></td>
<td><strong>3901m²</strong></td>
<td><strong>30073m²</strong></td>
</tr>
</tbody>
</table>

*TOTAL PROJECT AREA = 25878 + 22345.1 = **48223.1m²** = **4.9 hectares**.
(3_1_4) FUNCTIONAL RELATIONSHIPS DIAGRAMS

BUBBLE DIAGRAMS, MATRIX AND THE MOVEMENT DIAGRAMS.

(3_1_4_1) THE GENERAL DIAGRAM:

DIAGRAM (16) SHOWS THE GENERAL ACTIVITIES BUBBLE DIAGRAM

RECREATIONAL TOURISM RESORT
(3_1_4_2) RESIDENTIAL ACTIVITIES DIAGRAMS:

Diagram (17) Residential Activities Bubble and Matrix Diagram

(3_1_4_3) ENTERTAINING ACTIVITIES DIAGRAMS:

Diagram (18) Entertaining Activities Bubble and matrix Diagram
RECREATIONAL TOURISMORT
(3_1_4_4) HEALTHY & ATHLETIC ACTIVITIES DIAGRAMS:

Diagram (19) Healthy & Athletic Activities Bubble and Matrix Diagrams

(3_1_4_5) COMMERCIAL ACTIVITIES DIAGRAMS:

Diagram (20) Commercial Activities Bubbles and Matrix Diagram
(3_1_4_6) ADMINISTRATIVE ACTIVITIES DIAGRAM:

Diagram (21) Administrative Activities Bubble and Matrix Diagram

(3_1_4_7) SERVICES ACTIVITIES DIAGRAMS:

Diagram (22) Services Activities Bubble and Matrix Diagram
(3_1_4_8) GENERAL ACTIVITIES MATRIX:

Diagram (23) shows General Activities Matrix diagram.
(3_1_5) MOVEMENT SCHEMES
EVERY USERS HAVE THEIR OWN PLACES AND MOVEMENT PATHS

(3_1_5_1) GENERAL MOVEMENT SCHEME:

DIAGRAM (24) SHOWS GENERAL MOVEMENT SCHEME

(3_1_5_2) LODGERS MOVEMENT SCHEME:
RECREATIONAL TOURISM RESORT

**Diagram (25) Shows Lodgers Movement Scheme**

**Diagram (26) Shows Visitors Movement Scheme**
(3.1.5.4) Administrators Movement Scheme:

Diagram (27) shows administrators movement scheme.

(3.1.5.5) Labour & Goods Movement Scheme:

Diagram (28) shows labours and goods movement scheme.
## (3_2). INDICATORS, DETERMINANTS AND DECISIONS:

<table>
<thead>
<tr>
<th>INDICATORS</th>
<th>DETERMINANTS</th>
<th>DECISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contour leveling</td>
<td>Best use of leveling</td>
<td>Creating views for the residential spaces.</td>
</tr>
<tr>
<td>North west wind is the</td>
<td>Orienting spaces that needs</td>
<td>Residential spaces orientation into north west, south east.</td>
</tr>
<tr>
<td>Effective wind</td>
<td>ventilation to it</td>
<td></td>
</tr>
<tr>
<td>Differences in heights</td>
<td>Using it in entertainment</td>
<td>Applying a gondola station</td>
</tr>
<tr>
<td>Rainy climate</td>
<td>Save and use the rain water</td>
<td>Use rainwater tanks and reuse it as substitute way</td>
</tr>
<tr>
<td>Terrains</td>
<td>Terrain utilization</td>
<td>Doing activities such as climbing, camping, ...etc</td>
</tr>
<tr>
<td>Site topography</td>
<td>Use a suitable techniques of</td>
<td>Using the pile foundations</td>
</tr>
<tr>
<td>Slopes in site</td>
<td>technical solution</td>
<td>Helps in drainage rainwater naturally</td>
</tr>
</tbody>
</table>

**TABLE (29) SHOWS THE INDICATORS, DETERMINANTS AND DECISIONS**

RECREATIONAL TOURISM RESORT
(3–3) THE ZONING:

Figure (66) shows the zoning

- Healthy And Recreational Zone
- Residential Zone
- ATHELETIC Zone
- Parking
- Services
- Cultural Zone
- Gondola (Telepherique) Station
CHAPTER FOUR:

1. CONCEPT PHILOSOPHY
2. THE FIRST CONCEPT DESIGN.
3. THE CONCEPT DEVELOPMENT STAGE.
4. TECHNICAL SOLUTIONS.
   _ STRUCTURE SYSTEM.
   _ SERVICES:
   • Water supply.
   • Electricity supply.
   • Sewage system.
   • Drainage system.
   • Air conditioning system.
   • Firefighting system.
   • Lighting fixtures.

