Introduction

This present plan, titled the "Auroville Master Plan – Directions for Growth", has been made possible by the "Auroville Innovative Urban Management" project funded under the Asia Urbs Programme of the European Commission.

The plan builds on the earlier work carried out by Auroville in its Master Plan (Perspective Plan) 2000-2025, and has been facilitated by further studies undertaken in different sectors under the Asia-Urbs project (See **Annexure 1**).

While the earlier plan in effect consolidated the thinking behind construction of this unique township from the time it was conceived, and included broad based principles on which it is to be built, this latest plan charts out a road map for the future, indicating directions for its growth in the coming five years, which can lay a strong foundation for realizing the city in a systematic, professional and humane way over the coming two decades.

One important component of the plan is the identification of locations for ongoing and immediate term projects, in such a way that in a short time span a focus can emerge around which the future City can manifest itself in all its glory.

The construction and setting up of the Centre for Urban Research as a part of the Asia-Urbs project IND-015 has helped the emergence of this focus, which will bring together ideas, policies, programmes, projects and innovations for the development of the complete Universal Township.

The Auroville Charter

1. Auroville belongs to nobody in particular. Auroville belongs to humanity as a whole. But to live in Auroville one must be the willing servitor of the Divine Consciousness.
2. Auroville will be the place of an unending education, of constant progress, and a youth that never ages.
3. Auroville wants to be the bridge between the past and the future. Taking advantage of all discoveries from without and from within, Auroville will boldly spring towards future realisations.
4. Auroville will be a site of material and spiritual researches for a living embodiment of an actual Human Unity.

Chapter 1: The Concept of Auroville

1.1 Vision

Auroville is a unique opportunity for the manifestation of an actual human unity in diversity. The township, founded on 28th February 1968, lies 150 kms south of Chennai in south India. Established on a barren plateau devoid of greenery in 1968, it has now become a green forested area shaded with a wide variety of trees and shrubs, and as such an appropriate place for achieving sustainability and the other goals of Auroville.

The township, envisaged for a population of 50,000, aims to provide opportunities for people from all nations and all types of backgrounds to come together to work for the fulfilment of its Charter. Today it has about 1700 residents representing some 35 nations including 350 persons from the adjoining villages. It has also established very cordial relations with the larger population in its vicinity, extending over an area of approx 825 sq. kms.

The Auroville Foundation Act, passed by the Indian Parliament in1988, is one of the key milestones in the development of Auroville. It provides statutory support for preparation of a Master Plan for Auroville to ensure orderly development of the township, which is planned to occupy a circular area of 2000 ha, of which about 850 ha are presently owned by the Auroville Foundation. The Master Plan envisages systematic development of the township to the general exclusion of non-conformatory developments in the immediate area.

1.2 Unique Features

Planning Process

Auroville, although diverse in terms of the nationalities present and their widely different cultural, economic and social backgrounds, has the common aim of becoming a part of the evolutionary process of humanity, through the universal establishment of higher human values.

Economy

Auroville has a working group on its economy which manages a 'Central Fund', a common financial resource for running the facilities of the township, such as the schools, roads and various public services. The Central Fund also funds a health budget for Aurovilians able to meet special needs as they arise. The Central Fund gets its resources from the commercial and service units of Auroville, and through donations from Aurovilians. At present Auroville is trying to move towards a cashless economy, wherein there will be no exchange of money inside the township, cash being used only for external exchange of goods and services.

This type of experimental economy, though fundamentally different to the day to day economies of most of the outside world, is an interesting challenge for the township's residents. In part the inspiration for it derives from Auroville's founder, who in a written piece titled "A Dream" said: "Individual merit will have a greater importance than the value due to material wealth and social position. Work would not be there as the means of gaining one's livelihood. It would the means whereby to express oneself, develop one's capacities and possibilities, while doing at the same time service to the whole group, which on its side would provide for each one's subsistence and for the field of his work."

In short, the Auroville economy aims to provide a simple, satisfying and uplifting life for all its citizens without the usual limits imposed by individual financial circumstances.

Unending Education

One of the founding principles of Auroville - "Auroville will be the place of an unending education, of constant progress, and youth that never ages" (Charter) - requires its inhabitants to achieve a 'Learning Society'. This means that Auroville must be a place free from dogma and ritual, able to offer many exciting possibilities for the development of a truly integral education.

Unending education in Auroville means constant research through experiments and experiential processes. This research will be international in character and will focus on the theme of Human Unity.

Integrated Development

For Auroville, the ideal of integrated development has to become a reality. This means synthesizing the advantages and merits of urban development, while at the same time taking advantage of the merits of decentralisation and rural development. It will require a new approach, able to bridge the rural-urban divide and provide equal opportunities for all in their search for a better quality of life. In this effort the principles of sustainable development, encapsulated at the Rio summit, will be in full play.

1.3 The Context

Auroville is located in Tamil Nadu, south India, about 12 kms north of Pondicherry and 150 kms south of Chennai/Madras, adjacent to the Coromandel Coast.

Auroville's development has always been, and will always be, closely related to that of the surrounding villages. There are 13 such villages in the immediate vicinity of Auroville, and altogether 126 villages in the wider bio-region of 825 sq.kms. Auroville's immediate influence, in terms of socio-economic development and natural resource management, is expected to extend over this entire region, with its present rural

population of around 350,000 people (census 1991), a figure which is expected to increase to 600,000 by 2025.

Innovations in material and spiritual advancement in Auroville will be as much at the service of the local people of Tamil Nadu as at the service of the rest of India and the world at large.

