LANDSCAPE PROPOSAL FOR SMRITI VAN AT BHOPAL

MASTER OF ARCHITECTURE (LANDSCAPE)

By

Sayali Mahajan
2016MLA017

Under the Guidance of
Asst. Prof. Shivani Paliwal

SCHOOL OF PLANNING AND ARCHITECTURE, BHOPAL
NEELBAD ROAD , BHAURI, BHOPAL - 462030
MAY 2018

LANDSCAPE PROPOSAL FOR SMRITI VAN AT BHOPAL

A DESIGN THESIS

Submitted
in partial fulfillment of the requirements for
the award of the degree of

MASTER OF ARCHITECTURE (LANDSCAPE)

By

Sayali Mahajan
2016MLA017

Under the Guidance of
Asst. Prof. Shivani Paliwal

SCHOOL OF PLANNING AND ARCHITECTURE, BHOPAL
NEELBAD ROAD , BHAURI, BHOPAL - 462030

MAY 2018

Declaration

I Sayali Mahajan, Scholar No. 2016MLA017 hereby declare that the thesis entitled **Landscape Proposal for Smriti Van at Bhopal,** submitted by me in partial fulfillment for the award of Master of Landscape Architecture, in School of Planning and Architecture Bhopal, India, is a record of bonafide work carried out by me. The matter embodied in this thesis has not been submitted to any other University or Institute for the award of any degree or diploma.

17th may 2018 Sayali Mahajan

Certificate

This is to certify that the declaration of Sayali Mahajan is true to the best of my knowledge and that the student has worked for one semester in preparing this thesis.

RECOMMENDED

Asst. Prof. Shivani Paliwal

ACCEPTED

Prof. Sanjeev Singh

Head of Department

Acknowledgement

Foremost, I would like to express my sincere gratitude to my mentor Prof. Shivani Paliwal for the continuous support, patience, motivation, enthusiasm, and immense knowledge. Her guidance and inspiring suggestions have been precious for the development of design. Besides my mentor, I would like to thank the rest of my faculty members: Prof. P.C.Kotwal, Prof. Surrender Suneja, Prof. shishir Rawal, Ar. Arshiya Qureshi for their encouragement, insightful comments, and hard questions. My sincere thanks also go to my friends and fellow batch mates, for the stimulating discussions, for the sleepless nights we were working together before deadlines, and for all the fun we have had in the last two years. With a special mention, I would like to thank Samiran Mandal without whom it would not have been possible and also for constant discussions and brain storming. Last but not the least, my deepest gratitude goes to my family for their unconditional support throughout my life and my studies. You made me live the most unique, magical and carefree childhood that has made me who I am now.

Abstract

The city of lakes Bhopal, capital of Madhya Pradesh is a fascinating combination of scenic beauty old historic and modern urban city. Situated around the two beautiful lakes within the picturesque setting. The city was founded by Raja Bhoj in 11th century and later on his descendants developed and built into beautiful city. These early planners showed wisdom in land set aside for civic spaces as well as those for parks, gardens, urban forests, and open lands that form settings for civic life and recreational opportunities like nature walks, bird watching.

To merge memory with landscape is a concept of holistic approach for connecting past and keeping history alive. Making people understand about the evolution of landscapes they are living in. These successive layers of history also formed meaningful landscapes which showed their contribution towards various recreational opportunities and of great ecological importance.

The thesis intends to create Smriti Van at Bhopal having focus creation of memory through urban green forests which ultimately allows enhancement of ecology which is natural heritage to the place. The idea is to reflect the specimen trees from history that are natural heritage to the region. The thesis makes emphasis at retaining the existing feature for creation of ecological balance and various recreational opportunities to satisfy users' demands. The expected outcome from the study is an attempt to raise historical awareness and various benefits from green spaces that will help to improve the quality of life.

Contents

List of figures

CHAPTER 1: INTRODUCTION

1.1 Introduction

1.1.1 Background

Smriti van can be defined as space where memories are enhanced or kept alive through landscape. For creation of identity, a strong sense of place that announces it as a special landscape within the city for commemoration, respect for memory, creating meaningful gathering places. For different spaces and activities that link a series of events or activity nodes, some patches derived specifically for commemorative opportunities or by incorporating trees as both landscape feature and commemorative elements and enhancing the uniqueness of site. Memory and landscape are not always connected with pleasure but also with loss and pain hence it can stated as landscape and memories are attached with each other they cannot be separated.

"Before it can ever be the repose for the senses, landscape is the work of the mind. Its scenery is built up as much from strata of memory as from layers of rock." – Simon Schama (Taylor)

Landscape are reflections of our memories, myths and impressions, tangible and intangible, physical and metaphoric, encoded with meanings (Taylor). The experience, meaning and sense of place of a landscape are deeply influenced by the kind of memory and vision which one associate with it. Landscape are able to create different meanings and impressions for different people. For instance an old village street may bring to mind nostalgic memories to a city migrant where as a historic park may evoke memories and thoughts of that period.

The idea of smriti van is to bring people together for nature conservation and creation of social gathering space which allows active participation of society. Trees can be planted in good or bad occasion such anniversaries, birthdays or demise or in remembrance of near ones. Here trees act as a live memorials and satisfy the need to keep memories fresh as well as help in maintain ecological balance. Planting trees which are natural heritage to the state and have various values, stories of national

importance associated with it will help to enhance the concept of continuation of memory.

1.1.2 Need of the study

Bhopal, one of the India's greenest cities, having municipal extends of 286 km and a population of 1.8 million, a 125% increase over the last decade. (Aithal H. Bharath) Reflecting the trend of rapid urbanization and growth in its core areas and a rapidly spreading sprawl at its periphery. Significantly, the vegetation cover has declined by an astonishing 70% over four decades. (Aithal H. Bharath) By next year tree cover is expected to decline to just over a tenth of that four decades ago. Results of which Bhopal has experienced severe floods and urban heat island and water stress rising the risk of diseases and economic loss. To avoid the impacts due to environmental and social issue, proper management and conservation of green spaces is needed which help us to improve the quality of life as well as allows smoothly functions of ecosystems. The city has rich historical and cultural background and is renowned for several specialties. Also it become important to create awareness about rich historical and cultural significance of the city. All events and stories related to trees from past, that has contributed in shaping the city and giving strong identity to it, which are also evident for rich ecological and recreational activities leading to the quality of life.

1.2 Synopsis

1.2.1 Aim:

- To integrate memories with landscape through a comprehensive approach towards site design and enhancement of ecology.

1.2.2 Objectives:

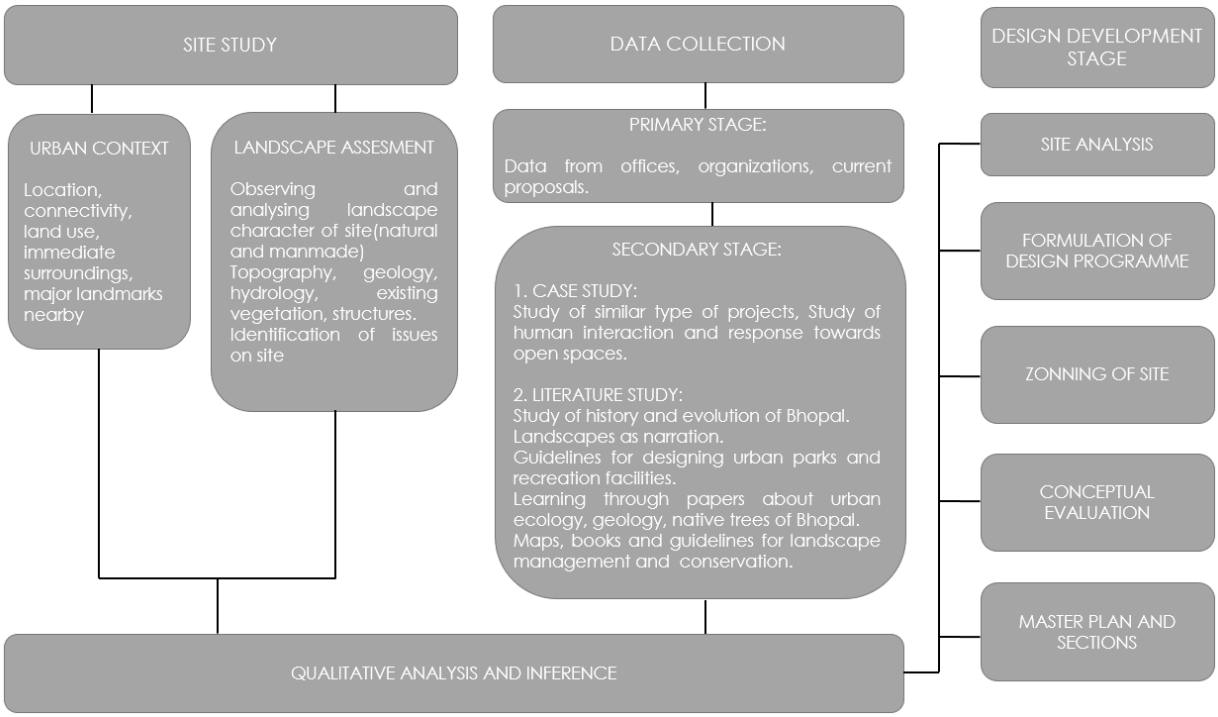
- To study and analyse the site existing features, its ecological, environmental and social issues.
- To preserve and maintain the natural character and identity of space.
- To create a memory for visitors through plantation of native species.
- To study and understand in detail the chronological historical development of specimen trees with values and stories attached to it and playing vital role for ecology

- Creation of urban green space for multifunctional use by preserving and maintaining the natural features of site.
- To create a recreational and learning opportunities for understanding the nature, role and value of green spaces and their benefits to city and citizens.

1.2.3 Scope and Limitation:

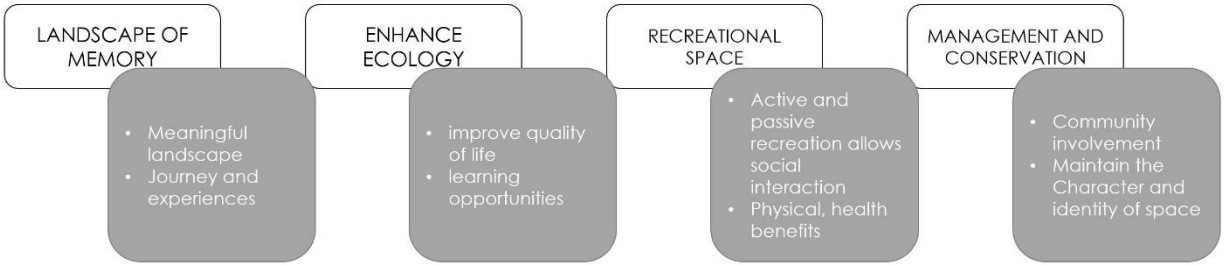
- A landscape plan for the smriti van which is based on the present site condition and scenario, followed by analysis of each factor, listing of issues and potentials.
- The study will only cater to urban scenario and would not consider other dynamics such as cultural and intangible aspects.

1.2.4 Methodology:



1.2.5 Expected Outcome:

A comprehensive plan that help to establish a desirable relationship of the natural area with urban environment of the city and sets equal emphasis on relationship and interaction between man and nature.



CHAPTER 2: SITE ANALYSIS

2.1 Location:

The proposed site for Smriti Van is located in Madhya Pradesh in Bhopal. The site is situated on link road no.3 to the adjacent of Maulana Azad National Institute of Technology.

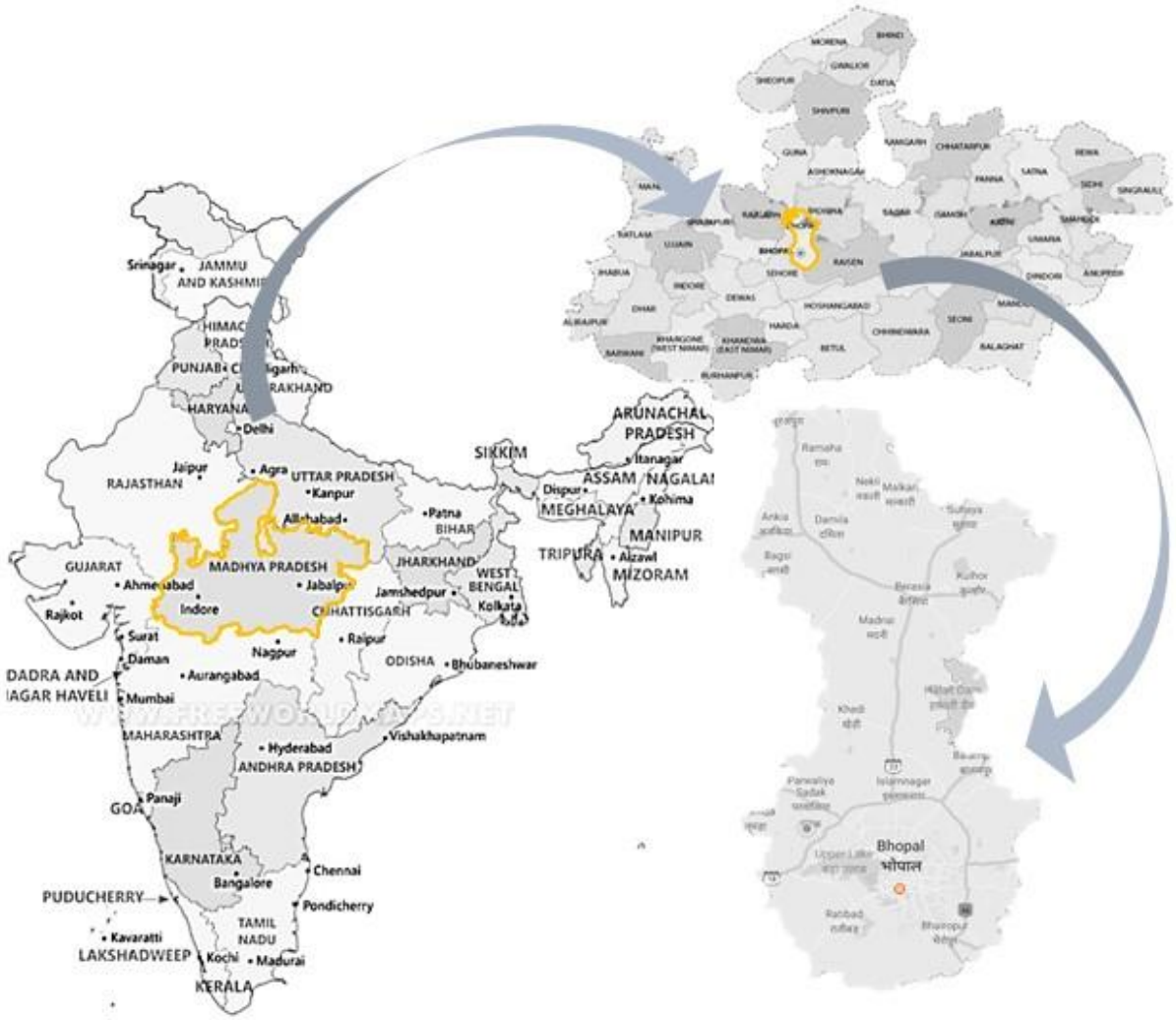


Figure 1: Map showing location of proposed Smriti Van

2.2 Project Details:

The site is proposed under Nagar Van Udyan by Rajya Sashan Pariyojna / Capital Project Administration. The area for Smriti Van is about 57 acres. Proposal intents to create urban green space that would act as breathing space for city of Bhopal through plantation and recreation space for users. The proposed requirements for landscape design as cycle track, gathering space, children's play area for citizens.

