

# Green Leaf Township Planning – An Over View

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## Abstract:

People of different community today are much more intended for sophisticated and secured lifestyle under a single roof. Inadequacy of land is the major problem facing by today's world which led to evasting growth of residential towers. The concept land inadequacy in addition with architectural prominent tends to existence of township. The paper deals with the planning phase of a township in IT SEZ Visakhapatnam, which is the industrial hub and where density of population is going to be increased in decades due to study, hospital, employment facilities. Planning of a township by consumption of minimum land and by giving importance to architectural purpose was studied. Township – Green Leaf gated community was designed in an area of 15acres in the shape of a leaf amplifying the sign of greenery from bird's view. It includes the basic amenities of a township as per the public needs in terms of recreation and security. The report predicts the out view of the township in the form of leaf by using software SKETCH UP and also gives the cost estimation of the township. To increase the density of population in townships the total cost should be decreased. By the method value addition it is necessary to increase profits in construction by maintaining the quality.

**Keywords:** Township, Infrastructure

## I. INTRODUCTION

More than 50% of population growth was incorporated in urban areas as a reason of economic hub and decently flourishing social engines. As per the statistics population growth of about 54% was incorporated in urban areas since 1921. And people love to live in urban areas as they tend to choose for the facilities in view of study, hospital, education and they tend to look for all elements at their doorstep in a secured area under one roof which shows the necessity of townships in now-a-days.

**Definition:** A Township is a small geographic area. Townships range in size from 6 to 54 square miles (15.6 km<sup>2</sup> to 140.4 km<sup>2</sup>), with 36 square miles (93 km<sup>2</sup>) being the norm.

The term township is used in three different ways.

- A small geographic reference which is used to define the location of a property as surveyed by General Land Office is termed as Survey Township. Generally a survey township is six by six square miles or 23,040 acres.
- A civil township is a local government unit.
- A charter township which is found only in Michigan, United States, is similar to civil township. With a certain conditions, a charter township is exempt from contiguous cities and villages. In addition, Charter Township carries additional responsibilities and rights of general home rule.

### A. Concept of a Township:

The concept of township is arrived from the demand of residential towers due to the population growth in addition to experience all urban facilities. High end Amenities within the apartments is a part of package. The concept of a township should include the provision of all facilities such as schooling, dispensary, recreation, infrastructure, sanitary etc.

The selection of site for a township is an important factor as a person look for nearby facilities for all his needs.

The amenities, infrastructure, recreation facilities provided in the township should make the township as a part of natural surroundings.

Generally anything that ranges between 15 to 2500 acres are termed as township. In real scenario, projects of 15acres plus areas are referred to residential townships, whereas projects over 1000 acres comes under integrated townships. Integrated townships would imply facilities like schooling, dispensaries, lifestyle facilities, recreation, infrastructure etc., but in IT SEZ Visakhapatnam, due the land constraint a township was designed in a small area providing all the facilities as of an integrated township.

All states in India has the respective state township policies and the government encourages real

estate for township development. Pollution prone is the major element which was taken into consideration during planning, design and execution phases of a township.

## **II. LITERATURE REVIEW**

Feasibility study of Residential Township Development at Kadambur, Chennai by Arun.S.Jena, Eashwar.S, and Hariharan.V provided a clear view of planning methodology of township in Chennai. Few case studies on residential, satellite and integrated townships provided the essential units of township as commercial commodities, dwelling units, road connectivity etc.,

- As the Township – Green Leaf Gated Community was planned in Visakhapatnam, GVMC Building Bye Laws provides the specifications, permissible land use, setbacks to be adopted for planning of a township.
- As per Building Bye Laws regulations applicable to all zones are stated below

### **A. Setbacks**

Setbacks for a site are provided based on the height of a building, area of a building, road network and type of the abut road.

- Depth of the site is considered for the front and rear setback whereas width of the site is considered for left and right setback.
- For Buildings of height less than or equal to 11.5m, setbacks are provided based on the width and depth of the building plot area.
- For plots of irregular shape and dimensions, setbacks are calculated based on the width or depth at a point where the width or depth of the plot are varying. In such a case of irregular plots, average setbacks are not provided.
- The setbacks should be provided only in the constructing plot. Public spaces should not be provided as setbacks.
- In case where building lines are fixed, the building line or the front setback which is higher should be considered as the front setback.
- A corner plot is the one where more than two faces of the building are facing the road, in such case two roads of width more than the left are taken into consideration for setbacks.
- In case of site facing roads both in front and rear, both the sides facing roads are treated as front and other two sides not facing roads should be treated as rear sides and the setbacks should be applied accordingly.