1.4 Inception of Auroville Township

Inauguration and UNESCO support

The Universal Township of Auroville was inaugurated on the 28th February 1968. The founder of the city, Mirra Alfassa – named as 'The Mother' - read out the Charter of Auroville in a ceremony attended by some 5,000 people from around the world.

This was then translated and read out in all the major languages of the world, while youth representing 124 nations and 23 Indian states placed a handful of earth in a lotus-shaped urn at the centre of the future township, symbolizing the creation of a city dedicated to peace, international understanding, and human unity.

The General Assembly of UNESCO has unanimously passed four resolutions of support for Auroville, in 1966, 1968, 1970 and 1983, inviting their member states and international non-governmental organisations to "participate in the development of Auroville as an international cultural township designed to bring together the values of different cultures and civilisations in a harmonious environment with integrated living standards which correspond to man's physical and spiritual needs."

Many years later on 31st January 1998, Mr. Federico Mayor, Director-General of UNESCO, proclaimed that "The Auroville project situated in Tamil Nadu, South India, which has been supported by the General Conference of UNESCO in 1966, 1968, 1970 and 1983, is actively developing according to the basic principles of international understanding and human unity."

1.5 Evolution of Urban Form

The planned urban form, or town layout, is the work of the French architect Roger Anger. The concept as developed has incorporated far reaching innovations, and envisions close community life while also facilitating interaction between Auroville and its surroundings to create a holistic model of development, in which urban and rural settlements will complement each other and not be disparate. This concept is now being widely discussed to ensure Auroville can achieve true sustainable development.

1.6 People

Drawn by the high ideals of Auroville and their own inner aspirations, the residents of Auroville, known as Aurovilians, have come from all over the world to this living

laboratory, where everything that needs to be worked out can be worked out anew. Already, with some 1700 members drawn from 35 or more nations, the population of Auroville is an exciting mixture of very different elements. Coming from widely differing educational and social backgrounds, from the East and the West, they constitute a wonderful opportunity for the establishment for the first time in the history of the world of a true human unity in their diversity. The link between all these people is their shared aspiration to work on themselves, and thereby work towards the ideals of Auroville, in the midst of the vibrant, spiritually rooted culture of India, a culture which is ancient, yet continually renewing itself.

Auroville encompasses all aspects of humanity's material development needs, including wasteland regeneration, appropriate technology for sustainable management of natural resources, education, alternative healing practices, collective economic structures, cross-cultural communication and expression, rural development and integral urban planning and management.

A part of Auroville's success to date can be verified by the fact that while urban development generally exploits available natural and human resources, the people here have regenerated the eroded, barren plateau on which the township is sited, to provide for a better quality of life for the local people without their having to move elsewhere.

Auroville's development to date, in a large measure, has been as much thanks to international collaboration and support from Government agencies, as to local cooperation. The project has won national and international recognition for its initiatives in the fields of environmental and development work, which are of immediate relevance to all future developments here.

Thus Auroville aspires to be **The City the Earth Needs,** a place to demonstrate and realise for future generations the practical possibility of harmonious and sustainable living, while at the same time coexisting with all the multitudinous forms of plant and animal life that make this planet a seemingly unique place in the universe.

1.7 The Matrimandir – The 'Soul' of Auroville

The Matrimandir is a spherical structure located at the centre of Auroville, seen as the 'soul' of the city. It contains a large inner chamber, a place for silent concentration, and on the outside 12 "petals" designed to house meditation chambers. Beyond the petals there will be a green area, divided into 12 thematic gardens. Close by the Matrimandir are the Amphitheatre containing the inaugural urn, and an ancient banyan tree, seen as the geographical centre of the town.

Chapter 2: Existing Situation

2.1 The Master Plan (Perspective 2025)

The Master Plan for the Township – "Auroville Universal Township Master Plan (Perspective 2025)" - was prepared by the Auroville Foundation with the assistance of the Town and Country Planning Organisation of the Union Ministry of Urban Development & Poverty Alleviation. The Ministry of Human Resource Development approved this Plan in April 2001, which essentially comprises 3 parts: 1) Description of existing scenario, 2) Development proposals for a population of 50,000 residents, and 3) Development regulations to guide its development.

The development proposals have included goals and objectives of the plan, land use pattern for distribution of assigned population, standards for social and physical infrastructure, phasing and resource mobilization, and the mechanism for planning and development of Auroville in a broad framework. The present Master Plan builds upon and elaborates definitive directions for future growth starting from now. Since the Perspective 2025 Master Plan was prepared, and approved by the Government of India, several in-depth studies in various sectors related to the future development of Auroville have been completed. Several important studies were also carried out as part of the Asia-Urbs project of 'Auroville Innovative Urban Management'. The results of these studies have helped in the drafting of this present Master Plan titled 'Auroville Master Plan – Directions for Growth', which sets out the principal directions for the future growth of the township.

However, in order to make this document self standing, and to provide a background, important aspects of the location and regional setting, climate and physical characteristics, existing land use, extent of developed and unbuilt areas, demographic characteristics, and the economy have been briefly indicated along with the land use proposed in the earlier Perspective Plan.

2.2 Location and Regional Setting

Auroville is located approx 150 kms south of Chennai and 10 kms north of Pondicherry on the East Coast of India, close to the East Coast Highway, which provides easy accessibility from both cities. **Map 1** shows the location of Auroville in the State of Tamil Nadu. The regional setting of Auroville township indicated in **Map 2** reveals that though it is part of Villupuram District of Tamil Nadu, functionally it has stronger links to Pondicherry, the former French settlement, which provides the essential markets and shops, health, education and entertainment facilities it needs, together with the local villages. The town of Tindivanam (population 60,000) northwest of Auroville, is another regional urban focus.