2.3 Site Surroundings:

The site is surrounded by variety of land use such as residential, institutional which also includes government offices nearby. The site is surrounded by institution on its west side and on east side encroached by Kolar road slums. The densely developed residential zone (patrakar colony) is in front side of the site. The site is accessible from link road no.3

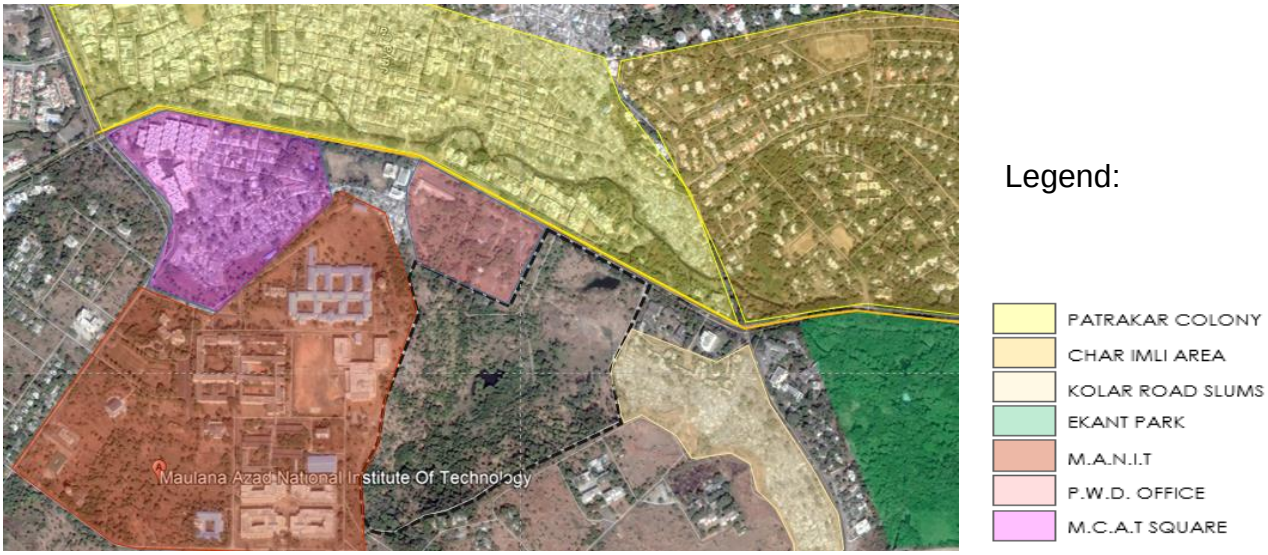


Figure 2: Google Earth image showing surrounding land use.

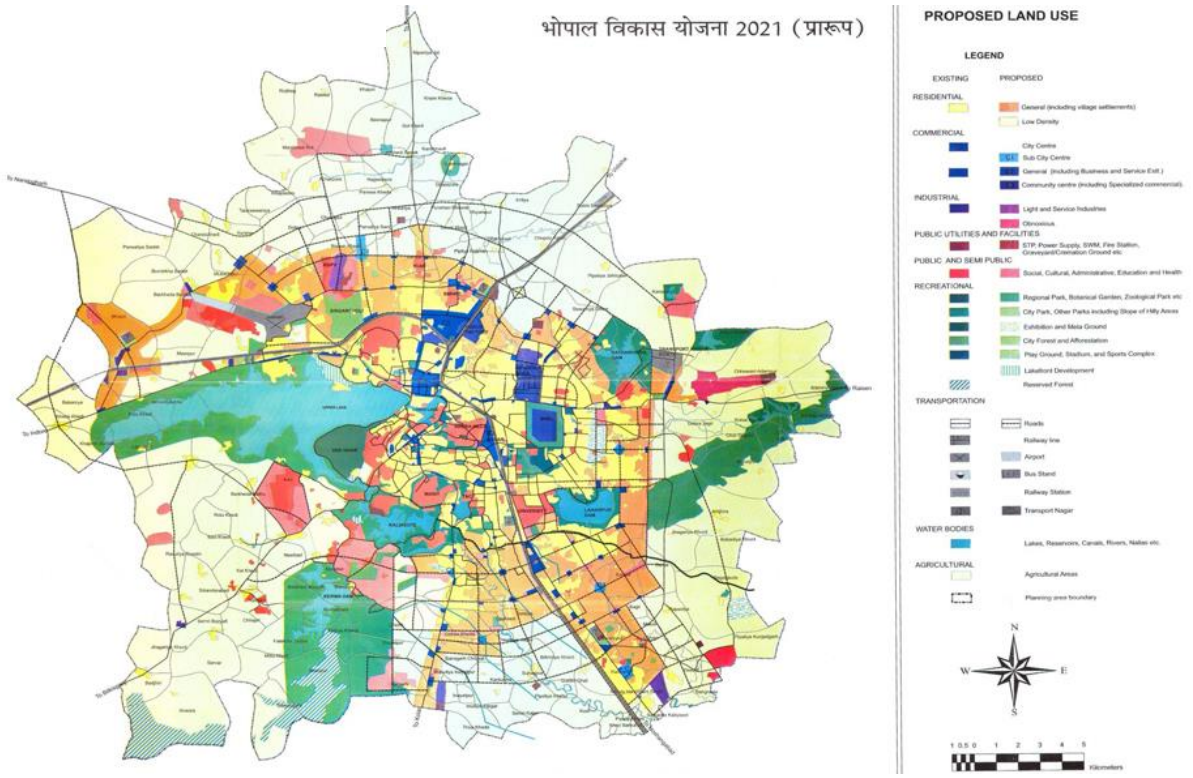
The major landmark nearby site is Ekant Park which is another urban forest in area and Maulana Azad National Institute of Technology.

Figure 3: Ekant park

Figure 4: Maulana Azad National Institute of Technology

2.4 Land Use:

The proposed site for Smriti Van is under recreational land use according to



proposed draft of Bhopal Development plan of 2021.

Figure 5: Proposed Land Use Map of Bhopal

Source: Directorate of Town and Country Planning M.P Bhopal

2.5 Physical Features:

2.5.1 Climate:

Bhopal has a humid subtropical climate with cool and dry winters, hot summer and humid monsoon seasons (Wikipedia, n.d.). Summers from march-June with average temperature 30 °C. Monsoon season begins from June – September with total annual rainfall 1146 mm. Winters in Bhopal starts from January with temperatures 16 °C and are cool but not very much comfortable, sometimes may drops close to freezing nights with when temperature 0.3 °C.

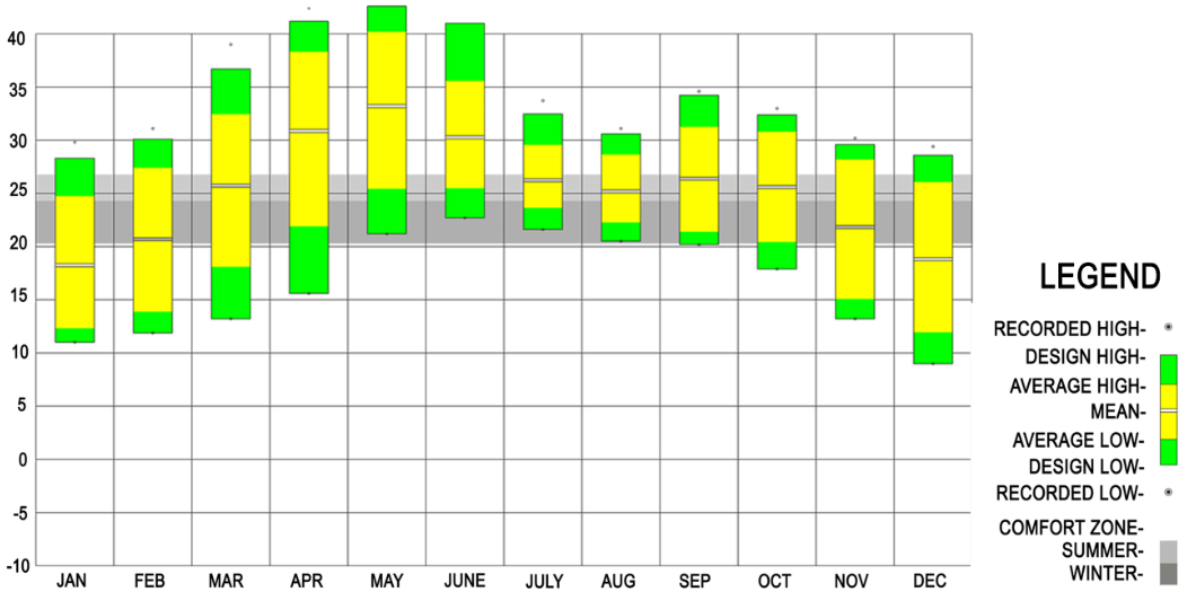


Figure 6: Graph showing temperature ranges

Source: climate consultant software

According to the graph high temperature range is recorded in month of April, May and June which extremely beyond the comfort zone of human.

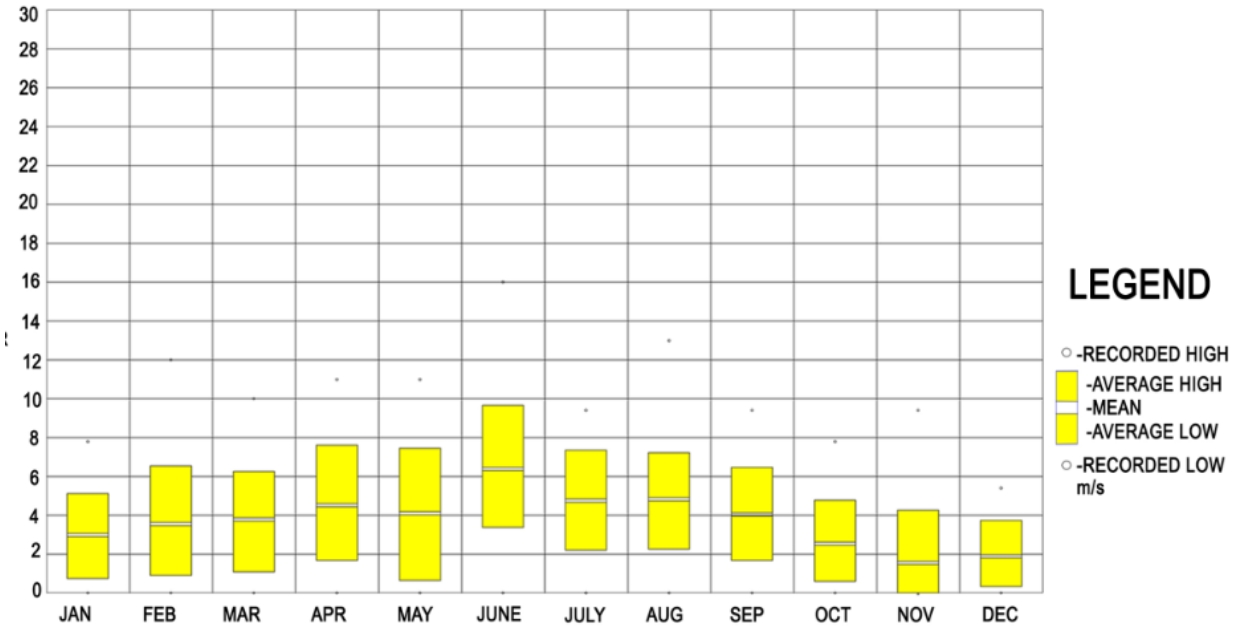


Figure 7: Graph of wind velocity data.

Source: climate consultant software.

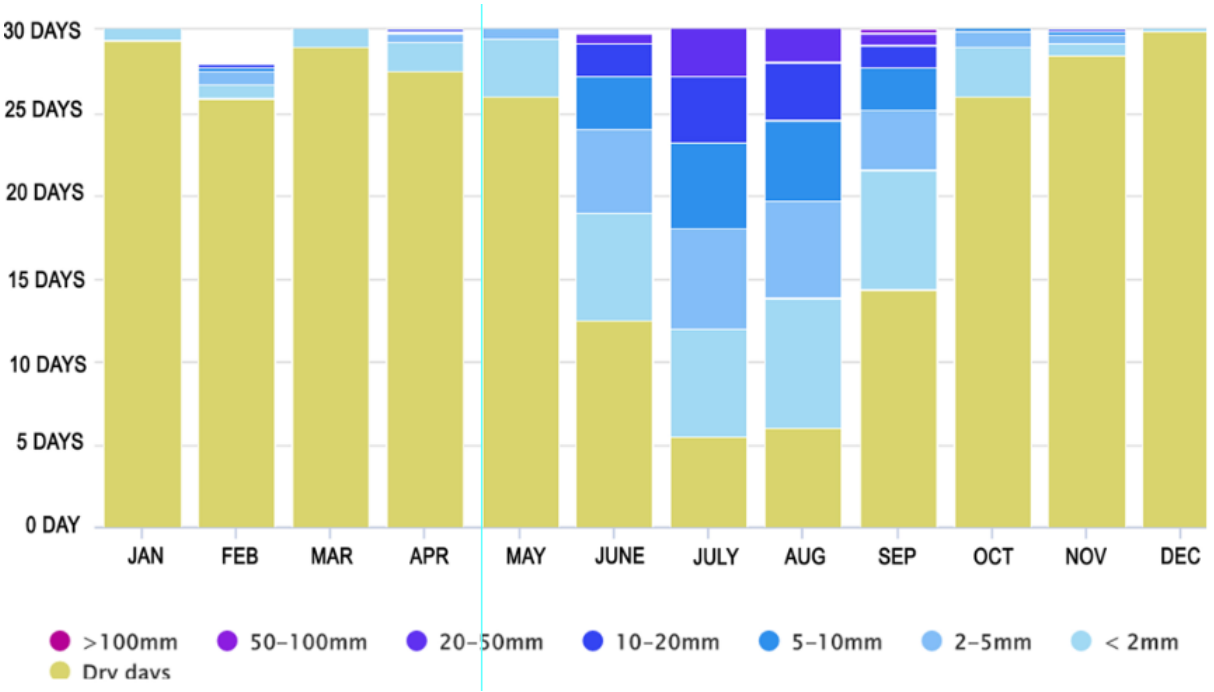


Figure 8: Graph of rainfall data

Source: climate consultant software.

2.5.2 Topography:

2.5.2.1 Elevation Map:

The site is having highest elevation of 527m and lowest elevation of 502m. The site is allocated on the 12m (ROW) front road.

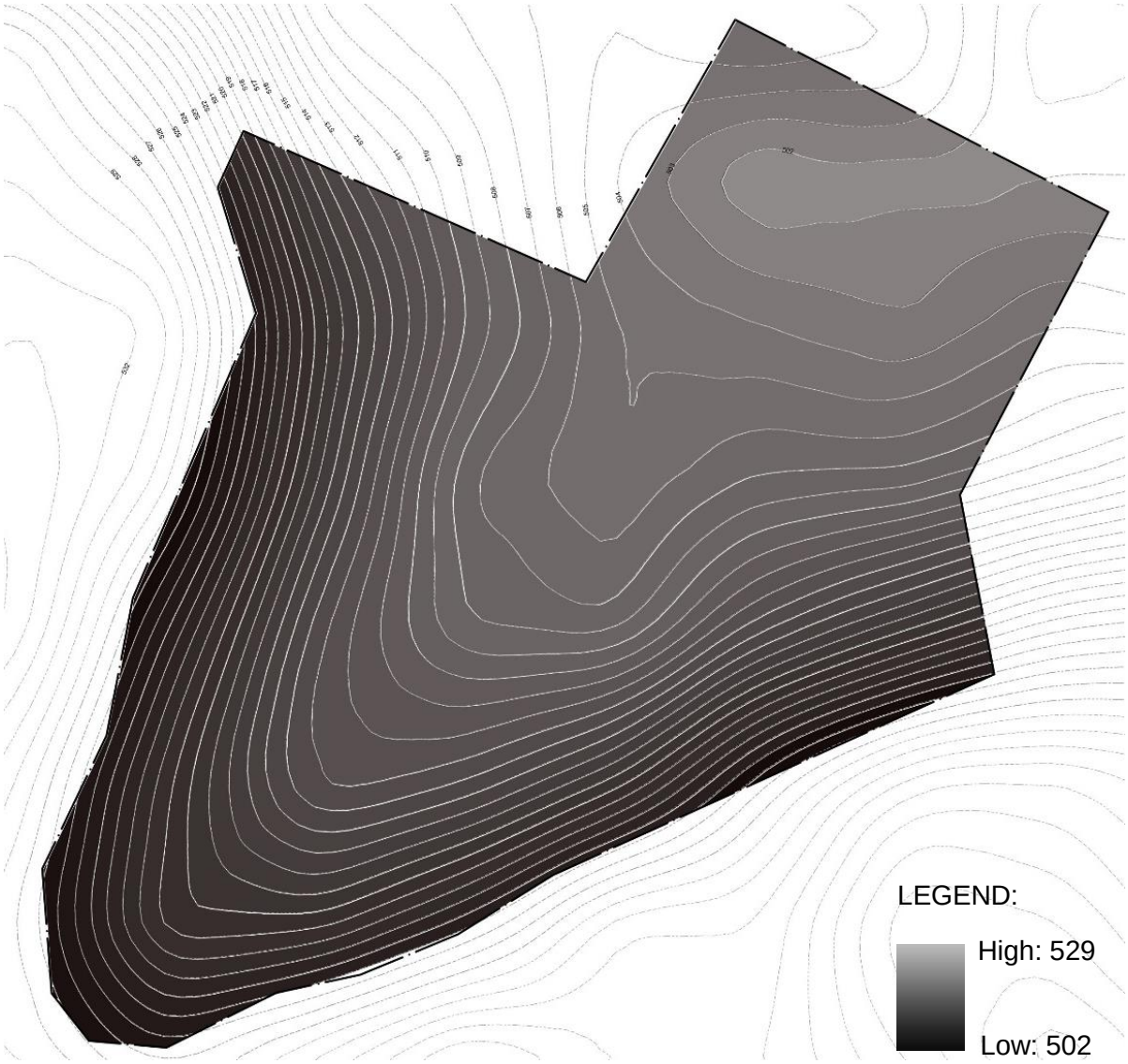


Figure 9: Elevation map

Source: GIS (Author)