### **B. Width of the Road:**

- During the calculation of width of the road, distance between road boundaries are measured including the foot path, drains, shoulders
- In case of a road network having service road along with the main road, the width of the service road is also added for determining the road width and FAR.

### **C. FAR or Floor Area Ratio:**

- Floor area Ratio should not include the area which is provided for stair cases, lift cases, tanks, public places, park, playground, recreation elements.
- If a site faces a road of width less than the one permissible to it, then FAR is taken for the corresponding road width.
- If a plot faces a wider road than the road prescribed for it, then the far is taken as the road prescribed for it.
- Specifications of movie theatre i.e., space to be provided based on the number of seats, wide row spacing, rise, minimum clearance, minimum sighting distance, wall thickness including acoustics etc., are adopted as per IS 4878 1986

## **III. METHODOLOGY**

Visakhapatnam is a coastal area which was authorized by Greater Visakhapatnam Municipality Corporation. The specifications for construction of a residential building based on the climatic conditions, soil properties and geographical location was given by GVMC Building Bye Laws.

Township – Green Leaf Gated Community was planned in IT SEZ in Visakhapatnam. The proposed area of township is 15acres. Residential Zone, Commercial Zone, recreation, infrastructure are the different sectors of township. 2D and 3D plans are generated using software Sketch UP, a designing software flexible for learners.

Built Up area of 47.419% was adopted (should not exceed 50% as per Building Bye – Laws) and percentage of 15.9 (should be minimum of 15%) was adopted for park.

### **A. Selection of Site:**

Selection of site plays prominent role for construction of a township. The following factors should be concerned for site selection

- ✓ Population growth is the prominent factor for existence of township, so site must be selected based on migration of population in future decades.
- ✓ Selected site should have the flexibility of transport.
- ✓ Site should command good view of landscape.

- ✓ SBC value should be more and water table at the site should not be high.

The proposed township was designed in IT SEZ Visakhapatnam, where industrial expansion is the major reason for site selection. It is a site where concentration of employees goes on increasing and people used to live superior lifestyles.

**B. Transport:**

Flexible for all means of transport.

- Road Connectivity: 1km from the site and 4km away from bus station
- Rail Connectivity: 15kms away from Visakhapatnam Railways
- Air Connectivity: 26kms away from Visakhapatnam Airport

**C. Residential Zone**

Area and percentage provided for residential zone is 15.81%, comprise 4residential towers each of area 40m x 60m to accommodate 240 families. Each tower was designed with 6floors consisting of 4 - 3BHK, 4 – 2.5BHK (2BHK with study room), and 2 – 2 BHK (2BHK without study room) in each floor i.e., a total of 96 - 3BHK, 96 – 2.5BHK and 48 - 2BHK. Towers are R.C.C framed structures with outer wall thickness of 150mm, inner (partition) wall thickness of 100mm are provided. Height of each tower is 18m with a slab thickness of 0.2m. A vault and stilt floor is provided for parking. 2dog legged stair cases, one passengers lift and one service lift are provided for each tower.

**Table I - Flat areas**

S.No	Item	Number of Flats	Plinth Area
1	3 BHK	96	2160sft
2	2.5 BHK	96	1650sft
3	2BHK	48	1240sft

**Setbacks:** Set Backs are provided as per Building bye laws for each tower of area 2400sqmt and height of 18m

- 4m on front side (min of 3m)
- 8m on the remaining sides (min of 6m)

**Vasthu:**

Vasthu is to be followed during planning of residential units, which is a prominent factor to be considered for Indian Constructions.

- Master bed room should be located at the South – West corner of the plot.
- Kitchen should be provided in the South – East of the plot
- In the North – West corner, children bed should be provided generally
- Living is generally given in the North – East corner of the plot

- Pooja must be located in the North – East corner of the total plot or to the North – East of the room in which we are providing.
- Borings should be given in the North –East corner.
- Slope should be in the negative gradient dropping from South –West to North – East regarding to the whole plot and regarding individual rooms
- The master bed room where main persons of the plot are staying which is located in the South – east should have more gradient regarding to all the corners of the plot.
- North – West corner should be of low gradient than South – West, but not compared to North – East.
- The water discharges are from the North – East corner for every room and to the plot.