To the immediate north of Auroville is a unique environmental resource – the Kaliveli tank and its watershed. To the southwest of Auroville is the Usteri tank and its surrounding irrigated agricultural lands.

The triangle bounded by Kaliveli tank, Tindivanam and Pondicherry, with about 400,000 rural population, which till recently was officially designated as "backward" because of its low agricultural production caused by the poor quality of land, is now emerging as a prosperous region with Auroville as its main driving force.

In some of these villages, especially those in the vicinity of Auroville and those where there is village-Auroville interaction, mostly through the Auroville Village Action Group, there has been considerable improvement in the economic levels and general quality of life. Among these the village settlements of Edayanchavadi, Irumbai, Kottakarai, Alankkuppam, Sanjeevi Nagar and Pettai fall in the designated area of the Township. The present cumulative population of these village settlements is about 11,500 persons, not counting the 5,000 population of the village settlements of Kuilapalayam, Acharampattu, and Oddampalayam which are just on the periphery of the township.

2.3 Climatic and Physical Characteristics

Auroville has a tropical climate. The dry season usually lasts seven months, from January to July. May and June are the hottest months, with occasional showers starting in June. The main monsoon rainy season is from October to December, sometimes continuing into early January. The average rainfall is 1,230 mm a year. The prevailing wind blows from the south-east.

The central part of the designated Auroville Township area is more than 50 metres above mean sea level. The site slopes down from the centre to the periphery. Uncontrolled runoff in earlier times has caused serious erosion in some areas of the adjoining land, with deep canyons running down to the sea in the east and south. There are water bodies or 'eris' in and around the township, of which Irumbai eri is the largest.

The topography and climatic characteristics were originally seen as challenges to the development of a town like Auroville, with its high ideals. However, the early constraints, in the form of gullied, windswept barren lands, generally considered unsuitable for urban development, have now been largely overcome through the planting of over 2 million trees and shrubs, which have been nurtured assiduously over the past thirty years. Thanks to this reforestation and other greenwork, the site is now ready for the full development of Auroville. In this effort the geomorphology of the area helped in conserving and optimally utilising the rainfall run-off for promoting tree planting and vegetation development. **Annexure 2** (Auroville Climate Data Sheet) gives an overview of the basic climatic features.

2.4 Existing Land Use

Out of nearly 20 sq.kms of the designated area of the township, only about 15.5% is presently under various built uses. The remaining 84.5% is either regenerated forest land, or under agricultural or other non-urban uses. The present land use pattern is given in **Table 1** and shown in **Map 4** (Township Level Existing Land Use). Out of the developed area, about 55% is residential, and about 21% under public and semi-public uses. Manufacturing, commercial and other economic activities constitute about 9.5% while about 9.8% lies under roads serving both the developed areas as well as unbuilt areas. A good part of the land coming under the category of unbuilt areas, particularly in the Green Belt, has become sites for wasteland regeneration, watershed management, reforestation projects, and building of check-dams, largely assisted by projects taken up with the support of the Government of India and Government of Tamil Nadu, as well as National and International NGOs.

Table 1: Existing Land Use – 2001

Land Use	Extent (ha)	Percentage
A. Developed Area		
1. Residential	169	55.3
a) Village settlements	*94*	
b) Auroville settlements	*75*	
2. Commercial	19	6.2
3. Manufacturing & economic activities	10	3.3
4. Public & semi-public uses including Peace Area, gardens and area under administration / institutions.	65	21.2
5. Roads	30	9.8
6. Recreational (sports and playgrounds)	13	4.2
Sub-total	306	100.0
B. Unbuilt Area		
1. Regenerated land	558	33.7
2. Agriculture		
a) Agricultural & related research	50	3.0
b) Farming	940	56.7
3. Water bodies	45	2.7

4. Canyon, waste and other lands	64	3.9
Sub-total	1657	100.0
Total Area of Township	**1963**	

Map 10 shows the existing land use at 'City Level'.

A. Developed Area

The residential areas comprise Auroville settlements (excluding those that are outside the designated area, covering about 200 ha). There are at present nearly 100 communities ranging from 3 to 40 residential units besides a few scattered houses. These cover approximately 75 Ha. Additionally, there are 6 village settlements providing residential accommodation for about 11,500 local people. These cover approximately 94 ha.

The manufacturing units are basically commercial establishments involved in production and processing of products, some of which are marketed internationally as well as nationally. Garments, leather, jewellery, handicrafts, aromatics and food products are some of the important products made well known by their Auroville brand name.

The public and semi-public uses of land include the Matrimandir and its gardens, schools, health facilities, and international pavilions such as the Indian pavilion of Bharat Nivas, the Pavilion of Tibetan Culture and ongoing construction related to pavilions for America, Russia and other countries.

The roads within the township area are mostly temporary gravel and mud roads, providing access to the many activities and settlements spread throughout the township. Future roads as planned under the Master Plan will replace many of these.

B. Unbuilt Area

A largest part of the unbuilt area lies within the Green Belt of 15 sq.kms, which is presently owned both by village residents and Auroville. They consist of agricultural lands, mostly cashew or casuarina plantations, and regenerated land planted with trees. The unbuilt area also consists of water bodies, canyons, and Government owned (poramboke) lands.