2.5.2.2 Slope Map:

The site is having steep slopes on its edges towards south west side, sloping gradually towards main road. According to slope analysis the site ranges between 0-5% and 10-15%

Figure 10: Slope map

Source: GIS (Author

Site sections:

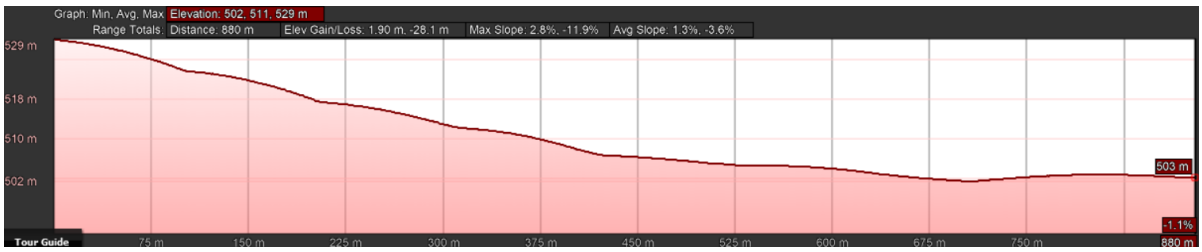


Figure 11: Topographic section at A-A'

Source: Google Earth

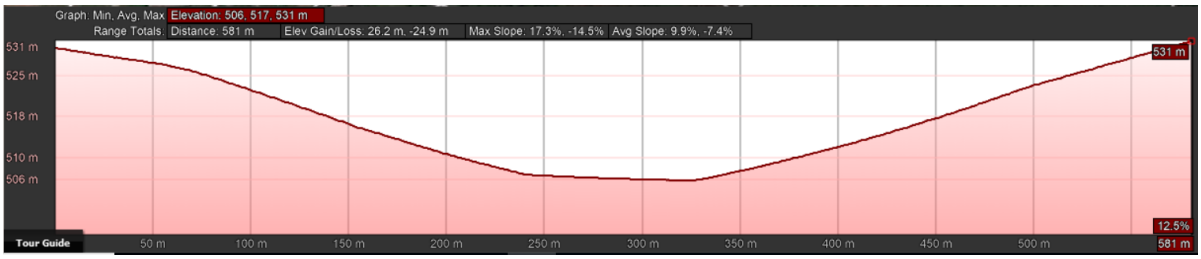


Figure 12: Topographic section at A-A'

Source: Google Earth

2.5.3 Soil type:

The site falls under clayey soil type which has good water holding capacity. As the clayey soil is poor in draining water due to its textures it allows water to remain for long time which results into various nutrients essential for plant growth. Hence this type of soil is good for plant growth.

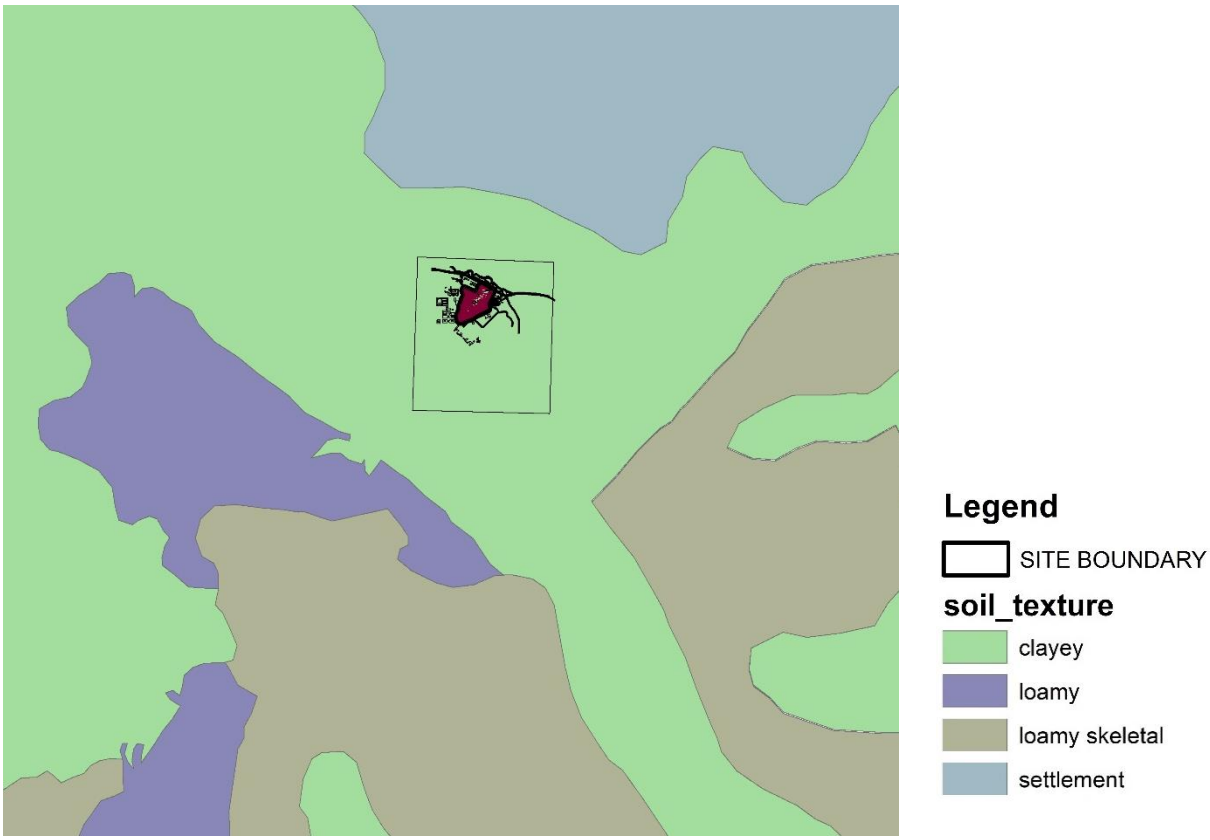


Figure 13: Soil Texture Map *Source: GIS (Author)*

Figure 14: Soil composition on study area.

2.5.4 Hydrology:

The site has steep slope towards main road which allows water to flow towards the main road through seasonal stream and then further through drains water is carried to Shahpura Lake, which is located near site.

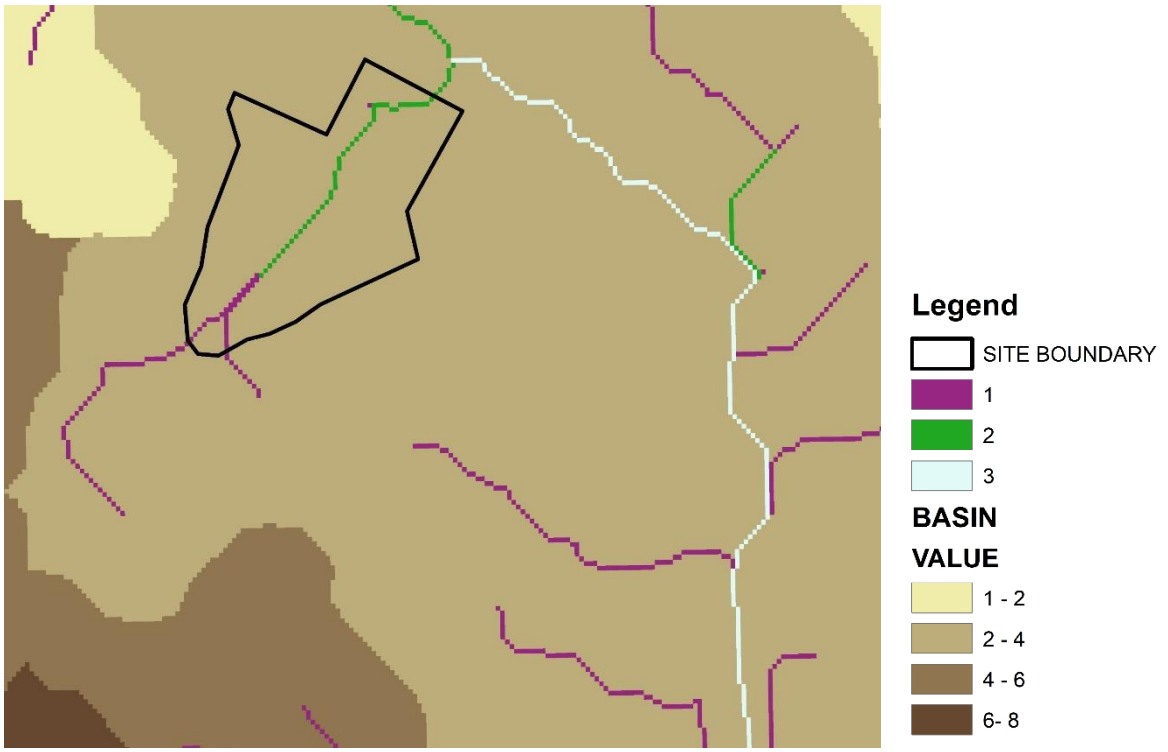


Figure 15: Hydrology Map

Source: GIS (Author)

Figure 16: Existing Valley on Study Area.

2.5.5 Vegetation:

The site has a very rich context in vegetation. Variety of species available on site. On its sloping edges, site has dense vegetation with mixed species which specially includes palash, neem, maha neem, karanjh, kasaud, kachnar, ber, shisham etc. and along the water body Arjun tree is found in large number. On west side of site large clumps of bamboo dandrecalamus can be seen due to nutrients contents in soil. Invasive species such subabool and babool are also seen great occurrence and various invasive groundcovers such as lantana camara and van tulsi is also found which can be later removed and native species will be introduce to site.

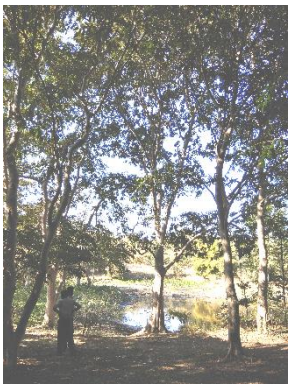


Figure 18: Arjun tree near waterbody and Palash tree

Figure 17: Clusters of Bamboo Dendrocalamus

Figure 19: mixed vegetaion on slope

List of trees observed on site:

Sr no.	Name of the species	Details	Image
1	Balam khirra *Kigelia pinnata*	Light requirements : semi shade Watering requirements : normal, can tolerate less Primarily grown for : foliage Foliage colour : green Plant height and form : more than 10 meters, upright or erect.	
2.	Eucalyptus	Light requirements : sun growing Watering requirements : normal Primarily grown for : stems or timber Foliage colour : green Plant height and form : more than 25 meters	
3.	Babul *Acacia nilotica*	Light requirements : sun growing, semi shade Watering requirements : normal, can tolerate less Primarily grown for : foliage Flowering season : april, may, june, july, august Foliage colour : green Plant height and form : more than 12 meters, spreading	
4.	Subabol *Leucaena leucocephala*	Light requirements : sun growing, semi shade, full shade Watering requirements : normal, can tolerate less or more Primarily grown for : foliage Flowering season : july to march. Foliage colour : green Plant height and form : more than 5 meters, irregular, spreading.	
5	Karanj *Pongamia-pinnata*	Light requirements : sun growing Watering requirements : normal, can tolerate less, can tolerate more Primarily grown for : foliage Flowering season : Foliage colour : green Plant height or form : more than 20 meters Plant form : spreading, upright or erect	
6.	Khirni *Manilkara hexandra*	Light requirements : partial sun and shade Watering requirements : can tolerate less Flowering season : january Foliage colour : green Plant height and form :18 meters and wide spreading	

Sr no.	Name of the species	Detail	Image
7	Peepal *Ficus religiosa*	Light requirements : sun growing, semi shade, full shade Watering requirements : normal, can tolerate less or more Foliage colour : green Plant height and form : more than 20 meters and spreading, upright or erect	
8	Baddh *Ficus benghalensis*	Light requirement: half sun to partial shade. Water: Drought tolerant. Soil requirement: fertile well drained Foliage colour: green Plant height and form: can grow up to 20-30 m tall and wide spreading crown.	
9	Nili gulmohar *Jacaranda mimosifolia*	Light requirements : sun growing Watering requirements : normal Flowering season : may Foliage colour : green Plant height or form : more than 10 meters Plant form : spreading, upright or erect	
10	Bel *Aegle marmelos*	Light requirements : sun growing, semi shade Watering requirements : normal. Flowering season : year-around flowering, flowers are inconspicuous Foliage colour : green Plant height or form : 4 to 6 meters, irregular, spreading, upright or erect	
11	Palash *Butea monosperma*	Light requirements : sun growing, full shade Watering requirements : normal Flowering season : mid march , april Foliage colour : green Plant height and form : more than 5 meters, straight	
12	Kadamba *Neolamarckia cadamba*	Light requirements : sun growing, semi shade Watering requirements : normal, can tolerate less or more Flowering season : may, june Foliage colour : green Plant height and form : more than 25 meters, upright or erect	

Sr no.	Name of the species	Detail	Image
13	Amaltas *Cassia fistula*	Light requirement: full light Water: adequate water supply is required for optimal germination Soil requirement: fertile well drained Flowering season: late april – mid of may Plant height and form: 10 meters, spreading irregular canopy.	
14	Neem *Azadirachta indica*	Light requirements : sun growing Watering requirements : requires less Flowering season : march, april, may, june, july Foliage colour : green Plant height or form : more than 12 meters spreading, upright	
15	Kassod *Senna siamea*	Light Requirements : Sun growing, Semi shade Watering requirements : Normal, Can tolerate less or more Primarily Grown For : extensively planted for afforestation program Flowering Season : Foliage Colour : Plant height or Form : More than 15 meters, Upright or Erect	
16	Kanak champa *Pterospermum acerifolium*	Light Requirements : Prefers warm climate and high rainfall. Watering requirements : Normal, Can tolerate less or more Flowering Season: march - april Foliage Colour: dark green on top and downy pale underneath Plant height or Form : More than 15 meters, round and dense canopy	
17	Chirhol *Holoptelea integrifolia*	Light Requirements : Sun growing Watering requirements : Normal, Can tolerate more Flowering Season : February-March. Foliage Colour : Green Plant height and Form : More than 15 meters, Spreading	
18	Ber *Zizyphus jujuba*	Light Requirements : Sun growing, full shade Watering requirements : Can tolerate less, Primarily Grown For : Fruit or Seed Flowering Season : April to May Foliage Colour : Green Plant height and Form : More than 5 meters Spreading, Upright or Erect	

Sr no.	Name of the species	detail	image
19	Khasai *Bridelia retusa*	Light Requirements : partial sun and shade Watering requirements : can tolerate more or less Primarily Grown For : medicinal use Foliage Colour : green Plant height and Form : 10 meters, straight an dopen canopy, magnet for birds in fuiting season	
20	Khamer *Gmelina arborea*	Light Requirements : Sun growing, Semi shade Watering requirements : Normal, Can tolerate more Primarily Grown For : Foliage Flowering Season : February , March, April Foliage Colour : Green Plant height or Form : More than 5 meters Plant Form : Upright or Erect	
21	Shisham *Dalbergia latifolia*	Light Requirements : Sun growing Watering requirements : Normal, Can tolerate less or more Primarily Grown For : Foliage, Stems or Timber Flowering Season : mid march Foliage Colour : pale Green Plant height and Form : More than 25 meters, Spreading irregular canopy	
22	Arjun, *Terminalia arjuna*	Light Requirements : Sun growing, Semi shade Watering requirements : Normal. Primarily Grown For - Foliage Flowering Season : April–July Foliage Colour : Green Plant height and form: 24 meters, spreading canopy	
23	Kosam, *Schleichera oleosa*	The plant is resistant to dry climate, but grows with ease in the moist tropical regions. Flowering Season : mid march - april Foliage Colour : green and bright scarlet of new leaves Plant height and form: 16 meters, spreading upright	
24	Khejra *Prosopis juliflora*	Light Requirements : Sun growing Watering requirements : Normal Primarily Grown For : Stems or Timber Flowering Season :late march – may. Foliage Colour : grey- Green Plant height and Form : More than 10 meters, Spreading, Upright or Erect	