**D. Commercial Zone**

Area and percentage of 1.87% was adopted for commercial block and provided on North – West of township with area of 30m x 30m. Commercial block includes departmental stores, Bakery, ATM, and Internet Cafe in 1<sup>st</sup> Floor, a Banquet Hall in 2<sup>nd</sup> Floor, Movie Theatre and Pizza Den in the 3<sup>rd</sup> Floor. A Mini hospital of area 30m x 30m was provided 15m away from commercial block towards east.

Area provided for each elements was mentioned in the below table

**TableII - Elements of commercial block**

S.No	Floor	Element	Area Provided
1	1 <sup>st</sup> Floor	Departmental Stores	18m x 25m
		Bakery	10m x 15m
		ATM	10m x 8m
		Internet Café	3m x 3m
2	2 <sup>nd</sup> Floor	Banquet Hall	30m x 25m
3	3 <sup>rd</sup> Floor	Movie Theatre	12m x 8m
		Pizza Den	22m x 9m
		Food Lounge	7m x 5m
4		Mini Hospital	30m x 30m

Commercial Building is of height 10.5m with slab thickness of 0.2m and it was constructed at an elevation of 1.5m from the ground level.

**Setbacks:** Set back are provided as per building bye laws for a building of height 900m and of height 10.5m

- 3m on front side (min of 3m)
- 8m on remaining sides (min of 3.5m)

**E. Recreation and Other Elements**

Area and percentage adopted for recreation and other elements is 30.109% which includes Children Park, playground, walking arena, fitness centre, tennis court, temple, and electric controlling room, garage, and security room. Area provided for each amenity was stated below

**Table III - Area Provided for Each Amenity**

S.No	Item	Area (Acres)	Percentage built-up
1.	Temple	0.025 (10m x 10m)	0.16
2.	Fitness centre	0.056 (15m x 15m)	0.37
3.	Garage	0.025 (10m x 10m)	0.16
4.	Security Room	0.025 (10m x 10m)	0.16
5.	Electric Controlling Room	0.056 (15m x 15m)	0.37
6.	Pools	0.17 (10m x 15m)	1.14
7.	Park	1.58	15.9
8.	Play Ground	1.753	11.7
9.	Tennis Court	0.022 (10.97m x 23.78m)	0.149
	<b>TOTAL</b>	<b>3.712</b>	<b>30.109%</b>

**F. Infrastructure**

In a large community townships or housing unit development, infrastructure such as road network, drains, sewage facilities, earthwork etc., are needed for the development and to support the modern community living in the new township estates. The main element of Infrastructure in its out view is road network, which was adopted in shape of leaf which derives the name green leaf gated community. Two lane road of width 7.5m, 1.5m extra width for footpath on both sides are adopted as per Indian Standards. The road network is provided connecting all the residential towers, commercial block and all the amenities provided in township. Generally, curved pattern was not preferred for road construction. In this gated community, minimum radius of curvature provided is 30.45m which is negligible for consideration of accident prone.

**G. 3D Warehouse**

It is a special feature provided by the software Sketch UP for interior design of an element. It is beneficial to plan the interior design of an entity during 2D and 3D drawing of a township or at the stage of construction to minimize the cost. 3D

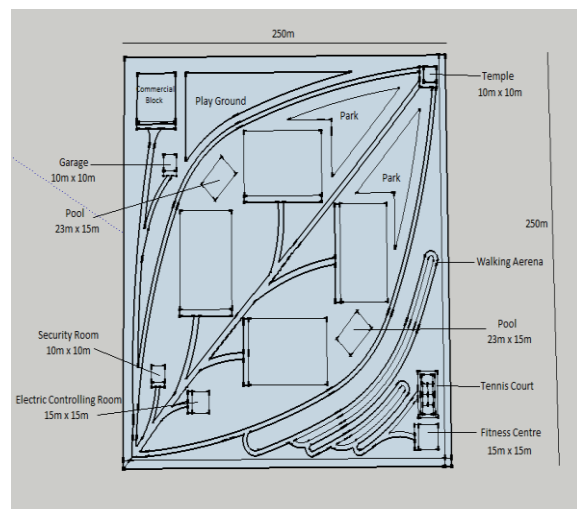
warehouse allows an user to select the required type, texture of a material, furniture etc., to design as per user requirement.