2.5 Land Ownership

The designated area of the urban core of Auroville is made up of 5 sq kms, hereafter described as the 'City Area', surrounded by about 15 sq kms of Green Belt. Out of the 5 sq kms. of the City Area the Auroville Foundation owns 387 Ha.. Out of the Green Belt area, a large part - namely 825 Ha - is still under village ownership. Auroville Foundation to date only owns 380 Ha of this area. The proper management of these lands becomes

crucial for the future development of Auroville, as planned. **Table 2** & **Map 3** provide details of land ownership.

Table 2: Land Ownership – 2001
Figures in hectares (Ha)

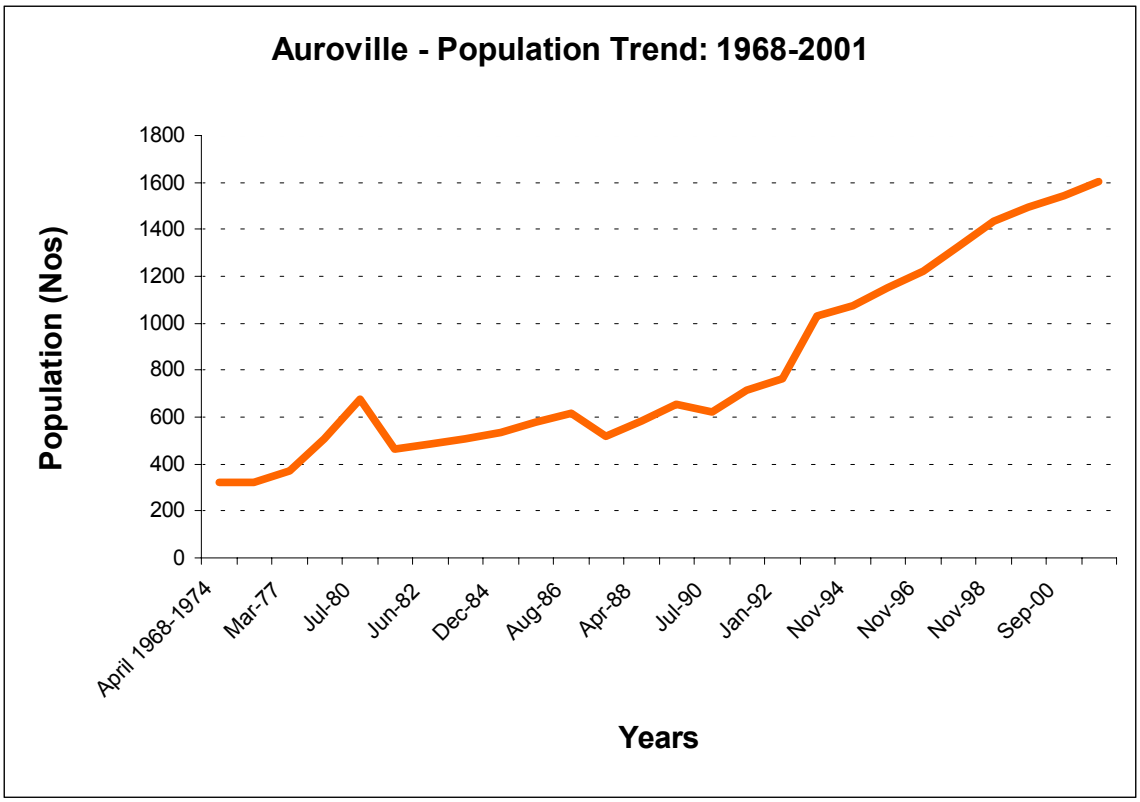
	Designated area	Government lands	Owned by Auroville	Private ownership	Total
City Area	491	26	387	66	479*
Green Belt	1472	56	380	825	1260**
Total	1963	82	767	891	1739

* Out of 491 Ha of the City Area, Kottakarai village settlement occupies 12 Ha.
** Out of 1472 Ha of the Green Belt, 211 Ha is occupied by existing village settlements, water bodies and roads.

Besides the 767 Ha of land in the designated area owned by Auroville, Auroville owns another 215 Ha of land in outlying areas. These lands were originally acquired to develop prototype habitats, while also avoiding putting constraints at the time on future planned development in the designated township area, through initial needs. Besides housing, some of the major Auroville activities and services continue to function from these areas. The Existing Land Use map shows these areas as well.

2.6 Demographic Characteristics

There are presently some 1700 Aurovilians settled both within the designated area and outside it. The chart below highlights the trend of population growth in Auroville from its early years till 2001. **Table 3** indicates the by-nationality composition of Auroville's population. By the very concept of the town as a Universal Township focused on research and development, only those who commit themselves to the realisation of its Charter are eligible to become its citizens. Therefore, the normal demographic process of growth does not apply to Auroville. It is against this background that the demographic characteristics of the township need to be understood.



The resident population of Auroville has increased from 320 in 1972 to 676 in 1980, and now to around 1700. These figures also include the Newcomer population at the time. The population growth in the last decade has been approx. 5% per annum. There has been an average addition of around 90 persons per year in Auroville's population over the last decade. It has been observed that the ratio of Newcomer population to total Auroville population usually works out at 1:10. In addition to the resident population there are:

- researchers and students, who come for short duration to learn and contribute to Auroville's development.
- day-workers from neighbouring villages working in Auroville's economic and service activities.
- short-term visitors, including casual visitors coming to experience Auroville's work in diverse fields.