Sr no.	Name of the species	detail	image
25	Junglee jalebi *Pithecellobium dulce*	Light Requirements : Sun growing, Semi shade Watering requirements : Normal, Can tolerate less, Can tolerate more Primarily Grown For : Fruit or Seed Flowering Season : Foliage Colour : Green Plant height or Form : More than 10 meters Plant Form : Irregular, Spreading, Upright or Erec	
26	Semal *Bombax ceiba*	Light Requirements : Sun growing, full shade Watering requirements : Normal, Can tolerate less, Can tolerate more Primarily Grown For : Foliage Flowering Season : Foliage Colour : Green Plant height or Form : More than 15 meters Plant Form : Spreading, Upright or Erect	
27	Sonjna *Moringa oleifera*	Light Requirements : full sun Watering requirements : normal and more Soil requirements: susceptible to water logging and needs well drained soil. Flowering Season : february – march sometimes twice a year. Foliage Colour : green Plant height and Form : 15 meter height and spreading canopy.	
28	Kala siris *Albizia odoratissima*	Light Requirements : Sun growing Watering requirements : Normal Primarily Grown For : Fruit or Seed Flowering Season : early april - may Foliage Colour : Green Plant height and Form : More than 20 meters Spreading, Upright or Erect	
29	Madhu kamini, *Murraya exotica*	Light Requirements : Sun to partial shade. Watering requirements : Follow a regular watering schedule during the first growing season to establish deep, extensive roots. Soil requirements: moist soil or well-drained Flowering Season : march – may and again in rains. Foliage Colour : dark green, glossy foliage Plant height and Form : 3 meters and irregular spreading crown.	
30	Peeli gulmohar *Pheltoforum pterocarpum*	Light Requirements : full sun Watering requirements : Drought Tolerant, average water. Soil requirement: light to medium free draining alkaline soils although it also tolerates clay soils Flowering Season : may – june, again in rains, from early September - october Foliage Colour : Plant height and Form :14 meters and dense, spreading, umbrella-shaped crown	

Sr no.	Name of the species	detail	image
31	Pink trumpet *Tabebuia rosea*	Light Requirements : Sun growing Watering requirements : Normal Primarily Grown For : Flowers Flowering Season : January, February, March, April Foliage Colour : Green Plant height and Form : More than 12 meters Spreading, Upright .	
32	Gulmohar *Delonix regia*	Light Requirements : Sun growing, Full shade Watering requirements : Normal, Can tolerate less or more Primarily Grown For : Foliage Flowering Season : May–June Foliage Colour : Green Plant height and Form : More than 10 meters Spreading crown	
33	Kachnar *Bauhinia blakeana*	Light Requirements : Sun growing, Semi shade Watering requirements : Normal Primarily Grown For : Flowers Flowering Season : March, April, May, June, July, August Foliage Colour : Green Plant height and Form : 8 meters spreading crown	
34	Maharukh, *Ailanthus excelsa*	Light Requirements : Sun growing, full shade Watering requirements : Normal Primarily Grown For : Foliage Flowering Season : march Foliage Colour : Green Plant height and Form : More than 20 meters, neat domed shaped crown.	
35	Mahau, madhuca longifolia	Light Requirements : strong light demander and readily suppressed under shade Watering requirements : drought-resistant Primarily Grown For : seeds Flowering Season : april Foliage Colour : dark olive green Plant height and Form : 15 meters with a wide spreading crown	
36	Imli *Tamarindus indica*	Light Requirements : full sun or shade. Watering requirements : can tolerate more or less. Soil requirements : Well drained fertile soils Flowering Season : june - july Foliage Colour : dark green Plant height and Form : 24 meters and dark green foliage.	

Grasses: Dichanthlum annulatum, vatevaria zizianiodes, Heteropogon contortus.

Figure 20: Ground covers on site.

2.5.6 Fauna Observed on Site:

Indian mynah and sparrow are the commonly seen birds on site. Indian mynah enjoying chironjee fruit.

Figure 21: Fauna observed on site.

2.5.7 Site Analysis:

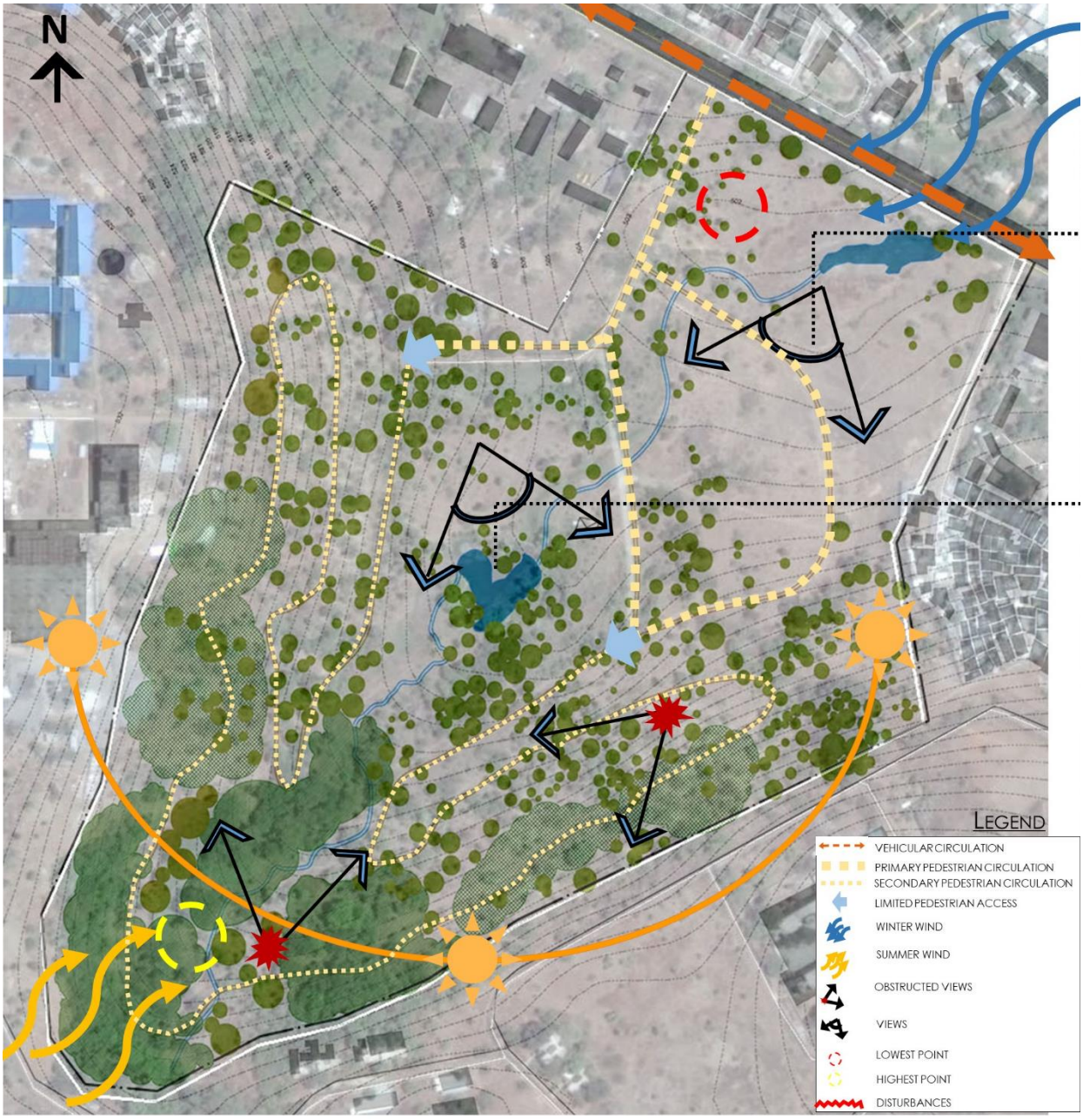
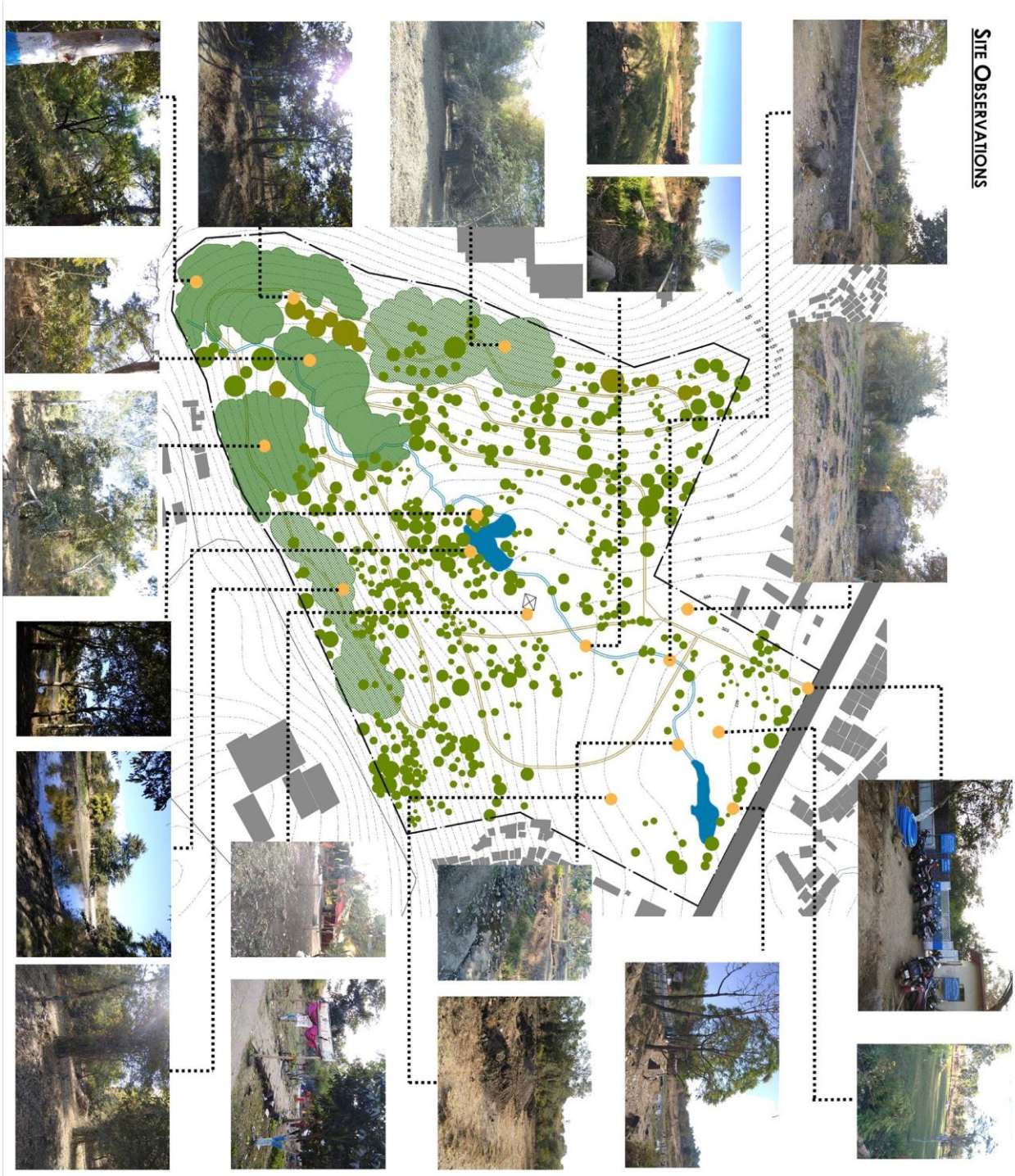


Figure 22: Site analysis

As per the climate study done it can be inferred that the site has winter wind from north east side hence dense buffer zone or shelter belt can be provided to control the velocity of wind. And the summer wind from North West side the funnel effect through vegetation and dense plantation need to be provided. The existing features such as dense vegetation on the edges of site, existing valley with concretize edge, temple situated in site need to be designed properly by solving issues with respect to ecology and care should be taken to protect the natural environment on site. The site is majorly accessible from link road no.3 and has good connectivity in terms of

transport. The site has restricted circulation movement due to improper signage and safety and security issues which can be addressed by design solution through providing direction to user's movements, signage's to provide flexibility in circulation and lighting for making site accessible for most of the time.

2.5.9 Activity Mapping Of Site:



The current activities on site such as users visiting to site for temple, creating waste disposal and damages to the soil and illicit cutting of trees. At the entrance of site conflicting pedestrian entry and vehicular entry due to less provision for parking's.

2.5.10 SWOT Analysis:

Strength:

- Easily accessible.
- Soil, topography, valley and lake at the site allows diversified vegetation and availability of avail fauna.
- Temple in the site attracts many visitors from nearby vicinity.

Weakness:

- No aesthetic appealing spaces. Entrance, sitting spaces, children's play area
- Low maintenance of vegetation and existing features such as valley, pond at site.

Opportunity:

- Revive natural features on the site.
- Creation of meaningful gathering spaces, recreational spaces

Threats:

- Encroachments of slums.
- Unhygienic conditions for visitors.
- Security issues.

CHAPTER 3: LITERATURE STUDY

3.1 ANATOMY OF A PARK – essential for recreational area and planning by Bernie Dahl (ASLA), Donald. J. Molnar (FASLA)

The book aims at understanding of the processes that are most effective for planning and design of parks from user's perspectives. Through provoking discussions about the multiple use concept and nature preservation. Resulting to effective site designs addressing modern challenges.

Everything must have a purpose:

Design elements must have recognisable purposes to establish the suitable relationships between the various parts of the park. These includes natural elements, minor and major structures and the users.

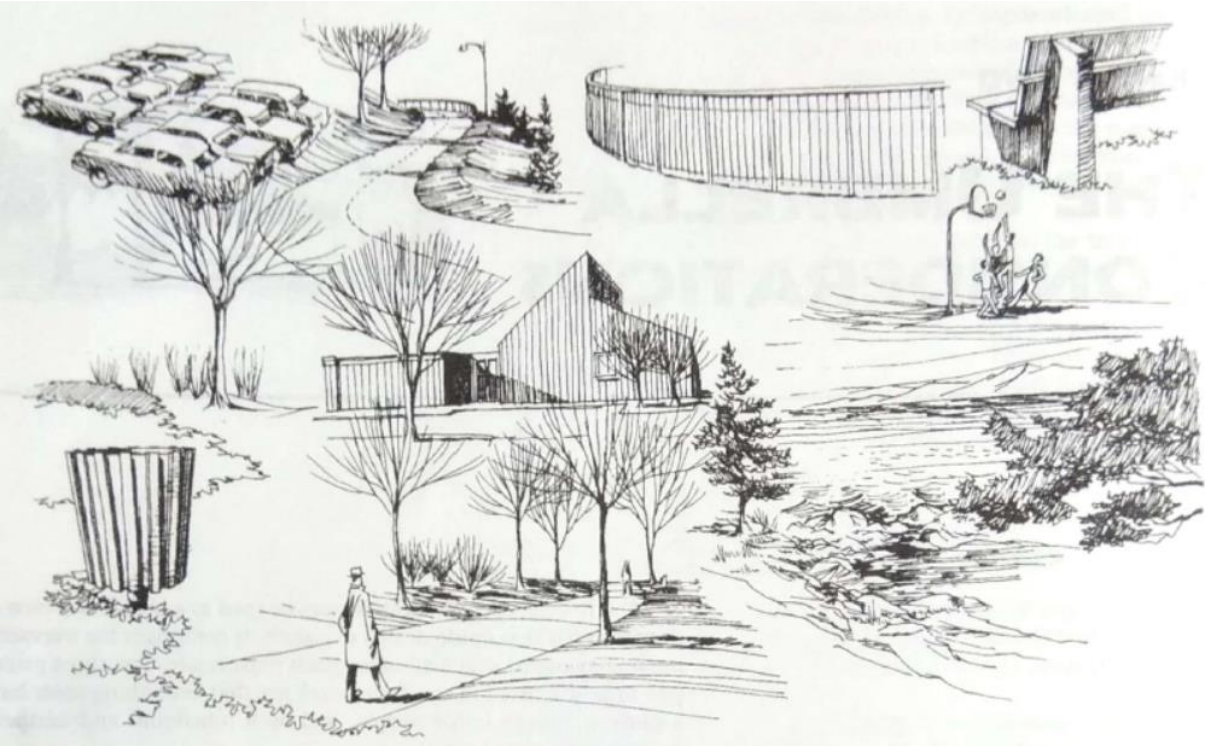


Figure 23: a park is a complex system of many parts

.