   _ SITE TREATMENTS AND FINISHES.
(4_1) CONCEPT PHILOSOPHY:

“LIVING IN THE NATURE DEMANDS BEING A PART OF IT” ...This was the main concept idea, and it was presented in:

_the simulation of the climbing plants growth behaviour in engaging with the surrounding environment, this was presented in the planning and corridors shapes.

_Opening the building to the outside world such as using a panoramic stories.

_Using the terrain nature of the site as part of the project design such as: climbing mountains and lake spa.
(4.2) THE FIRST CONCEPT IDEA:

_the idea of the design was to interference the resort with the nature by forming the masses to suit the terrain and the irregular pathways.

FIGURE (67) SHOWS THE MASTER PLAN OF THE CONCEPT IDEA
FIGURE (68) SHOWS THE CHALETS DESIGNS AND HOTEL DESIGN

(4_3) THE CONCEPT DEVELOPMENT STAGE:

_organizing the corridors in a geometric way .

_Moving the plaza to the centre , works as a main lobby .

FIGURE (71) SHOWS MASTER PLAN

(4_3_1) GROUND FLOOR:

FIGURE (72) SHOWS THE GROUND FLOOR PLAN
(4.3.2) CHALETS:

Chalets designing idea was: simulating the volcanic rocks in stability while it’s existential on unstable surfaces.

FIGURE (73) SHOWS THE CHALETS SECTION.

FIGURE (74) SHOWS THE CHALETS PLANS.

FIGURE (75) SHOWS THE CHALETS ELEVATIONS AND VIEWS.
(4_3) THE DEVELOPMENT STAGE:

_developing the planning form so it becomes a smooth organic shaped.

FIGURE (76) SHOWS THE GROUND FLOOR

_Developing the hotel form by allocating the hotel to the whole natural views and achieving the idea of the interference of the hotel with the nature of the site and opening the stories to the outside world.

FIGURE (77) SHOWS THE PANORAMIC POOL PLAN

FIGURE (78) SHOWS THE DEVELOPED hotel VIEWS
(4_4) TECHNICAL SOLUTIONS:

(4_4_1) STRUCTURE SYSTEM:

BEAM AND COLUMN STRUCTURE SYSTEM:

-The type of building consists of a frame or skeleton of concrete. Horizontal members of this frame are called beams and slabs, and vertical members are called columns. The column is the most important, as it is the primary load carrying element of the building.

![Diagram of Beam and Column Structure System](image)

FIGURE (79) SHOWS THE ELEMENTS OF THE BEAM AND COLUMN STRUCTURE SYSTEM.

(4_4_1_1) FOUNDATIONS:

- SPREAD FOUNDATIONS:
  - It behaves like an inverted cantilever with loads applied in the upward direction. As a rule, a spread footing is a quite rigid element, therefore, the applied soil stresses are almost linear. These soil pressure are the loads carried by the footing that behaves like a slab and deformed by the way shown at figure.
(4_4_1_2) FLOORS:

- THE FLAT PLATE (SLAB):

The flat slab is a two-way reinforced concrete slab that usually does not have beams and girders, and the loads are transferred directly to the supporting concrete columns.

(4_4_1_3) COLUMNS:

*THE COLUMN TENDS TO PUNCH THROUGH THE SLAB IN FLAT SLABS, WHICH CAN BE TREATED BY THREE METHODS:

a. Using a drop panel and a column capital in flat slab

b. Using a drop panel without a column capital in flat slab.

c. Using a column capital without drop panel in Different types of flat slab.

_Uses of column heads:

Shear strength of flat slab is increased by using column heads.