Note: The population listed under the last two categories forms a floating population in the township.

Table 3: Nationalities Constituting Auroville Population – 2001

Nationality	No	Nationality	No	Nationality	No
Indian	507	Argentinian	10	French/Spanish	3
French	272	Brazilian	10	French/Swiss	3
German	230	Austrian	9	French/German	2
Italian	73	Tibetan	5	German/Indian	2
Dutch	65	Hungarian	4	Italian/Spanish	2
American	55	Sri Lankan	3	American/Irish	1
Swiss	44	Colombian	2	Argentinian/Italian	1
British	36	Estonian	2	Australian/French	1
Spanish	35	Korean	2	Australian/German	1
Belgian	26	New Zealander	2	British/Indian	1
Russian	26	Slovene	2	French/Irish	1
Australian	23	Belo Russian	1	French/Ukrainian	1
Canadian	19	Irish	1		
Ukrainian	18	Japanese	1		
Swedish	16	Moroccan	1		

The age and sex composition of the resident Aurovilian population indicates that about 70% is in the active age group. About 20% of the population is comprised of school-age children. Although 7% of the resident population is above 60 years of age, they are also considered to be active workers in their respective fields. The ratio of women to men is currently 880 to 1,000, but varies from time to time. **Table 4** indicates the age composition of Aurovilians.

Table 4: Age composition of Aurovilians - 2001

Age group	No. of persons	%
0-14	298	17.88
15-19	99	6.19
20-24	91	5.69
25-29	149	9.31
30-39	306	19.13
40-49	319	19.94
50-59	232	14.50
60 +	118	7.38

Resident Aurovilians: There are at present some 1700 Aurovilians from various nationalities, of whom approx one third are Indians. The population growth till now has been rather slow. However, it may be observed that since a critical mass has already been formed, and the development activities are picking up, Auroville is expected to attract a growing number of people from around the world in the years to come. In this context, it may also be mentioned that a number of 'Auroville International' centres and 'Liaison Offices' have been set up in some 20 countries around the world, and it is proposed to set up similar centres in the different states of India. These centres will disseminate information about Auroville's ideals and work, thereby attracting more people to the township.

Students and Researchers: Nearly 100 students and researchers are in Auroville at any given point of time. As Auroville grows, their number will also grow. These students come from all over the world. They are committed youth, who want to learn and use their knowledge in various fields of personal interest, ranging from architecture and arts & crafts in their various forms to a variety of other disciplines, all relevant to sustainable development. The estimated number of researchers is expected to increase substantially as more young people come to know of opportunities for varied learning in Auroville.

Day-workers: Auroville provides work opportunities for about 5,000 people residing in its neighbourhood, in both manufacturing units and services. These workers have their own houses in the surrounding villages and return there each evening. The break-down of day workers engaged in manufacturing and services is given in **Table 5**. Nearly 48% of those in manufacturing and services are female, indicating a high participation ratio of women in the workforce.

The majority of the resident population is engaged in manufacturing, services and rural & agricultural related activities.

Table 5: Auroville - Sectoral Employment

Main Sector	No of Units	Aurovilians	Day-workers
Manufacturing	35	200	2925
Services	120	520	1775
Rural & agriculture related	10	130	300

Casual Visitors: Matrimandir is the main attraction for visitors from outside, and on an average around 1,000 persons visit it every day. Sundays and holidays are specially crowded days when the number may reach 2,500 or more. Facilities such as toilets and vehicle parks are available for their use at a well developed Visitors Centre, which has a cafeteria, bookshop and boutiques, and provides information by way of videos, an exhibition and printed material. Apart from such visitors, students and professionals also come to Auroville to learn about its activities, and to attend workshops and seminars. The number of visitors for such purposes - on average - varies from 50 to 75 persons at any

given time, though this number is also bound to increase in the near future. Guest house facilities are available for the visitors.

The total number of casual visitors is already estimated at 250,000 per year, and expected to go on increasing at a fairly rapid rate, specially on completion of the Matrimandir and its surrounding gardens.

2.7 Physical Infrastructure

The physical infrastructure in Auroville serves a dual purpose. Firstly, to provide the required facilities for the development that has taken place. Secondly, to innovate and experiment with low cost and environmentally friendly alternatives. The second objective directly stems from one of the fundamental principles of founding Auroville, namely research into promoting real progress towards meeting human material needs in a sustainable way, not only for Auroville but also via developments elsewhere in India.

Auroville in this respect has gained extensive experience in the development and management of infrastructure, especially in the fields of alternative energy, solid waste management, water supply, wastewater treatment and construction technology. Many of the Aurovilians engaged in these activities are sharing their rich experience with other parts of the country. A brief description of the current situation in terms of infrastructure is given below. **Map 5** shows the existing status of both physical & social infrastructure in Auroville at the overall township level, while **Map 11** highlights the same information in a bit more detailed way, focusing at the city level.

Water Supply

Auroville is located in an area where the groundwater situation can be described as highly critical. In order to maintain a satisfactory level of water availability in the subterranean aquifers, rainwater runoff from the area is held back wherever possible by raised earthwork ‘bunds’, or if it reaches the canyons which lead down to the sea, is retained in many places by check-dams, the latter giving the water time to seep down into the ground.

Supply of water to Auroville comes mainly from some 60 good wells, out of the 130 wells constructed over the last 30+ years. Together they can provide on average 3,800 cum per day. The present system involves a highly decentralized pumping system coupled to about 60 storage reservoirs of size ranging from 40,000 litres to 150,000 litres. However, there are a few smaller storage reservoirs also, of around 10,000 litres.