The design must focus on the relation of parks to its surrounding. In order to develop the solutions for naturally occurring problems such flooding, traffic etc. regarding any disturbance that are due to surrounding environments. Through purposeful design

solutions this effects can be managed effectively. Assigning the proper use areas to the site to reduce the wastage of the space. The active and passive uses, facilities should be assigned only to portions of the site that are compatible with those users. These can be done through identifying the limitations and the potentials of the site before assigning any use

Design must be for people:

People are the benefactors of the park. (Bernie Dahl) Thus the designers must focus on the demands of users and should be satisfied through the creative design solutions. The different age groups while designing the activities should be considered.

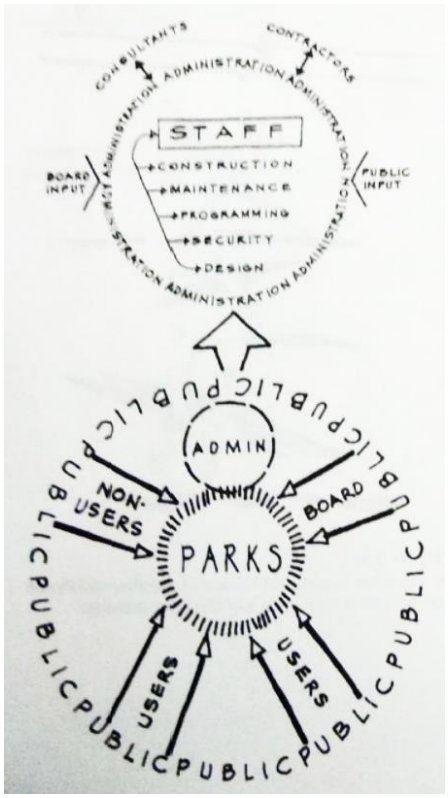
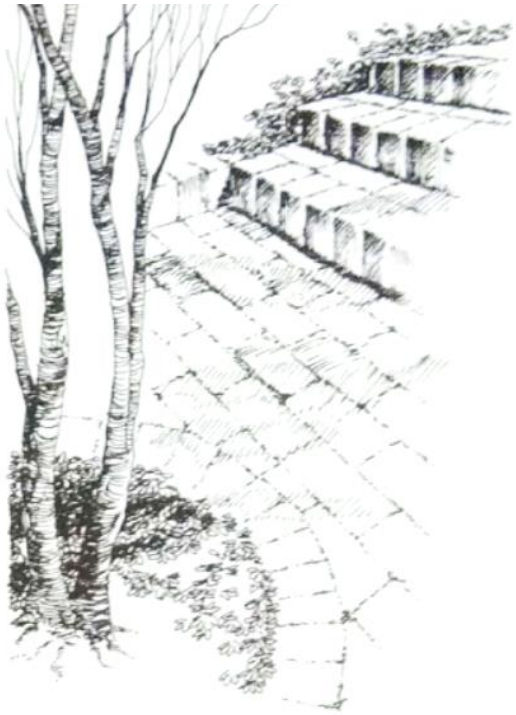


Figure 25: Anatomy of a park – relationships

Figure 24: The land drains well and the steps accommodate the grade change (function), while the paving pattern satisfy the visual appetites (aesthetics).



Both functional and aesthetic requirements must be satisfied: Every design solution must be effective. That is every object and system of relationship proposed must function in efficient manner at same time providing experiential qualities to the users. As aesthetic solutions defined themselves as a refreshment of mind. Aesthetics can be defined as the emotional response in the mind of the user that to him is pleasureful. (Bernie Dahl) Aesthetics is the quality that is provide senses to user (smell, touch hear) (Bernie Dahl)

Figure 26: Simple open space should be set aside to satisfy the leisure time

Establish a substantial experience: In order for understanding and perceiving of the spaces, the development itself must have such a strong character that it produces an impressions capable of being identified. In order to construct the design that would create substantial experiences for the user effects through lines, colours and textures should be implemented in design.

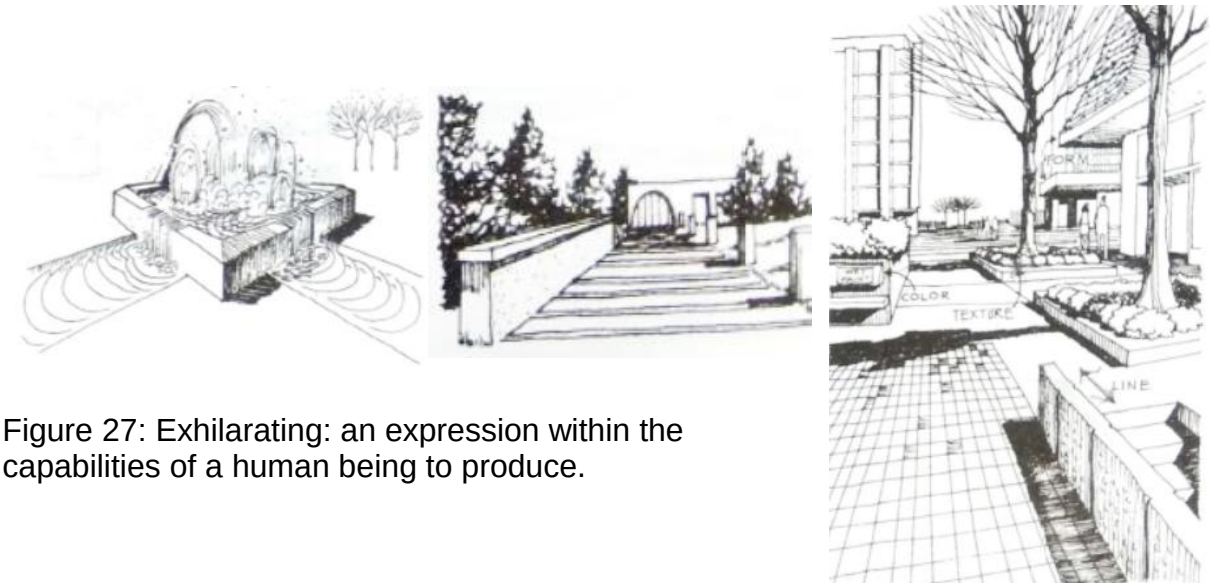


Figure 27: Exhilarating: an expression within the capabilities of a human being to produce.

3.2 Design for Outdoor Recreation – Simon Bell

The book is envisioned as a guide for designers to satisfy the balance between the demands of users and the site. With the help of examples drawn from a wide filed author explains the needs and way of designing for outdoor recreation activities that are sustainable in nature and provide less damage to habitat or natural environment which is main focus of the study.

What is recreation and why is it important?

Recreation is the term used mainly to refer to activities that are carried out not far from home and within the normal daily routines while the term nature tourism implies activities that are part of a holiday or vacation and which involve staying away from home. (Bell)

Several people may be tourists or from other regions or people who are local to particular area are interested in learning more about the area they are visiting, the organizations which manages those landscapes for enjoyment of visitors also allows creates interest in teaching visitors about it as well as help in its protection or management.

The term 'the outdoors, can be defined as a comprehensive places which includes all those where people can experience special feeling of being away from home. (Bell)

There are many reasons for visiting and exploring the great outdoors: physical exercise, release from the stresses of city life, fresh air, getting closer to nature, enjoyment of the scenery, hunting and fishing, walking the dog, an occasion to meet family and friends. (Bell) For most of the visitors it is a combination of reasons. The trend may change but the intention behind it will remain same that is a chance to escape from the busy schedule, to spent time alone or to be with other people or close to the nature to get relaxed, for enjoyment. The users mainly prefers activities full of adventures which different from their daily routine such as hiking in hilly areas to walking in a park which located nearby or far away from the town. Sometimes also prefers to spend a day with family on picnicking areas thus everything depends on the potential and variety of activities provided by landscapes in a particular region. On the other hand users creates disturbance to the ecological sensitive areas

through various activities. Hence it is a job of designer to manage the visitors as well as the precaution for minimum damage and disturbances to the ecological sensitive areas, wildlife for their long term survival. Thus designing and maintaining is the way to respect these landscapes and to avoid the pressure created by visitor which is reducing their natural identity and character of the place.

Recreational planning and its three phases:

Recreation planning is about assessing the demand, both actual and potential; about assessing the capacity of the land base to meet that demand in a sustainable way and about using available resources wisely to optimize the potential. (Bell) Planning can be looked on as taking place at three levels.

The first planning level is strategic, where major decisions are made based on policies set by government.

The second type of planning is where the policies and strategies are delivered on the ground at the level of the land management unit.

The third planning level is the site level, where amore localized area is to be developed as a specific site for particular activities, with car parking, information, toilets, trails.

Trends in demand for outdoor recreation and its assessments:

The changes in recreation demands can be recognized and their impacts can be analysed by number of key trends that are responsible for it. Some of these are demographic trends, some are social or political, others are technological and economic and yet more are driven by lifestyles. At the planning level assessment can be done by effective questionnaire and survey of existing users in order to determine who is coming how often and from where and for what purpose. A wider survey should be able to identify potential as well as actual users of an area so that their demands can be built into the brief for the development of a new or redevelopment of an existing area. (Bell)

The landscape as a setting for recreation:

A landscape of cultural heritage, wildlife habitats and with diverse land uses may satisfy the demands to meet the type of recreation and by its carrying capacity or by

combination of all of them. Thus the designer has to satisfy the needs of various visitors with potential that landscapes can offer to them. These all depends upon the degree of land that can accept or offer and its existing use, its strength and diversity of nature, climate and different opportunities.

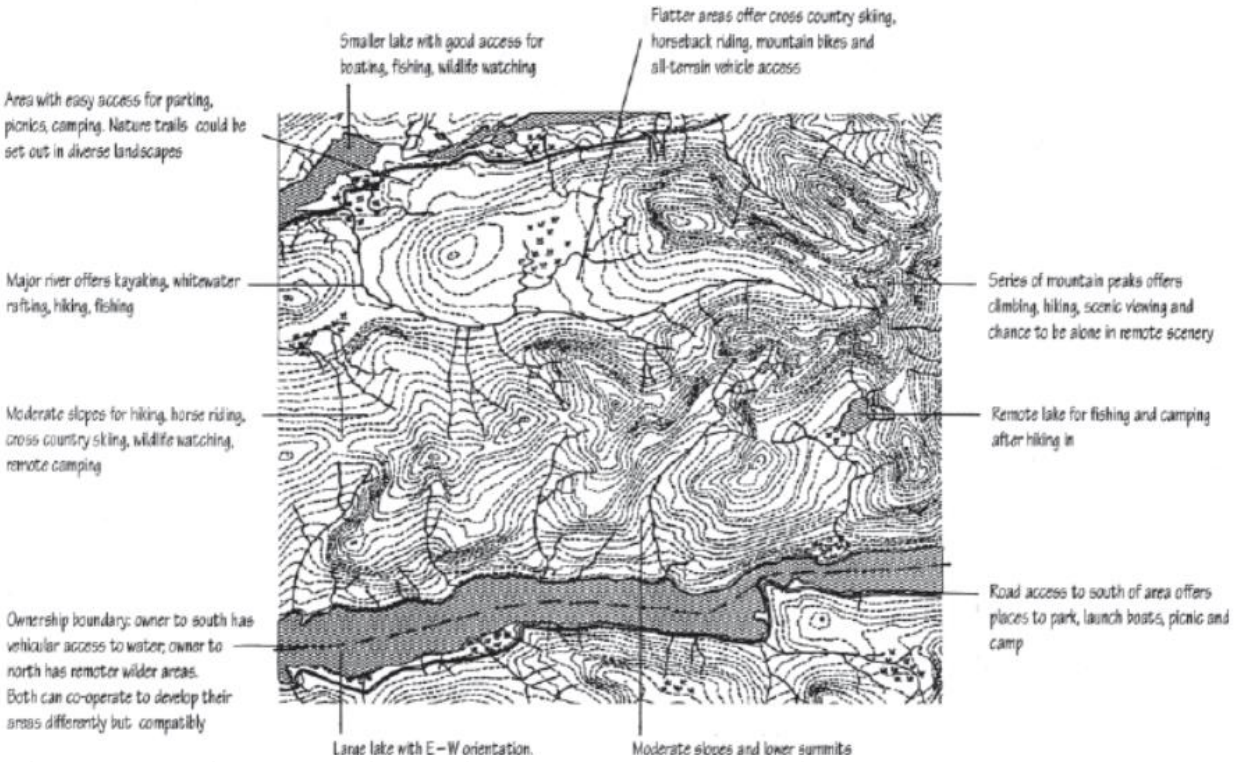


Figure 28: A plan presenting variety of scope for recreation

(Source: designing for outdoor recreation)

The area can be classified into areas of particular visual characteristics based on the landform and vegetation types, presence of water, land use, cultural heritage, and so on. (Bell) A maximum care should be taken for most sensitive zones such as places with rare species of flora and fauna, with unique geographical formations that are termed as special landscapes which are iconic in nature and with strong identity.

Zoning is an important factor that recognizes the suitability of placement of activities based on analysis made of all natural, physical and manmade factors of a particular region. Zones are based on suitable, logical, coherent units that aids to balance activities and landscape in harmonious ways. (Bell)

Design concepts for outdoor recreation:

A city view where human activities and structures dominate. The plan is based on a geometric grid, the buildings are rectangular, densely packed, and the whole is tightly controlled, as are traffic movement and the regulation of people´s lives to some degree by timetables. New York.

A remote, uninhabited wilderness area, untouched by direct human activity. The mountains, glaciers and hard climate dominate. It is possible to wander freely and feel far from the urban world; to obtain solitude; and to use the skills of self-reliance when facing natural hazards. Alaska/Yukon border, USA/Canada.

Figure 29: Contrasts between city and wilderness

Many people believe in escaping from city in order to reconnect with wilderness, the natural or semi natural areas. The concept of placing building at low level of land form is to avoid the obstruction getting in views this is one of the approach to respect the nature and character of landscape. Also by implementing the concepts that are relevant to the different materials used in outdoors. The distinct change from city life to that of wild area is main reason for attraction of visitors. Thus it becomes important to recognise and respect the character of the place in order to keep the landscapes dominant. This qualities makes places special and creates attraction for visitors. It is designer duty to identify such qualities and can be used as a potential factor in a design. It is should be appreciated and implacable by the activities created to satisfy the demands of users and to preserve the naturalness of site.

A more recent example from Germany uses natural stone, gravel and weathered rough sawn timber, which work together and fit their surroundings. Simplicity and good attention to the detail of construction make this a timeless solution.

(Top) The landscape at Glenveigh National Park, County Donegal, Ireland. The lake, bare mountains, subdued colours and natural textures present a character that should determine the use of materials and finishes. (Bottom) Part of the external landscape around the visitor centre, where urban materials and finishes used in a fussy design are out of keeping with the character of the landscape as a whole.

Figure 30: The image explains the use of local materials in design to maintain the character and identity.

Comprehensive site design

Design scales:

The planning scale: the concerns about large areas are considered and general action zones are defined. Master planning where the general layout and circulation of public in an area is developed from the planning scale according to zones or from landscape personality areas.

Site planning and design where the locations of different amenities have been decided by the masterplan and the detailed layout is to be prepared.

Detailed design of individual elements such as signs, barriers, toilets, picnic tables etc.

Site design at any scale needs to start with a brief. It may identify who are the expected

Visitors, how many, over what time, and for what activities. It will help to identify the issues generated due to planning and management that are to be dissolve through solutions in zoning and design and management.