**IV. LAYOUT PLAN**

Infrastructure is the major element of measuring a country’s development and a source of country’s income in means of transport, recreation, and construction industries etc., Infrastructure investment is likely to increase in India over the next 25years which reflects the raising income levels. As per the economic predictions India need about \$4.5 trillion by the year 2040 for the development of infrastructure, which is the root for the adoption of leaf shape for township. In addition leaf is the sign of greenery which in turn indicates anti – pollution.

**A. Compute Model:**

Concerning to the current study of township, Sketch UP software is used of drawing and drifting of each blocks and elements individually. Initially 2D drawings of each residential flat are done and arranged to build the floor plan. Plans of each facility provided in commercial block and all the amenities are drawn using the software. Layout plans of each unit are drawn to scale. Another plan showing the locations of all units in the township is also drawn. Along with 2D drawings, 3D view is also generated using Sketch UP, so as to visualize the township. Software Sketch UP is used, as it is flexible to draw the plans and 3D view and easy to learn for beginners. It gives the approximate 3D view of a proposed structures compared to AutoCAD.



**Fig 1: 2D Plan of Township in Sketch UP**





Fig 2: 3D View of Township in Sketch UP



Fig 3: Bird's View of Township using Sketch UP

All the units of township are arranged and connected so as to give the layout plan in shape of leaf which is the prominent phases of this project. Different units provided in township and the areas and percentages adopted for each unit are stated in the table below

Table IV-Built Up Area

S.No	Item	Area (Acres)	Percentage built-up
1.	Block A	0.593	3.95
2.	Block B	0.593	3.95
3.	Block C	0.593	3.95
4.	Block D	0.593	3.95
5.	Commercial Block	0.222	1.5
6.	Hospital	0.056	0.37
6.	Temple	0.025	0.16
7.	Fitness centre	0.056	0.37
8.	Garage	0.025	0.16
9.	Security Room	0.025	0.16
10.	Electric Controlling Room	0.056	0.37

11.	Pools	0.17	1.14
12.	Park	1.58	15.9
13.	Play Ground	1.753	11.7
14.	Tennis Court	0.022	0.149
	<b>TOTAL</b>	<b>6.313</b>	<b>47.419</b>

## V. COST ESTIMATION

Continuous monitoring of the design process from beginning to end is required instead of allotting the money. Initially a detailed plan of the events is scheduled and critical path is identified. The total cost for construction of township includes various factors such as cost of land, material, labour, equipment, administrative allowances etc., Sum of direct cost and indirect cost will give the total cost of the project. Direct cost includes cost of material and equipment, site cost, transportation charges etc., whereas indirect cost includes the administrative charges, maintenance etc.,

Site cost, schedule rates of materials are studied and approximate cost analysis of building units has been performed and calculated cost of the township is presented.

Based on all the factors approximate cost of residential towers is given as Rs.4500/- per sft.

Table V - Cost Estimate of Each Flat

S.No	Flat	Area	Cost (Rs)
1	3 BHK	2160	97,20,000
2	2.5 BHK	1650	74,25,000
3	2 BHK	1240	55,80,000

Table VI Cost Estimate of Residential Zone

S.No	Flat	No of Flats	Total cost (Rs)
1.	3 BHK	96	93,31,20,000
2.	2.5 BHK	96	71,28,00,000
3	2 BHK	48	26,78,40,000
	TOTAL		191,37,60,000

Table VII - Approximate Cost Analysis

S.No	Name of Unit	Approximate Cost
1	Residential blocks	191,37,60,000
2	Commercial blocks	28,57,42,000
3	Miscellaneous charges	12,46,52,000
4	Total	232,41,54,000

## **VI. RESULTS**

Various aspects of planning phases have been studied and some of conclusions are stated

- Townships has become necessary and important in this tremendously increasing population to lead a comfortable life and townships provides a best solution for the population problem.
- Township existence plays a major role, where land inadequacy is the major problem facing by today's world.
- Bird's view in the shape of leaf itself defines the infrastructural developing country and a cautionary of pollution prone.
- Township – Green Leaf gated Community can accommodate 240families.
- Townships are beneficial to individual home in terms of secured lifestyle and recreation purpose.
- Township provides employment for construction and its maintenance.

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