The present water availability and pumping capacity is projected to be adequate to meet the requirements of a population of 15,000, when all the present sources are brought into a linked network. This is one of the aspects proposed to be studied in detail. The quality of groundwater is generally good, of potable standard, and can mostly be used directly for higher uses without need for special treatment.

A number of monitoring studies in the use of water in several communities have been initiated, which will help in planning better utilization of groundwater as well as in the initiation of water conservation measures where needed.

Wastewater Treatment Systems

The wastewater treatment facilities existing at present are also decentralized. These consist of many tested as well as experimental systems, and include septic tanks and Imhoff tanks with or without further treatment through root zone plants.

The wastewater from residential, manufacturing and commercial units is being directed to 20 neighbourhood level facilities. Some experimental waterless toilets have also been built. From a study carried out recently it was observed that the performance of the waste treatment plants ranges from moderate to good. **Annexure 3** gives the performance of a few of the plants studied. The results of the study report are being used not only to bring the effluent quality from the plants to standards set by INDS, but also in the design of future local needs.

Energy

Auroville gets most of its electrical energy from the Tamil Nadu Electricity Board grid, which as feeder stations located in Kalapet to the north on the East Coast Road, and Tiruchitrambalam on the west side. The total connected load is 3.17 megawatts, of which 1.5 megawatt is used for domestic use and the rest for manufacturing/commercial activities and service units. The supply is through 27 transformers in 15 substations. Two standard sizes of transformer are in use – 63 KVA and 100 KVA. There are altogether 681 connections at present, which gives a per capita electricity consumption of 1428 KWH. The per capita consumption of power is higher compared to the average consumption in Indian cities. Studies conducted under the present Asia Urbs project are expected to help in devising ways and means of reducing energy consumption through Demand Side Measures (DSM).

Auroville has been experimenting extensively in the use of solar energy since its inception. A survey of solar installations shows that the total installed solar power for pumping applications is of the order of 190 KW. Auroville has been one of the first sites in the world to have installed a huge standalone solar power plant with a capacity of 37 KW using 484 photovoltaic panels. This facility is being used to meet the air-conditioning and lighting needs of the Matrimandir and its surrounding gardens. A unique 15m diameter solar collector bowl has also been installed in the 'Solar Kitchen', a dining facility located in the Residential Zone, which generates enough energy to cook meals for 1000 people daily. Auroville units such as CSR, Aurore, Auroville Energy Products and Aureka are engaged in the manufacture and installation of renewable energy systems, both for use in Auroville and other parts of India.

Solid Waste Management

Solid waste is managed by a separate unit of Auroville named Eco-Service, which was set up in 1995. It is responsible for waste collection and recycling and serves all the Auroville communities, both residential and non-residential. Waste is segregated at source into organic and non-organic components. The organic waste is composted within Auroville itself, while the non-organic waste is taken away by waste collectors on a periodic basis for separation and recycling. The Eco-Service employs two such waste collectors for this purpose. It is estimated that about 3,500 kgs of waste are generated per week, of which 1,000 kgs are recycled, 500 kgs are incinerated, and about 500 kgs of wastes like rubber items and batteries are stored in temporary storage facilities awaiting acceptable disposal solutions. About 100 cu.m of waste goes to a landfill just outside the designated area of the township.

Communication

Auroville is served by a local telephone exchange with a present capacity of 2,500 lines, of which 1,000 lines are dedicated to Auroville. It has its own electronic network, which has currently about 1,486 subscribers – a very high rate of telephone connectivity, working out at 928 telephones per 1000 people, far above the Indian national average.

Auroville News, published weekly, provides reports on the happenings in Auroville and gives other important information needed by the residents. There is also a community network, AuroNET!, which facilitates electronic communication within the township and outside (there are nearly 1,100 registered e-mail accounts), and a Post Office with sub-office handling all Auroville mail.

Roads

Auroville is easily accessible both from the East Coast Road and the Pondicherry, Tindivanam Highway to the west. These entry roads, although hard-topped, are presently narrow and inadequate considering the township's international status. They require widening, and also need to be maintained in better condition on a regular basis. This is one of the priority areas for implementation.

Within Auroville itself there are about 24 kms. of gravel roads and 32 kms of cycle tracks and footpaths. These have been developed over the years to link the scattered settlements and facilities that have sprung up around the landscape up to now. It will be necessary to integrate them in the future road development scheme of Auroville, converting some of the gravel roads into foot and cycle ways, and providing all the required street furniture - including street lighting - which is needed.

2.8 Social Infrastructure

Health

The Auroville Health Centre, officially recognized as a 'mini health centre' by the Tamil Nadu State Government, is equipped with basic medical facilities and staffed by an

international team. It serves the Auroville residents as well as about 200 patients daily from the villages at its headquarters near Aspiration, and via 6 sub-centres. A team of 30 local women, trained as village health workers and paid for by Auroville, serve supportively in 17 villages, providing first aid, home cures and basic health education.

The Auroville Health Centre also runs a 10-bed in-patient care unit, a handicapped children's day-care centre, a medical lab, an X-ray facility, a pharmacy and a small medicinal plant garden, and offers several preventive health programmes for village women and children.

Auroville is also experimenting with several alternative systems of health care in addition to allopathy, including homeopathy, acupuncture, chiropody, podology, massage, chromato-therapy, ayurveda and others.