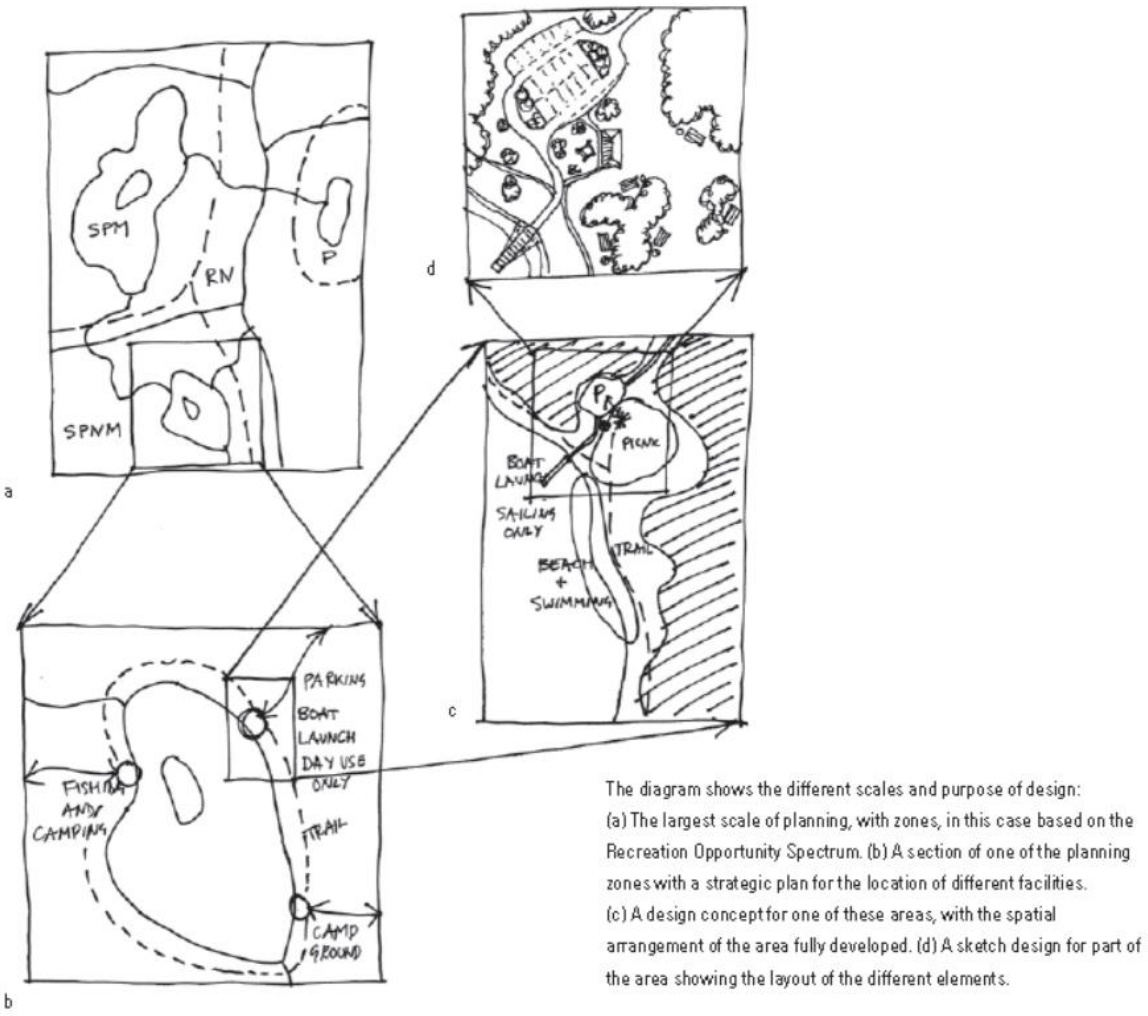


Figure 31: The image shows the various scales and purpose of the design

Stages of design:

- Assessment of demand
- Survey/inventory phase that includes: terrain (elevation and slope), knowledge of soil, hydrology, drainage patterns, plant species, ecosystems, sensitive zones, knowledge about history and past traditional recreational habits. Various recreational features that are potential to the area.
- Landscape character, where area is divided into zones with different character because of landform, vegetation, presence of water, historical aspects, qualities such as mystery and specific ways of experience such as high elevation views.
- Analysis stage which allows application of the inventory or study made.
- Designing is the next stage which includes innovative ideas to achieve the desired outcomes and objectives made. It is a holistic approach with solution to dissolve the issues, reduce the disturbance and allows smooth functioning.

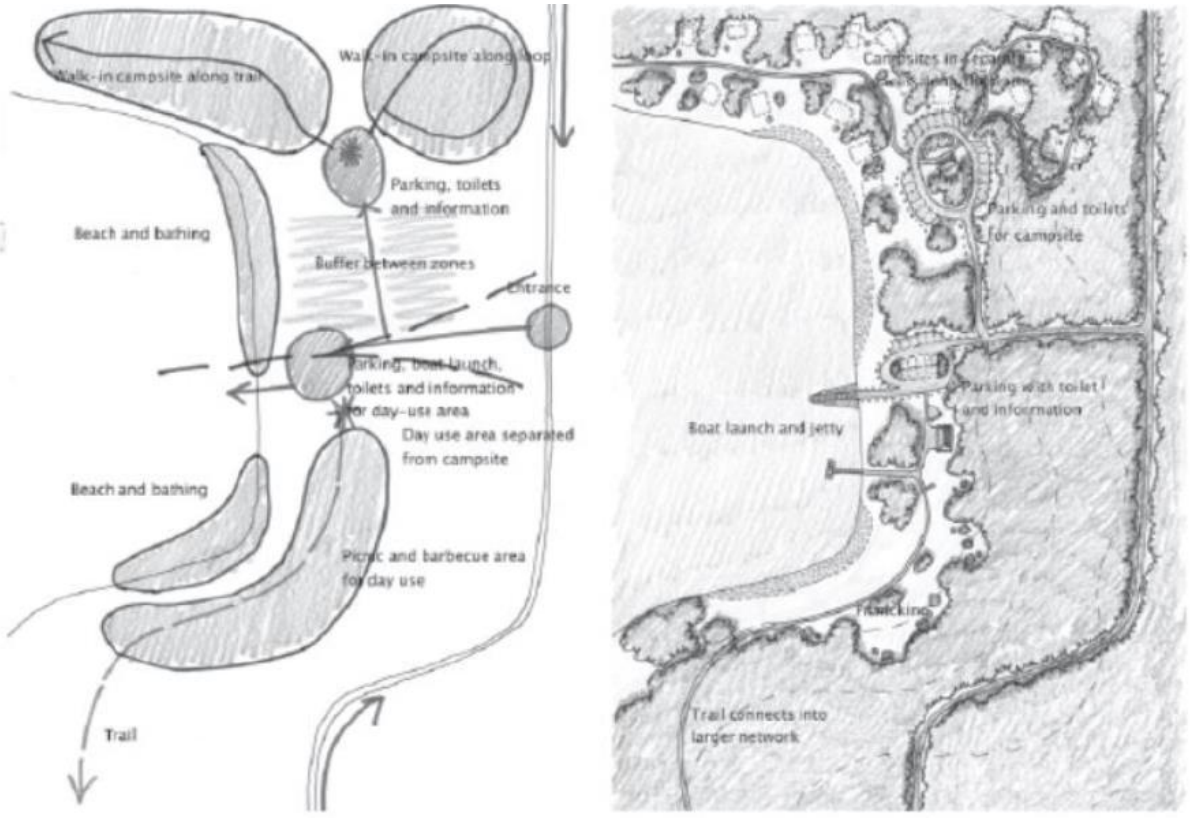
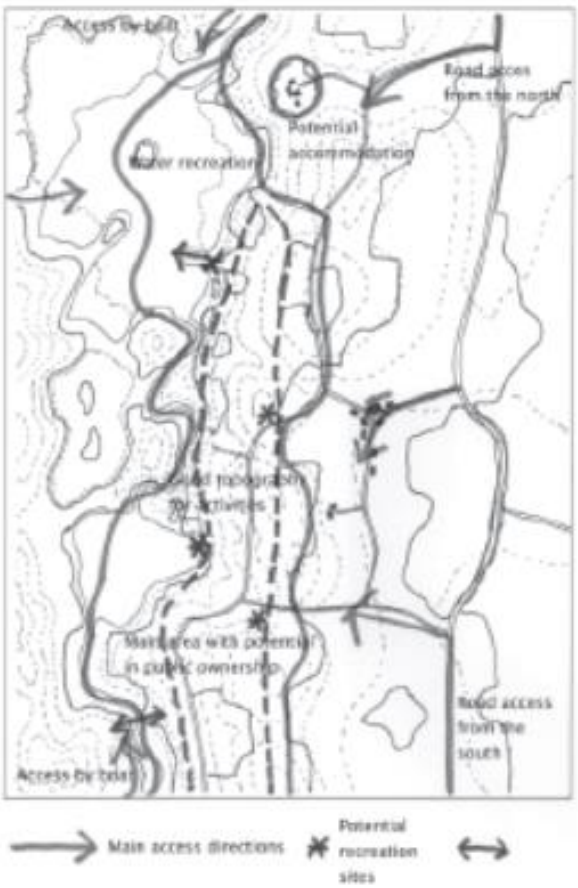


Figure 32: Application of concepts to the site



Clockwise from top left

This map shows the assessment of recreation potential for the area, based on where there is access, suitable terrain, land use types, and so on.

This is one of the first of the analysis stages, looking at landscape character and quality. This will be used to try to ensure that recreational development both fits into and makes the most of the character and its qualities.

The map of opportunities and constraints, mainly those of a practical or legal nature. The idea is to make the most of the opportunities and to work around the constraints.

Figure 33: Application of concepts in detail plan

3.3 Ecological Landscape Design:

Design is a hinge that inevitably connects culture and nature through exchanges of materials, flow of energy, and choices of land use (Çelik). Design solution has power to solve the environmental problems and showed up integration of ecological processes and functions in design. While ecologies play vital role in providing information and direction and design provides innovative ideas towards various ecological issues.

The relationship between ecology, sustainability and design:
These three different aspects merged together to solve the negative impacts on surrounding environment created by human lifestyle. The design and ecology are very closely related making sudden complexities. Ecology explains the functioning and behaviour of natural world, and design is the key approach for creating sustainability in ecology. The knowledge gained from ecology can influence landscape design (Çelik).

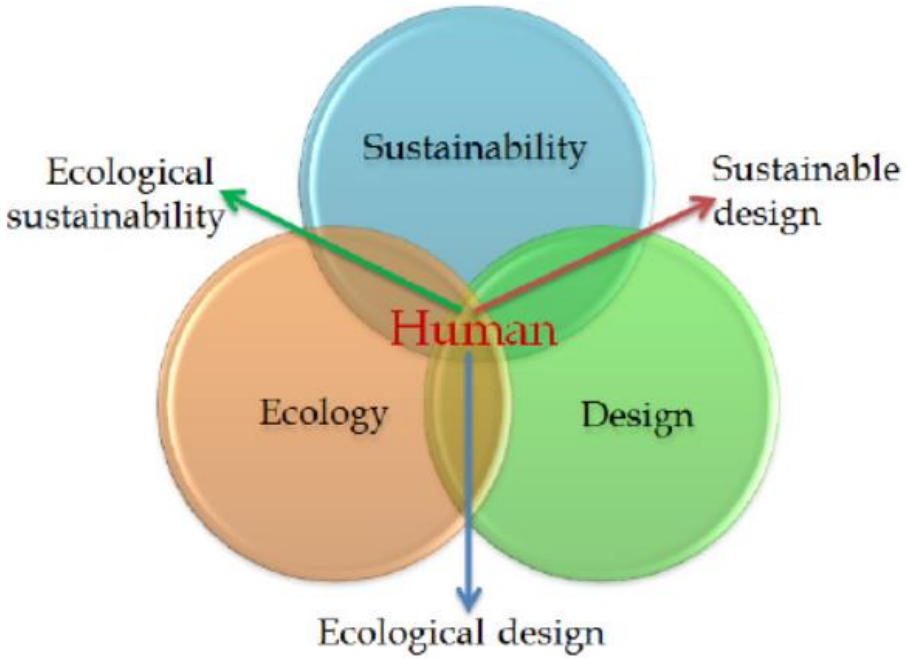


Figure 34: The relationship between ecology, sustainability and design.

In landscape architecture ecology's emphasis on natural processes and the inter relatedness of landscape components influenced outlook and method and prompted an ecological approach to design (Çelik). According to the principles of sustainability ecology is considered as crucial in landscape design.

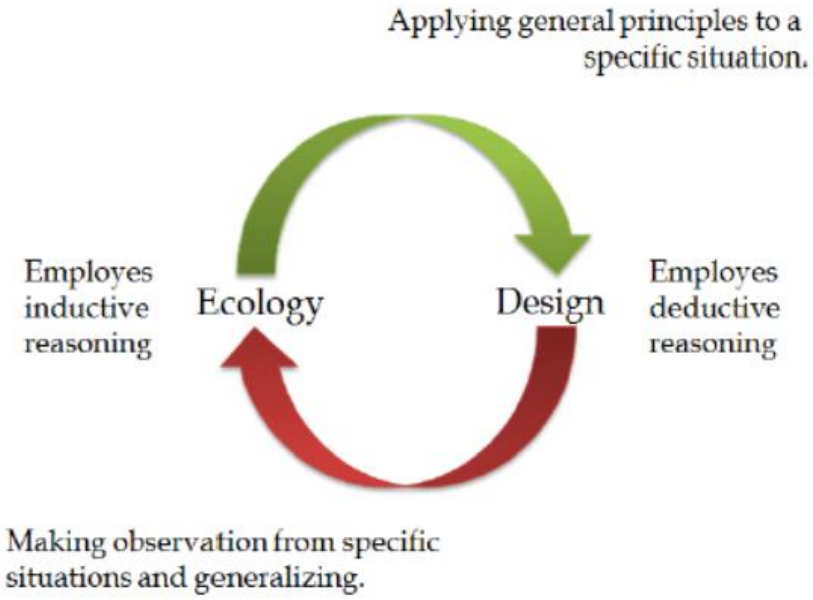


Figure 35: Design and ecology are paired techniques for solving problem.

The typological framework aims to illustrate and differentiate current methods of approaching ecological design in landscape architecture.

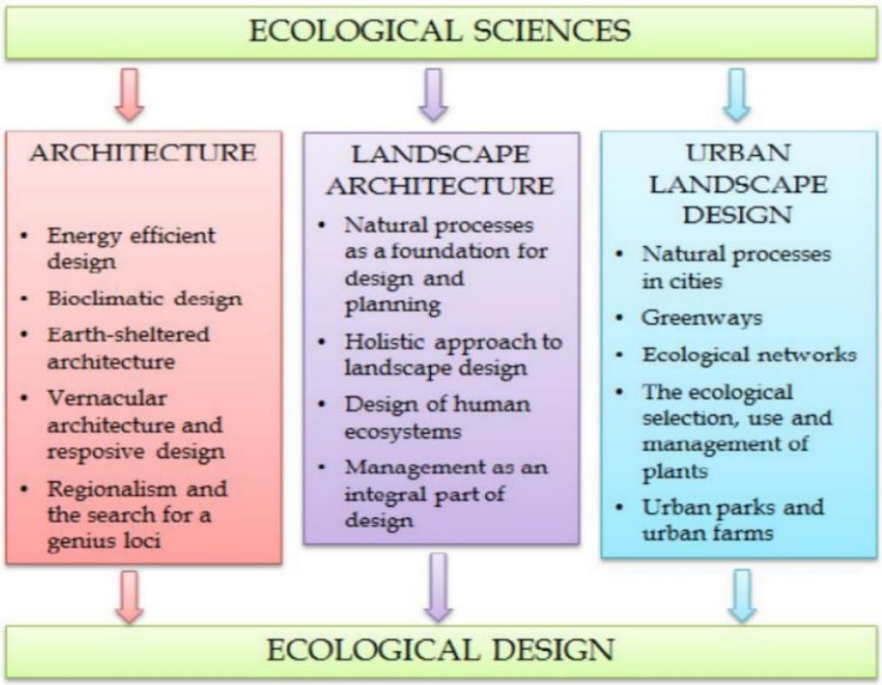


Fig: The interface of ecology with architecture, landscape architecture and urban landscape design.

Ecological landscape design:

Ecological landscape design is based on an ecological understanding of landscape which ensures a holistic, dynamic, responsive and intuitive approach (Çelik). The objectives of ecological landscape design is to manage landscape integrity; stimulating landscape sustainability; and strengthening the natural and cultural aspect of place.