Column heads reduce the clear or effective span, and therefore, reduce the moment in the flat slab floor.
Uses of drop panels:
1. Drop panels increase the shear strength of flat slab floor.
2. Drop panels increase flat slab's negative moment capacity.
3. Drop panels reduce deflection by stiffening the flat slabs

<table>
<thead>
<tr>
<th><strong>ADVANTAGES</strong></th>
<th><strong>DISADVANTAGES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility in room layout</td>
<td>Span length is medium</td>
</tr>
<tr>
<td>Reinforcement placement is easier</td>
<td>Not suitable for supporting brittle (masonry) partitions</td>
</tr>
<tr>
<td>Reinforcement placement is easier</td>
<td>Drop panels may interfere with larger mechanical ducting</td>
</tr>
<tr>
<td>Ease of Framework installation</td>
<td>Critical middle strip deflection</td>
</tr>
<tr>
<td>Building height can be reduced.</td>
<td>Higher slab thickness</td>
</tr>
<tr>
<td>Less construction time.</td>
<td></td>
</tr>
<tr>
<td>Prefabricated welded mesh.</td>
<td></td>
</tr>
<tr>
<td>Auto sprinkler is easier</td>
<td></td>
</tr>
</tbody>
</table>

*TABLE (30) SHOWS THE ADVANTAGES AND DISADVANTAGES OF THE FLAT SLAB SYSTEM.*
(4_4_2) **SERVICES:**

(4_4_2_1) **WATER SUPPLY:**

The used system: (ANNULAR WATER SUPPLY SYSTEM):

The water supply system is indirect and feedback system that by placing a ground tank and then work the upper cabinets after dividing the building parts and pump water to the upper reservoir through pumps for upper cabinets.

\[
\text{CALCULATIONS OF CONSUMED WATER PER DAY:}
\]

\[
\text{THE TOTAL AMOUNT } = (\text{water for daily use by lodgers } + \text{water for irrigation} + \text{water for the fire distinguishing})
\]

a. The Minimum Quantity of water per person per day:

Hotels with private bathrooms: 60 gallons "per person ".

The daily need of water per person per day = \(60 \times 3.8 = 228\) liter.

The daily need of water per day for lodgers = \(228 \times 240 = 54720\) Liter.
b. Water For Irrigation:
- 5 liters per square meter --> 1460*5 = 7300 liters.

C. Fire Extinguishing:
- 1800 liters for each hose reel.

A fire hose every 400 square meter = 1800*26 = 46800 liters.

THE TOTAL AMOUNT OF WATER = 54720 + 7300 + 46800 = 108820 LITER

(4_4_2_1_2) SPECIFICATIONS OF THE WATER TANKS AND PIPES:

a. WATER TANKS:
- Are Made Of Polyethlene with an insulating layer of of light and anti bacterial layer.
- A ground water tank to cover the need for 3 days with 231450 liters capacity.
- Water tank for the recycled waste water.
- Upper tanks to cover the need of 1100505 liters per day.
- 3 water tanks to cover the need of 7300 liter for landscapes irrigating.

b. PIPES & SPRINKLERS:
- Irrigation sprinkler's diameter 18m with a 3/4 pipe's diameter.
- Fire fighting sprinkler's diameter 4m.
- A main supply pipe with diameter of 8" to the upper tanks, a 4" pipe's diameter to the ground water tank and 2" pipe's diameter to different floors and 1" pipe's diameter to the
  - the system is annular it works by surrounding the site with a closed pipe to maintain the high pressure of water inside the pipes.
(4_4_2_1_3) LANDSCAPE IRRIGATION:

(4_4_2_1_2_1) DRIP IRRIGATION:

Is a type of micro irrigation system that has the potential to save water and nutrients by allowing water to drip slowly to the roots of plants, either from above the soil surface or below the surface. The goal is to place water directly into the root zone and minimize evaporation. Drip irrigation system distribute water through a network of Valves, Pipes, Tubing, and Emitters. Depending on how well designed, installed, maintained and operated.

![Drip Irrigation System Diagram]

FIGURE (85) SHOWS DRIP IRRIGATION ELEMENTS AND TECHNIQUES

(4_4_2_2) ELECTRICITY SUPPLY:

Electricity cables were extended from the nearest stations (NEYALA). Then it’s stepped down by a transformer to 3000V. Then reduced again by a step down transformer to 415V to 220V at the main distribution panel then to sub distribution panels.
(4.4.2.3) SEWAGE SYSTEM:

TWO PIPES SYSTEM: The system used in sanitation is the tubes system. Within the site processing unit exists because there is no global network area where runoff is collected inside the processing unit via the manholes are distributed within the site. Slope in pipe is 1:120 pvc with diameter of 12" and 6m length. Inspection rooms (manholes) is a meeting point between the two different counselors barrelled so you should put that in mind about choosing the right depth.