Education

Auroville's basic educational research endeavours to find ways of nurturing children to develop their fullest and highest human potential, which includes the mental, physical, vital/emotional and psychic parts of their being, using a totally child-centred approach. A free choice system, allowing the students to increasingly choose their own subjects for study, is gradually being introduced, particularly in the more advanced courses. At the same time, sports and physical education are strongly emphasized for the balanced and healthy growth of the children. Artistic training and the development of aesthetic faculties and appreciation of beauty is also included, being seen as an intrinsic part of the educational system.

At present, there are two crèches, two kindergartens, two primary schools, and one high school in Auroville, together with 4-day schools and over 15 part-time evening schools for the children of nearby villages. About 700 children from the surrounding villages benefit from Auroville's educational programmes via schools established and overseen by Auroville.

The Sri Aurobindo International Institute for Education Research (SAIIER) and the Centre for International Research for Human Unity (CIRHU) are designed to provide innovative approaches in the field of education, both basic and advanced, for application within Auroville as well as the outside world.

Table 6 presents figures on the existing situation regarding the schools, the students and their growth.

Table 6: Schools & Students of Auroville – 1999 to 2003

Year		1999-2000			2000-2001			2001-2002			2002-2003		
		Total	M	F	Total	M	F	Total	M	F	Total	M	F
Age	**School**												
2 To 4	Pre-Crèche				20			35			41	19	22
3 To 6	Kindergarten	45	26	19	36	23	13	54	33	23	54	32	22
	Deepanam				29			34			38	22	16
7 To 13	Transition	120			130			123	75	48	130	88	42
	Last School												
	After School												
	C F L	23						32			25		

2.9 Architecture and Urban Design

A spirit of experimentation and search for new ways in all aspects of life, both individual and collective, is the ideal of Auroville. This spirit underlies much of what is being attempted in the field of building design and use of alternate materials and technology. Sustainability is one of the underlying principles of Auroville. The Auroville Building Centre, which is part of a national network of officially recognised building centres in India, has been doing pioneering work and has received awards for its outstanding performance from the Government of India. Auroville's architecture and innovative building experiments are well recognized and appreciated throughout India.

Chapter 3: The Master Plan – Directions for Growth

3.1 Resources for Growth

Auroville Township has been envisaged for a population of 50,000 Aurovilians, living and working for the ideals for which it was founded. Over the last thirty years it has made its mark on the Indian scene and has attracted worldwide attention. It has today a sizeable reservoir of people specially skilled in and dedicated towards the promotion of sustainable development, even though its present population is less than 2,000. This human resource is committed to developing Auroville into a full-fledged township able to serve humanity. However, it is first necessary to chart out the best directions for development and growth if Auroville is to serve everyone's long term interests at the highest level.

For this purpose, it requires substantial financial resources as well as additional human resources. First, all the remaining land required for development, be it for roads, housing, built environment, parks, agriculture, infrastructure, water collection and treatment, etc, or for national, international, and local activities, has to be acquired. Secondly, the actual buildings and infrastructure have to be established. In the past - and currently - the resources for development have been mobilized broadly in the following ways:

- Seeking donations mostly from abroad for purchase of land.
- Contributions to Auroville Fund from commercial units operating in Auroville.
- Project grants from national as well as international funding agencies for specific purposes.
- Support from GOI (Govt of India) for specific projects like education, and CIRHU.

No urban settlement can hope to develop unless it has a strong self-sustaining economy and external support. Settlements all over the world are not able even to maintain basic infrastructure with receipts from taxes alone, which the residents and entrepreneurs pay, and more often the State or Federal Government has to come to their assistance. In such a situation the development and sustaining of Auroville poses a greater challenge. It has now become imperative to develop largely self-sustaining mechanisms for the growth of the township, in line with the vision and Master Plan of development proposed.

This aspect has been discussed for a long time, and in the recent past several new suggestions have emerged. Among these there are three studies that show directions in which further progress can be made.

1. Follow-up of recommendations made on commercial units by Henk and Manuel Thomas (April 2002)
2. Economic Strategy Concept for Auroville by Helmut Ernst (February 2003)
3. An outline paper on establishing Goodwill Zones by Chandresh Patel (2003)

As regards resource generation from commercial units, this entails not only mobilizing more revenue from existing units but also the question of encouraging more of the right type of units, units which are environment-friendly and at the same time have the potential to contribute substantial financial resources. In addition these units have to be efficient and frugal in regard to land utilization and infrastructure services. This calls for further in-depth study and the incorporation of innovative inputs.

The concept propounded for Goodwill Zones under (3) is eminently suitable not only for building endurable links with the surrounding communities and securing the lands in the Green Belt from inconsistent use, but also for building up a strong agro-sustainable economy for Auroville, as well as the people from the villages within the Auroville township area.

The translation of this concept into a workable model requires building up mutually advantageous and trustworthy partnerships, plus a legal structure within which they can operate. Further work has to be carried out for the practical application.

This Master Plan has identified these two concepts for detailed investigation, and the setting up of appropriate processes to implement them as avenues for the mobilization of funds, while also promoting better understanding in human relationship terms.

The strategy proposed in the concept mentioned under (2) above has high potential in terms of how quickly it can be put into practice, and the extent of resources it can generate if concretised. Basically, this concept requires expanding knowledge and the dissemination of skills and practices for material, environmental and technical growth, specially for the youth of Auroville, but also for the rest of India and abroad. The concretisation of this concept would achieve one of the principal objectives set out in the goals and vision of Auroville, namely self-sufficiency. The paper, titled 'Economic Strategy Concept for Auroville', spells out the principal ideas and shows how the strategy can fund Auroville's development.