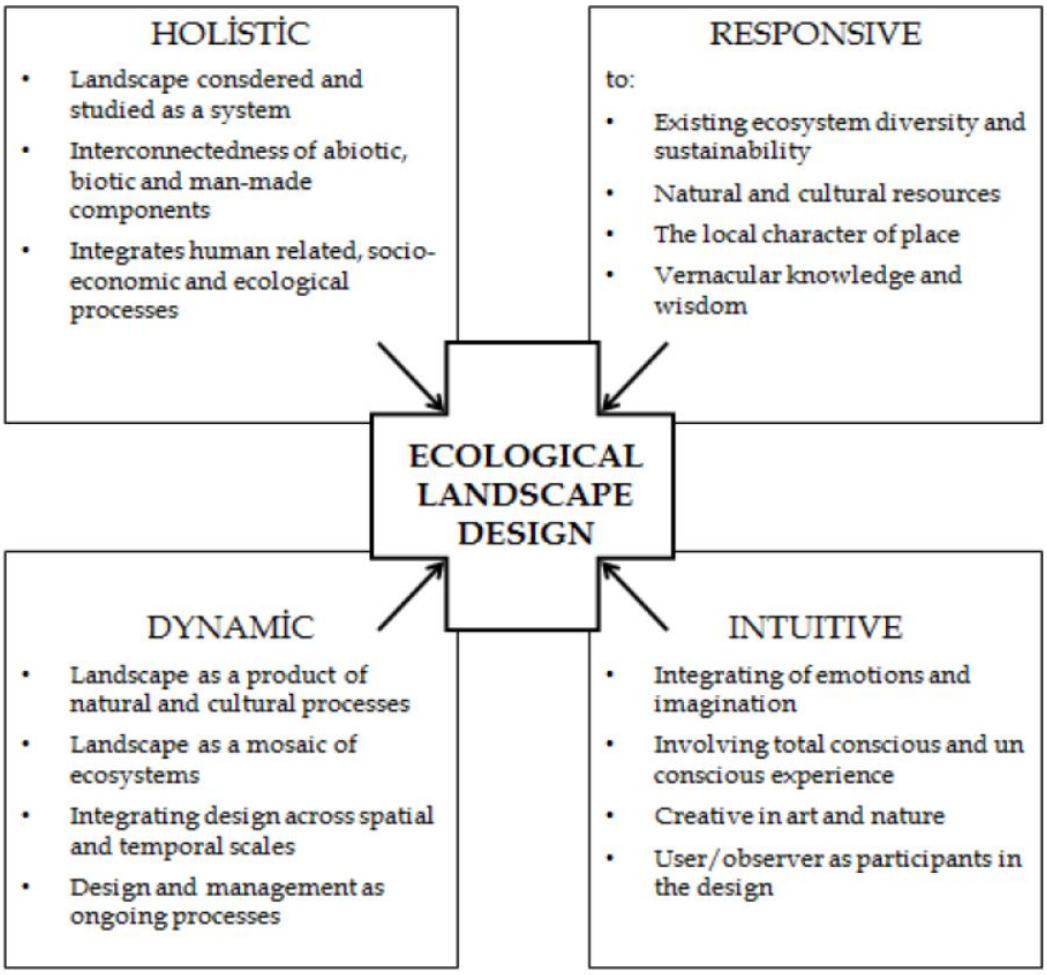


Figure 36: Structure for ecological landscape design

Philosophies of ecological landscape design:

The main ecological philosophies about cities are that:

- Cities are systems of ecologies.
- They are vibrant in nature.
- They are have mixed combinations of human and natural processes and these are interrelated in cities.

Principles	Summary of Implication for Landscape Design
Cities are ecosystems	Design affects all four components of human ecosystems.
Cities are heterogeneous	Design should enhance heterogeneity, and its ecological functions.
Cities are dynamic	Design must accommodate internal and external changes projects can experience.
Human and natural processes interact in cities	Design should recognize and plan for feedbacks between social and natural processes.
Ecological processes remain important in cities	Remnant ecological processes yielding ecological services should be maintained or restored.

Figure 37: An application of five principles for ecological landscape design in cities.

These philosophies state the character of cities and changes in their compositions and also emphasis on ecological systems in cities.

Principles	Summary of Implication for Landscape Design
Solutions grow from place	Ecological design grows from an intimate, detailed knowledge of the place and its nuances.
Make nature visible	Make sure natural cycles and processes are visible to bring the designed environment back to life.
Design with nature	Nature's living processes offer opportunities to design using natural cycles, natural waste, and regeneration as part of the total design.
Ecological accounting informs design	By tracing the environmental impacts of a design, we can discover the more ecologically sound options.
Everyone is a designer	Listen to every voice in the design process.

Figure 38: Principles of ecological design.

3.4 Environment for Children's Play Area:

According to the desire of children the outdoor spaces designed for play should be full of natural elements such as various types of plants which has different colours and fragrance, mud and soil allowing them for constructive and imaginative plays. Earlier children were freely allowed to interact with nature without restrictions. They had access to open spaces in vicinity and streets, sidewalks, parks in neighbourhood etc. These all help to explored and learning about the nature. Due to busy and hectic schedule of parents, children's are provided with restricted option of play and mainly that offers indoor play which includes video games, games on mobile etc. The scope for interaction with nature has been reduced these days due to shortage of open space in vicinity. Looking at study made by researcher's children's love to play in outdoors in natural landscapes.

The outdoor experiences in the wilderness and natural areas show that natural outdoor environments produce positive physiological and psychological responses in humans, including reduced stress and a general feeling of well-being (Stoecklin, March/April 1998).

The Importance of Nature to Children:

The response of kids towards the outdoor environment is more positive as they have not yet fully altered themselves to manmade, indoor environments. The children's have emotional attachment towards the natural environment. It is essential for children's to have positive contact towards sense of connection to community as well as encouragement towards naturalness as it allows child for isolation and creativeness and surprises. The nature offers and introduces a child with positiveness about each other and surrounding.

Children's Experience with the Natural World

Generally the children loves outdoor play than indoor play as they offers them various freedom to play. To play as they want no restriction and encouraged for messy activities. Outdoor offer them various types of experiences with different modes of play that are constructive and full of imaginations which are not usually supported by indoor games. The outdoor play generally reflects the wilderness in

nature hence they and have certain qualities that attracts children. The qualities of outdoor environment that can be describe are:

They are distinctive in nature, most encouraging and attracting due to its endless range of activities. As they are not designed, more original and unique in context. As the composition of nature is more related to stories and fairy tales that is major attraction for kids. Children judge environments on interaction and closeness with nature which very different from adults. Children have a unique, direct and experiential way of knowing the natural world as a place of beauty, mystery and wonder (Stoecklin, March/April 1998). The nature offers innovative explorations with various types of materials through natural elements such as plant, mud, water. The natural environment's provides more constructive type and complex type of play. Because of their interactive properties, plants stimulate discovery, dramatic pretend play, and imagination (Stoecklin, March/April 1998). The natural vegetation offers various textures, fragrances and enclosures to the space which provides complete freedom to shout and freedom of behaviour. Natural settings offer qualities of openness, diversity, manipulation, exploration, anonymity and wildness (Stoecklin, March/April 1998).

Designing Outdoor Spaces for Children:

The designer should consider the natural setting as elements to incorporate in designing the outdoor play. Play of different materials and nature elements that actually build the children capacity to judge and discover learnings about nature. The requirements for children's play area differs from that to the requirements of adults. Children prefers wilderness, rough and natural components to get more adventure and mystery and hiding spaces whereas the adults prefer neatly designed and manicured spaces.

From these the requirements for elements to design children play area can be described as different type vegetation's including trees, flowers, creepers, sand, play with water, features to roll on, sit, lean such as mounds. These all elements encourage child to investigate and closeness to nature. Also the paly areas along the natural streams that offers interactive water play should be enhance in order to make children experience about their local environment. Different type of locally available material should be used to make children enthusiastic about nature.

CHAPTER 4: CASE STUDY

4.1. Kulish Smriti Van, Jaipur

4.1.1 Location:

The kulish smriti van is a bio-diversity forest situated on Jawaharlal Nehru Marg in Jaipur. During highly destructive flood of 1981 this area was inundated and deep ravines were formed. The area was taken up to plant trees in memory of the near and dear ones.

Figure 39: Location map of Kulish Smriti Van (source: wikimapia)

Project detail:

Area: 47.03 ha

Architect: Rajiv Khanna

Location: Jaipur, Rajasthan.

Figure 40: Google Earth image of Kulish Smriti Van.

4.1.2 Concept of smriti van:

The landscape conservation in that particular region resulted into creation of smriti van. Which likely to be considered as ecological heritage of rajasthan. The landscape in this area is an integral part of the ecology of the Aravalli ranges. Thus the creation of smriti van was to retain all natural features and existing trees that would help to maintain the natural wilderness and character of the site, which is also known as a biodiversity forest.

PRESERVE THE NATURAL CHARACTER OF THE AREA	• WORKING WITH EXISTING LANDFORMS • TO ENCOURAGE THE RE-EMERGENCE OF AN ECOLOGICAL BALANCE THAT IS NATURAL TO THE REGION.
CONSERVE SOIL AND WATER RESOURCES	• CAREFUL PLANTATION AND BOULDER PITCHING IN APPROPRIATE AREAS HOLDS THE SANDY, POROUS SOIL IN PLACE, REDUCING EROSION THAT CONSTATNTLY DEGRADES THE LANDSCAPE. • TREATING WASTE WATER ON SITE THROUGH NATURAL PURIFICATION.
AUGMENT THE NATIVE FLORA AND FAUNA OF THE REGION	• RESEARCH INTO NATURAL HISTORY OF THE REGION WHICH ALLOWED UNDERSTANDING OF NATIVE SPECIES AND REVEALED A PATTERN TO PLANTATION. • INCLUSION OF NALLAH IN MASTER PLAN TO MAKE SPECIAL PROVISSION FOR WATER BIRDS THAT TRADITIONALLY VISITED THEIR.
PROVIDE OPPORTUNITIES FOR ECOLOGICAL EDUCATION, AWARNESS AND PARTICIPATIONIN GREENING PROCESS]	• SPECIFIC AREAS DEMARCATED FOR PLANTATION THAT CAN BE CARRIED OUT BY VISITORS AND CHILDREN. AS THE PLANNED FOREST AREA IS WITHIN CITY LIMITS AND EASILY ACCESSIBLE.
PROVIDE A NATURAL, GREEN AND HEALTHY RECREATION AND LEISURE FACILITY, WITHIN EASY ACCESS TO THE URBAN AREA	• INCLUDING VARIOUS OUTDOOR RECREATION ACTIVITIES AND EXERCISE ZONES. • OPPORTUNITIES FOR PICNICS AND CULTURAL ACTIVITIES.

Figure 41:concepts and its application site

Figure 43: Layered vegetation to prevent soil erosion.

Figure 42: Soil erosion control measure.

4.1.3 Master plan:

	ZONE	DESCRIPTION	AREAS (ACRES)
A	BIODIVERSITY FOREST	REJUVENATION OF REGIONAL PLANTS NATIONAL SPECIMEN PALNTS	27 18
B	XEROPHYTIC PLANTATION		15
C	SPIRITUAL GARDEN		1
D	MEDICINAL HERBAL GARDEN		5
E	THERAPY GARDEN	FOR PHYSICALLY CHALLENGE PEOPLE AND OLD AGE PEOPLE, EXERCISE ZONES	2
F	GARDEN OF SENSES	FRAGRANCE,COLOUR TEXTURE	26
G	SMRITI VAN		9
H	SOIL CONSERVATION, PLANTATION ZONE	TERRESTIAL AND ACQUATIC ZONE	6
I	ECO-ENVIRONMENTAL AWARNESS CENTRE		
J	NURSERY		1
K	FOREST TRAINING INSTITUTE		6
L	GENERAL ACTIVITIES	1.NATURAL TRAIL 2.HORSE TRAIL 3.WALKWAY 4.CAMPING SITE 5.SUNSET N SUNRISE POINTS 6.WATERLILLIES SEDIMENTATION POND 7.PEDESTRIAN BRIDGE 8.BIRD WATCHING(MIGRATORY BIRDS) 9. OPEN AIR CULTURAL ACTIVITIES 10.GREEN HOUSE 11.PLANTING 12.FOREST HUT	
M	MAHAVIR UDYAN		5
N	O.T.S SUNKEN GARDEN		4

WASTE WATER STREAM
SOIL EROSION AREA
GRASS LAND
GROUND COVERS
SOIL CONSERVATION PLANTS
REED BED
BOULDERS PITCHING
PATH IN WOOD LAND
BRIDGE

4.1.4 Zoning:

Wetlands and waterbodies:

A low cost natural purification and oxidation process transformed the polluted stream into a pure odourless stream within a system of ponds and wetlands that help to attract a strong avian population. Sedimentation ponds and reed beds resulted into creation of habitat for water birds

Figure 44: Greening of storm water drain banks as a phytoremediation and beautification strategy.

Bio-diversity forest:

All trees on site were retained and additional plantation was chosen among the native flora of Rajasthan. The careful selection and clustering of new plantation was directed by the creation of ecological balance and sustainability of a wilderness that would not require constant attention. The careful nurturing of the understorey growth with its accompanying worm and insect population that is so critical to healthy development of a wilderness and to attract native species back to area.

Xerophytic plantation;

The hilly area on site was almost barren and rocky. Hence plantation in this area was restricted to typical semi-arid and desert species. Planting of succulents amid boulders reveals the survival capacity of hardy plant type that is not frequently seen in its natural habitat.

Figure 45: Regeneration of species in shady areas that promote vigorous germination in tropical dry region.

Experience natural garden:

The ravines which were formed by water erosion of soft sandy soil are spectacular natural formations that provided a wonderful opportunity for the development of unique experience and interactions with nature. Since these ravines still served as stream beds during the monsoon, hence the soil erosion control measures such as ground cover and plantation that hold soil were adopted. A number of walking tracks were laid to create unique experiences through forest. Also these ravines allowed for the creation of number of micro- climatic zones.

A holistic wellness park:

A recreation areas within easy access, near entrance areas that are used for yoga, meditation, walking, family picnics etc.

Figure 46: Recreation spaces at Smriti Van.

Figure 47: Sequential stabilization of sand dunes using geotextiles.

Figure 48: Saucer shaped micro-catchment for rainwater harvesting around seeding

Figure 49: natural trails on site.

4.2.5 Flora and Fauna at Smriti Van:

Plants found in the kulish Smriti Van are:

Sr no.	Vegetation at Smriti Van
1	Trees:
	Bahera, Amla, Arjun, Maulsari, Bel, Kathal, giloe, Kachnar, Lasura, Gular, Rudraksha, Jamun, Sita Ashok,, neem, Mehndi, Bhringraj, Bansa, Dhak, Dhavada, Saalar, Gurjan, Hawan, Rohida, Khejdi, Gangan,
2.	Herbs
	tulsi, Guggal, Putranjeeva chandan, Akarkara, Gokhru Ghritkumari, Ashwagandha, Sarpagandha, cactus, Euphorbia, Agave
3.	Succulent plants for birders it's a paradise, reason is thousands of birds of hundreds of breeds in there natural habitat

Figure 50: Fauna at Smriti Van

4.2 K.B.R National Park, Hyderabad:

4.2.1 Location:

Kasu Brahmananda Reddy National Park, the largest lung space in the heart of Hyderabad. Located in the Jubilee Hills/Banjara Hills areas, which are famous for their hilly terrain and rocky outcrops.

Figure 51: Google Earth image showing location of K.B.R Park

4.2.2 Project Detail:

Project: Kasu Brahmananda Reddy Park

Total area: 142.5 ha and visitor zone is 56 ha.

Landscape consultant: kishore pradhan

4.2.3 Concept:

In a city that's rapidly losing its green cover, this park is one of the few large, surviving lung spaces. This sensitive space having various ecosystems was disturbed daily due to movement and activities of visitors. Thus the HUDA (Hyderabad Urban development authority) came upon with the concept to provide 25 m wide belt around the park which will be made accessible to visitors while avoiding the entry to main core areas which ultimately resulted into reducing the damage to ecosystem in park. This idea gave rise to the linear park which is majorly used as walkway these days. With the help of existing terrain different experiences was carved out for the park creating sense of belongingness and mystery for users.

4.2.4 Zoning:

Conservation zone	Visitors zone
86.50 ha	56 ha
Soil and moisture conservation works, water harvesting structures, raising of indigenous fruit and fodder trees.	The visitors are allowed to walk along the designated pathways to see the flora and fauna of this park and enjoy its wilderness. For spreading environmental awareness among the citizens. Regular nature camps are conducted for school children
Thus care for less disturbance is taken to enable the functioning of ecological process	the beautiful creations made by human for preservation and safety for wildlife, Biodiversity and Ecosystem.

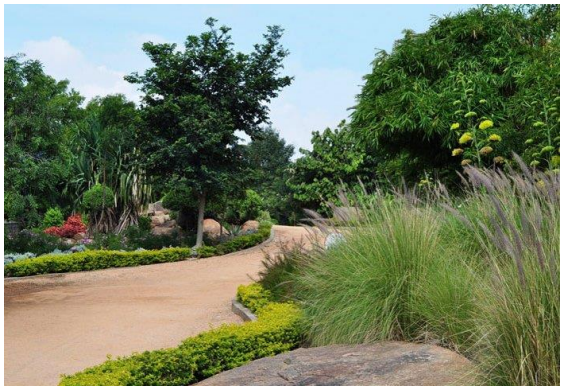
Figure 52: Shows the division of park into different zones according to its use.

4.2.4 Master Plan:

The beautiful planted trees along the pathway, clumps of cactus plant and a water body filled with lotus, a waterfall and resting peacocks these all creates unique experience for users.

Figure 53: Different textures along the pathway.

Figure 54: Visitors for daily walk at park.