**FIGURE (86) SHOWS SEPTICTANK**

**FIGURE (87) SHOWS THE TWO PIPES SYSTEM.**

**FIGURE (88) SHOWS MANHOLES DETAILING**

<table>
<thead>
<tr>
<th>Name</th>
<th>Depth</th>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH1</td>
<td>45 CM</td>
<td>60 CM</td>
<td>45 CM</td>
</tr>
<tr>
<td>MH2</td>
<td>47 CM</td>
<td>60 CM</td>
<td>45 CM</td>
</tr>
<tr>
<td>MH3</td>
<td>43 CM</td>
<td>60 CM</td>
<td>45 CM</td>
</tr>
<tr>
<td>MH4</td>
<td>51 CM</td>
<td>60 CM</td>
<td>45 CM</td>
</tr>
<tr>
<td>MH5</td>
<td>55 CM</td>
<td>60 CM</td>
<td>45 CM</td>
</tr>
<tr>
<td>MH6</td>
<td>64 CM</td>
<td>75 CM</td>
<td>57 CM</td>
</tr>
<tr>
<td>MH7</td>
<td>70 CM</td>
<td>75 CM</td>
<td>57 CM</td>
</tr>
<tr>
<td>MH8</td>
<td>75 CM</td>
<td>75 CM</td>
<td>57 CM</td>
</tr>
<tr>
<td>MH9</td>
<td>82 CM</td>
<td>75 CM</td>
<td>70 CM</td>
</tr>
<tr>
<td>MH10</td>
<td>85 CM</td>
<td>75 CM</td>
<td>70 CM</td>
</tr>
<tr>
<td>MH11</td>
<td>91 CM</td>
<td>100 CM</td>
<td>75 CM</td>
</tr>
<tr>
<td>MH12</td>
<td>45 CM</td>
<td>60 CM</td>
<td>45 CM</td>
</tr>
<tr>
<td>MH13</td>
<td>51 CM</td>
<td>60 CM</td>
<td>45 CM</td>
</tr>
<tr>
<td>MH14</td>
<td>57 CM</td>
<td>60 CM</td>
<td>45 CM</td>
</tr>
<tr>
<td>MH15</td>
<td>61 CM</td>
<td>75 CM</td>
<td>57 CM</td>
</tr>
</tbody>
</table>

**TABLE (31) SHOWS MANHOLES DIMENSIONS**
(4.4.2.4) **DRAINAGE SYSTEM:**

(4.4.2.4.1) **Buildings:**

Building surfaces with a slope of 1:25 divides into parts that gathers and goes down through p.v.c down pipes → 2" diameter and passes through gully trap then to the tranches which surrounds the building.

**FIGURE (89) SHOWS SEWAGE AND DRAINAGE SYSTEM**

**FIGURE (90) SHOWS GULLYTRAP**

**FIGURE (91) ROOF DRAINAGE USING DOWN PIPES.**
(4_4_2_4_2) Pathways:
The drainage of water through slope 1:15 towards openings that leads directly to main tranch tranches.

![Diagram of drainage system](image)

(4_4_2_4_3) Landscapes:
The excess water is gathered by overflow pipes at the corners and middles of landscapes when the area is large then to a 2" diameter pipes leading to the main sewage line.

![Diagram of landscape drainage](image)

**FIGURE (92) SHOWS TRANCHES WHICH USED FOR DRAINING PATHWAYS RAIN WATER.**

**FIGURE (93) SHOWS LANDSCAPE DRAINING (GETTIG RID OF OVERFLOWED WATER.)**
AIR CONDITIONING SYSTEM:

The determination of the HVAC system depends on specifying the buildings with its parts and sectors and this will be through the table below.