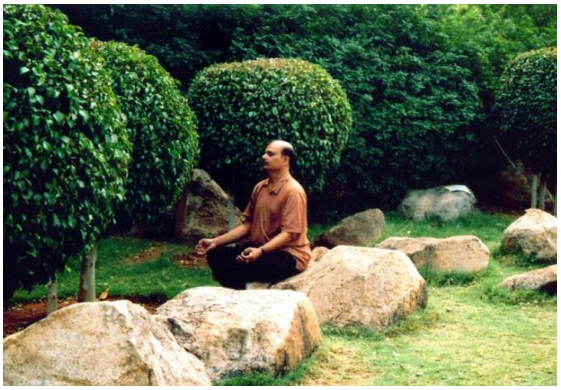


Figure 55: Different textures along the pathway and recreational activities at park.

Figure 56: Trees providing shade for pathway and seating.

The park mainly houses local flora with few exotic species to encourage the colourful environment at all seasons. This picturesque park is unique in its own way (lajournal.in, 2017). The park also includes palace of former nizam of Hyderabad (chiran) and other historic buildings

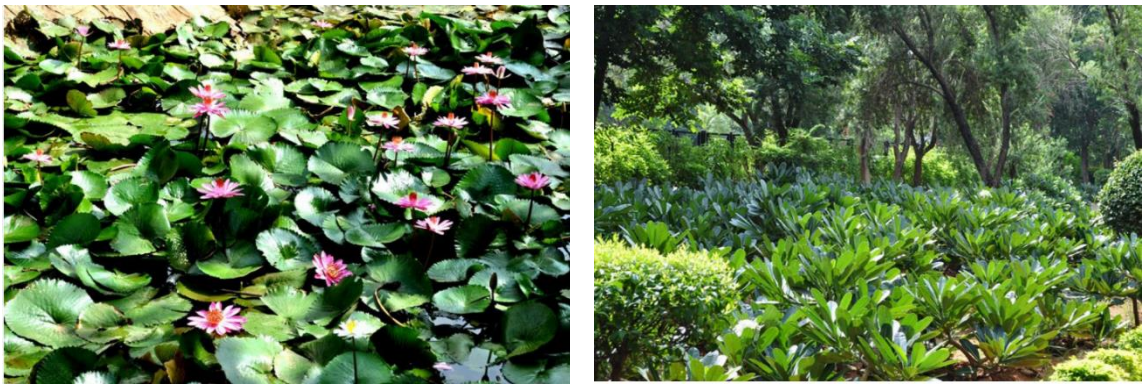


Figure 57: Image of lotus pond and exotic species at park.

4.2.5 Flora and Fauna of K.B.R Park:

The park contains almost 600 species of plant that includes trees, shrubs, climbers, herbs, grasses, pteridophytes, bryophytes and xerophytes. Most of the important trees species are native to the region such forests like Teak, Rosewood, Anogeisus, Lagerstromea, Cassias, Albizias, Accacias, Neem, Zizyphus, Bamboo, Sandal are Wood are represented in this park. The shrub layer includes Ullinta, Dante, Manga, Lantana, Carissa, etc. The lower layer consists variety of seasonal grasses, herbs.

The fauna becomes the major centre of attraction to users. The resting of peacocks and diverse species of avial fauna can be observed at park. As well as park has 30 species of butterflies and 20 species of reptiles, 20 species of mammals and numerous invertebrates.

Figure 58: Avian fauna observed at park.

Figure 59:regeneration of native flora a quality of indicator

CHAPTER 5: DESIGN DEVELOPMENT

The proposed site for Smriti Van located on link road no.3 in city of Bhopal, surrounded by different types of land uses has potential to be developed as a urban green space. The site has rich context in vegetation which plays vital role in managing the ecology of cities. According to the present scenario the existing valley on site has concretize edges and majorly disturbed due to activities of users. Through a comprehensive landscape design approach the disturbance to natural environment can be minimized. The comprehensive approach includes conservation and preservation of existing features on site and allowing the smooth functioning of them with satisfying the demands of users. The resultant would be urban forest within easily accessible area which encourages to various opportunities for learning, recreation and creates microclimate conditions which is very important for urban areas now a days. The design proposal projects a vision for the site addressing major issues raised by the study.

5.1 Design Brief:

Based on the analysis made and literature study and case studies made the requirements of areas for comprehensive landscape design are derived. Also looking at requirements proposed and demands of users which need to satisfy through design. The design brief includes following areas

- Parking and drop off point
- Entrance
- Tree court
- Visitors centre
- Lake area along with deck
- Lawn area for recreation
- Children's play area.
- Tree walk
- Temple
- Trails through natural vegetation
- Watch towers
- Flowering garden
- Trellis walk
- Smriti van
- Nursery.

5.2 Zoning:

Based on the analysis study of natural and physical layers, Smriti Van is divided into the different zones according to its suitable use and activities. The Smriti Van is majorly divided in two zones:

i. Conservation zone
ii. Active and passive recreation zone
iii. Forest of memories

The conservation zone emphasis on reviving and protection measures for existing features of site area. That includes present vegetation on site, seasonal stream and waters bodies.

The active and passive recreation zones are located near entrance area of site with idea of easy accessibility and reducing the damage and disturbances to sensitive areas of site due to interference of visitors. These zones mainly includes walkways and trails, resting and seating spaces for users, lake area, lawn and outdoor gym for daily recreation. The children's play area has constructive and creative play options which attracts kids towards the nature and provide complete freedom to discover new inventions, communications with other kids and learnings to their surrounding local environment. The area for children's play is placed near temple complex and lake area. The dense canopies at tree court near the entrance introduces users to the feel of dense forest and sense of belongingness and creates mystery that allows them to investigate more and maintain the curiosity about the park. The flowering garden would be major attraction for people that contains trellis walk and gazebo. Watch towers are located at suitable points to experience users the unique and picturesque setting of the park. The zone successfully responds to the demands of visitors.

The memories of forest has an area to host the plantation by visitors. The trees are used as an element to enhance the memories and keep them alive. These is the one of the best approach towards conserving and allowing the smooth ecological processes and their functioning back to the cities. On other hand also an approach towards making urban areas resilient by reducing the heat stress and water stress.

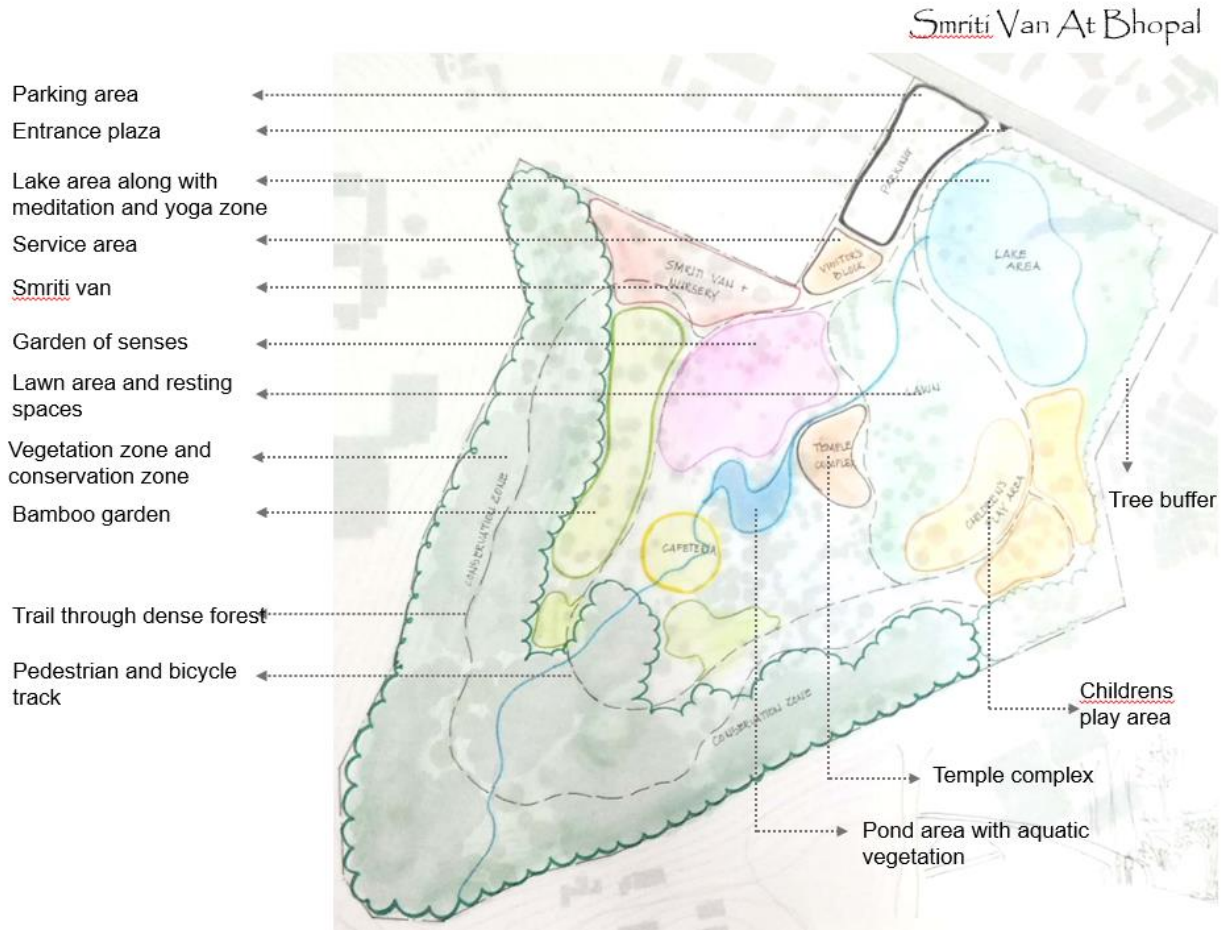


Figure 60: Zoning map of Smriti Van

5.3 Concept:

The theme chosen for integrating memories with landscape is '**Trees of History'**. The idea behind this is to reflect the stories that are associated with the focal trees of Madhya Pradesh. These trees are considered of national importance due to diversified values and stories attached with it and are natural heritage to the region. Hence focusing such trees which has great values and allowing users to experience and know about them. The equal emphasis is made on preserving and maintaining the existing elements for ecological landscape design. These includes various conservation techniques such as provision of check dams at regular interval to reduce the runoff. Phytoremediation techniques for pond to reduce the organic and inorganic wastes. Soil stabilization techniques at sloping areas to prevent soil erosion. The shelter belts are provided to control the effects of winter wind on site and users. Enhancing native plantation to attract the avian fauna and to generate micro climatic conditions.

5.4 Design Development:

Figure 61: initial stage plan.

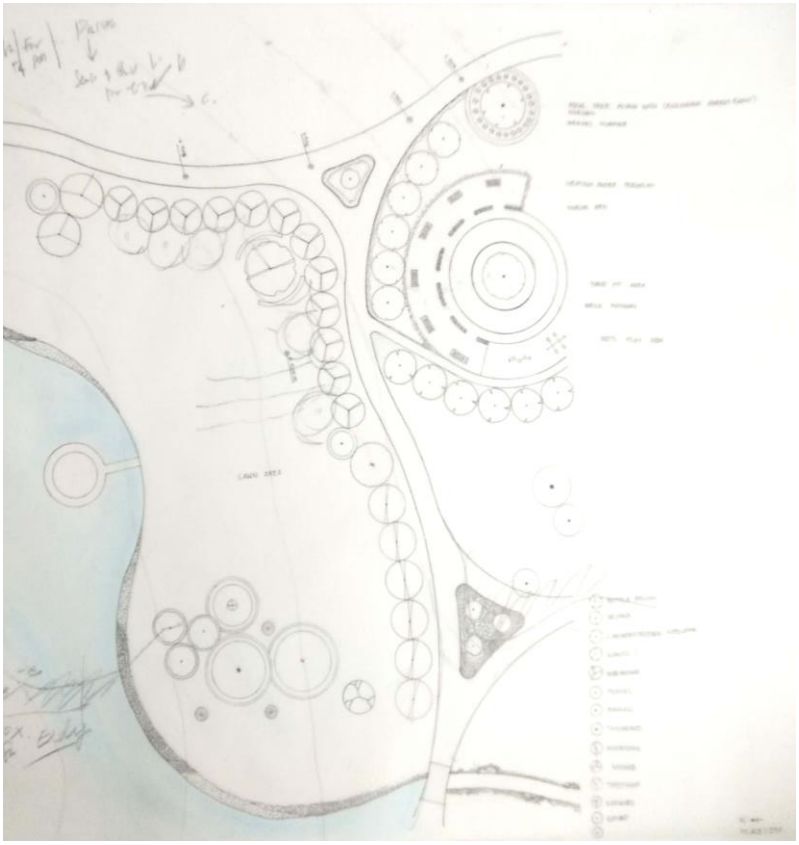


Figure 62: Detailed part plan

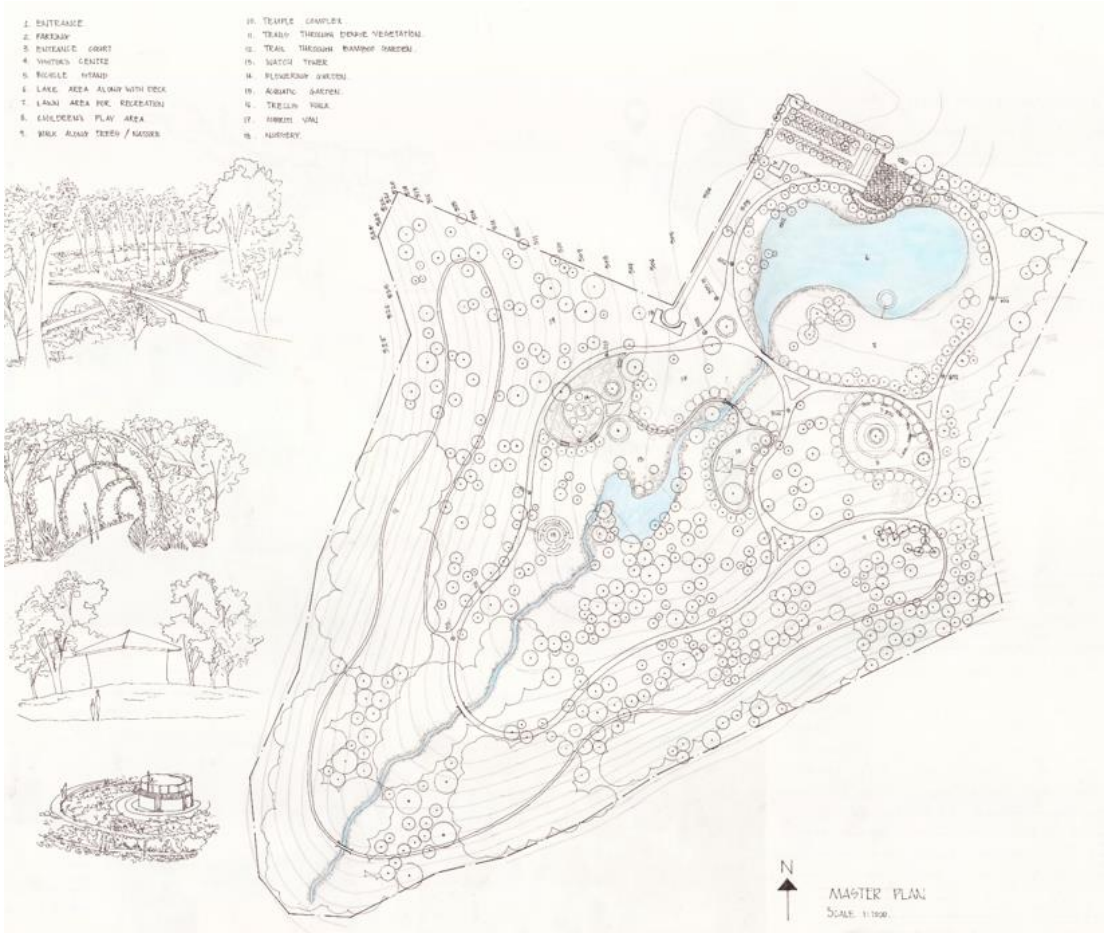


Figure 63: Final master plan

Bibliography

Aithal H. Bharath, S. T. (n.d.). *Agent Based Modelling Urban Dynamics Of Bhopal, India.*

Bell, S. (n.d.). *Designing for Outdoor Recreation.*

Bernie Dahl, A. a. (n.d.). *Anatomy of a park.* waveland press, inc.

Çelik, F. (n.d.). *Ecological Landscape Design.*

lajournal.in. (2017). issue 52- hyderabad. *journal of landscape architecture*.

Stoecklin, B. R. (March/April 1998). Children's Outdoor Play & Learning Environments: Returning to Nature. *Early Childhood News magazine*.

Taylor, K. (n.d.). *Landscape and Memory.*

Wikipedia. (n.d.). Retrieved from https://en.wikipedia.org/wiki/Bhopal.