Building Specifications:

<table>
<thead>
<tr>
<th>Space Function Type</th>
<th>Main Use of the AC System</th>
<th>Important Requirements</th>
<th>Less Important Requirements</th>
<th>AC Control System</th>
<th>Spaces Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Large main space</td>
<td>* Cooling or heating</td>
<td>* Temperature</td>
<td>Temperature</td>
<td>Central</td>
<td>Large</td>
</tr>
<tr>
<td>Multiple Spaces</td>
<td>Cooling or heating big quantities</td>
<td>Air recycling</td>
<td>* Air recycling</td>
<td>* Single space control</td>
<td>* small</td>
</tr>
<tr>
<td>* Variable temperature</td>
<td>* Quiet sounding</td>
<td></td>
<td>Quiet sounding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Humidity</td>
<td>* Sterilized Air</td>
<td></td>
<td>Sterilized Air</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to the building specifications the chosen system is ALL AIR SYSTEM (AAS).

The Definition of the All Air System:

This type of system only use the flow of air in the operation of cooling or heating, the air cycle goes with direction the exhausted air outside, and then supplying the building interior with fresh air that flows through ducts to all the sectors of the building.

The Components of the (AAS):

1. An outdoor air handling unit (AHU) horizontal type.
2. An interior variable air volume unit (VAV) inlet.
3. Air ducts (squared, Round and flex).
4. Air terminal diffuser.

FIGURE (94) SHOWS AHU AND THE VAV (VARIABLE AIR VOLUME UNIT)
FIGURE (95) SHOWS THE DUCT WORKS, VAV Box AND THE AIR TERMINALS.

FIGURE (96) SHOWS AIR CONDITIONING PLAN WHICH CONTAINS: THE DUCT WORKS, VAV Box AND THE AIR TERMINALS.
### (4_4_2_7) FIRE FIGHTING SYSTEM:

Building Specifications:

<table>
<thead>
<tr>
<th>Building Masses</th>
<th>Building Risk Users Rating</th>
<th>Building Risk Components Rating</th>
<th>Space Function</th>
<th>Fire Rating Material Type</th>
<th>Building Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Single Mass</td>
<td>*</td>
<td>Theater, Restaurants, Hospitals, Airports</td>
<td>High Hazard</td>
<td>Storing</td>
<td>* A Hard carbon materials</td>
</tr>
<tr>
<td>Single main mass + Scattered masses</td>
<td></td>
<td>Banks, Universities</td>
<td>Ordinary Hazard</td>
<td>Education Admin Housing and Hosting</td>
<td>B Flammable Liquids</td>
</tr>
<tr>
<td>Schools and Kindergartens</td>
<td>Light Hazard</td>
<td>Quiet sounding</td>
<td></td>
<td>C Electrical Equips</td>
<td>* Above 5 Floors (Dry Pipes)</td>
</tr>
<tr>
<td>Factories</td>
<td>Industry</td>
<td></td>
<td></td>
<td>D Metallic and chemical Materials</td>
<td></td>
</tr>
</tbody>
</table>
FIGURE (97) SHOWS FIRE FIGHTING FIXTURE IN ROOMS PLAN.

(4_4_2_8)LIGHTING FIXTURES:

FIGURE (98) SHOWS THE USED LIGHTING FIXTURES IN THE MAIN LOBBY
(4_4_3) SITE TREATMENTS AND FINISHINGS:

(4_4_3_1) HOTEL & CHALET ROOFING:
- Concrete Tiles 20*20*2cm
- C/S Mortar 5cm (1:8) Mixed
- D.P.C Layers, Insulation layers.
- Reinforced Concrete 20cm (1:2:4) Mix.
- Plane Gypsum Board False Ceiling

(4_4_3_2) LANDSCAPING:
- English Grass 10cm.
- Flattery Layer 10cm.
- Water Proof Layer.
- Normal Sand With
- Hard Core 15cm.

(4_4_3_3) PARKINGS AND MAIN ROADS:
- Asphalt Main Layer 10cm
- Asphalt Sub Layer 5cm
- Water Proof Layer 2mm
- Hard Core 10cm
- Natural Soil

(4_4_3_4) MOUNTAIN PATHWAYS:
Natural Terrained Mountain Surface

(4_4_3_5) WALKWAYS:
Composite Wood Boards.
(4_4_3_6) HOTEL FINISHINGS:

(4_4_3_6_1) ENTRANCE:

(4_4_3_6_1_1) FLOOR:

- Precast concrete landing Boards.
- Packers (riser) 15 cm height.
- Precast concrete (tread) unit 30 cm.
- mm Packing to underside of stairs.
- Concrete slab 20 cm.
- Earth.

(4_4_3_6_1_2) Wall:

- Concrete board 10 cm.
- Cavity fill 3 mm.
- Brick wall 10 cm.

Concrete board 10 cm.

(4_4_3_6_2) LOBBY:

-(4_4_3_6_2_1) WALLS:

- Concrete board 10 cm.
- Cavity fill 3 mm.
- Brick wall 10 cm.
- Concrete board 10 cm.

GREEN WALL:

- Plants
- Continuous back layer of fibrous growth media.

-waterproof backer board.

-Air gap.
- Sheet waterproofing.-Brick wall 10 cm.
- C/S mortar 1:6 mix 5 cm.
-Concrete board.

(4_4_3_6_3) WAITING AREA FLOORING:

- Turkish maroon carpet.

- Mastic glue layer.
  – Metalized PET carrier.

- Cement 1cm.

- Foam underlay 8mm.
- Screed 1:6 mix.
- P.C 1:8 mix.
- Reinforced concrete slab.

(4_4_3_6_4) LOBBY’S CORRIDORS:

- Lacquer layer.
- Parquet boards.
- Adhesive 7.2 mm.
- Underlay damTec 3mm.
- Adhesive layer.
- Damper resistant layer.

(4_4_3_6_5) CAFÉ’S AND RESTAURANT FLOORING:

- Porcelain flagstone.
- Outdoor grade tile adhesive applied with notched spreader.
- Mass concrete base.
- Dampproof membrane layer.
- C/S mortar 1:8 mix.
- Reinforced concrete slab.

(4_4_3_6_6) RESIDENTIAL SPACES FINISHES:

(4_4_3_6_6_1) ROOMS:

(4_4_3_6_6_1_1) WALL:

- Room walls are from plasters and paint and the main wall in the room is a green wall.
- Bathrooms walls are made of ceramic or marble (royal suites, VIP rooms).

(4_4_3_6_6_1_2) **FLOORS:**
- Rooms floors are made of parquet.
- Carpet flooring in living rooms and corridors.
- Bathrooms floors are ceramic or marble (Royal suites and VIP rooms).

-(4_4_3_6_6_1_3) **ROOFS:**
- Main lobby roof is a plane Gypsum boards panel with wooden elements.
- Rooms, living rooms and bathrooms have a gypsum boards roofs.
- Plaster and paint roofs in Chalets rooms, living rooms, kitchens and bathrooms.

**FIGURE (100) SHOWS SITE TREATMENT**
CHAPTER FIVE:

RESULTS.
FINAL DESIGN DRAWINGS.
CONCLUSION
REFERENCES.
1. A designed resort using the ideas that goes with the functions that depends on the nature and the natural views.

2. achieved the idea of interference the resort with nature in two ways :

   a. Visually:

      using the visual contacting with the natural views and the rest of the resort .

   b. By Forming :

      using the technique of simulation in the corridors pathways and in the main mass .

3. used a design style that suits the users traditions and the different natures .

4. achieved the recreation for the user ,created a suitable nature that helps them to relax away from crowded cities and the killing life routine.

5. glad that I exploited one of the greatest and most breath taking natural places in sudan.
(5_2) FINAL DESIGN:

(5_2_1) the ground floor, perspective and views.

FIGURE (101) SHOWS THE GROUND FLOOR PLAN

(5_2_2) the
mezzanine floor, first floor and panoramic pool floor.

FIGURE (102) SHOWS MEZZANINE FLOOR, FIRST FLOOR AND PANORAMIC POOL FLOOR.
(5_2_3) the services floor ,3rd. to 7th floor.

**FIGURE (103) SHOWS SERVICES FLOOR, 3rd. TO 7th FLOOR**
(5_2_4) the Sections:

FIGURE (104) SHOWS SECTIONS

(5_2_5) the chalets:

FIGURE (105) SHOWS CHALETS.
(5_3) **CONCLUSION:**

Last but not least,

It’s all about the challenges we take to achieve our goals, and problems are not stop signs, they’re always a guidelines, they’re the reason beyond feeling our goals value... that exactly how my life as an architecture student was... and it’s the exact how I am going to enjoy living.
REFERENCES:

5. Barri 4..
7. Time Saver Stander For Building Type.
8. Ministry Of Tourist And Investment.

THANKS 😊