This concept can be profitably applied not only to "Higher education blended with research and demonstration of the results of research", but also to practical education at all levels. Building of relevant skills at appropriate levels for establishing a sustainable society, with all the good qualities that humanity needs so badly at this time, becomes of major importance. The immediate steps to implement the programme would include:

- Identifying the fields of study in sustainable development that would attract students from within India and around the world, who would be willing to contribute to the development of Auroville.
- Identifying resource persons from within Auroville, and resource persons from elsewhere in India and abroad, who value "high thinking and simple living", to teach and put into practice the several sustainable development courses.

To start with, no expensive infrastructure would be needed, either for the accommodation of students or resource persons or for new classrooms and laboratories, optimising the use

of Auroville's present land and open areas, institutions and existing buildings would be the starting point. At the same time funds can be mobilised from national and international agencies, such as UNESCO, plus the Government of India and different State Governments, to support the needed basic infrastructure development.

It is in this background, and taking into account the several studies that have been made (listed in **Annexure 4**), that the directions for future growth of Auroville in physical terms, incorporating principles and parameters of sustainable development, have been outlined.

3.2 Ongoing Projects

There are several important projects now being implemented, apart from the normal developmental activities, to meet the basic requirement of this growing city. One such major development is the Centre for International Research in Human Unity, CIRHU. This is a project fully funded by the Government of India, for which most of the preparations have already been made. The projects projected to come under CIRHU are shown in **Map 6**, and a brief description of them can be seen in **Annexure 4.**

The core objective of the CIRHU project is to further facilitate the educational set-up in Auroville, by using it as a model for experimentation in new ways of education and learning. This is going to be a major landmark in Auroville's development.

Chapter 4: Building the City

4.1 Guiding Principles of Development

The guiding principles for all developments proposed both during construction and operation will be efficiency in use of resources, conservation of resources and concretisation of eco-friendly alternatives.

In general all new buildings will maximize use of local materials, and will try to use materials which are not energy-intensive in their production. They will also use principles of passive solar architecture and climate responsive designs to reduce electrical energy consumption. These developments will also maximise the use of energy saving, water conserving, water harvesting and recycling methods, equipment and fixtures. As far as land utilisation is concerned, in every situation 50 to 60% of the land will be kept as open space and suitably landscaped, in such a way that it can be maintained without much need for water, whether the source be groundwater, recycled water or harvested rainwater. Every developer and development will be required to go one step further towards the goal of sustainable development practices, drawing on the experience of earlier developments.

4.2 Auroville Assigned Population

The present assumption is that Auroville's ultimate population of 50,000 people can be achieved by around 2025.

The numbers of persons in different age groups and the size of households as estimated for 2025 is given in **Table 7**. This table also gives corresponding estimates for 2008, five years from now.

Table 7: Estimated Age Groups of Aurovilians – 2025

	Year 2008			*Year 2025*
Age group	**Total**	**Men**	**Women**	**Total**
0-19	1330	665	665	17000
20-59	3335	2000	1335	28000
60+	335	135	200	5000
All age groups	**5,000**	**2,800**	**2,200**	**50,000**

Working Population

The working population in the age group 20 to 59 is projected to be 3,335 persons by 2008. These persons will be directly engaged in the production of goods and services for Auroville, or in applied research activities that will bring widespread benefit. Estimated break-up of workers in various sectors is given in **Table 8**.

Table 8: Estimated Break-up of Sectoral Employment 2008

Sector	Estimated number	%
Primary	500	10
Farming, forest development, animal husbandry, wildlife, fisheries and such activities		
Secondary	3000	60
Manufacturing including medium-sized clean industries, cottage & household industries & artisans, both for local consumption and export		
Tertiary	1500	30
Trade, transport, construction and services		
Total	**5,000**	**100**

4.3 Distribution of the Assigned Population

The ultimate population of 50,000, as well as the Current Phase projected population of 5,000, is expected to be distributed in various use zones as shown in **Table 9**.

Table 9: Distribution of Population – Ultimate & Current Phase

Zone	Ultimate	Current Phase
Residential	**40,000**	**3,750**
International	**600**	**100**
Industrial	**1,800**	**300**
Cultural	**600**	**100**
City Centre	**5,000**	**450**
Green Belt	**2,000***	**300***
All Zones	50,000	5,000

* Excludes the village settlement population in the Green Belt. The village population in the Green Belt in Phase I is estimated at approx 15,000 persons.

4.4 Proposed Land Use

The broad land allocations for the main uses and principal uses permissible in the different zones at the township level are summarised in **Table 10**.

Table 10: Auroville - Proposed Land Use

Use Zone	Area in ha.	%	Principal Uses
Peace Area	**28.00**	**5.70**	Matrimandir, Lake, Gardens
1. Residential Zone	**173.00**	**35.20**	
Primary Residential	160.00	32.60	Residential houses, apartments in five sectors at different densities, and basic infrastructure facilities
Crown	13.00	2.60	Shopping, utilities, communication, recreation and infrastructure facilities of higher order, supporting residential use
2. International Zone	**68.00**	**13.90**	
Pavilions	63.50	12.90	National and international pavilions, conference and exhibition halls
Crown	4.50	1.00	Utilities, communication, shops and other common facilities related to the main activity in the International Zone, including housing and staff quarters
3. Industrial Zone	**126.00**	**25.70**	
Economic	94.50	19.30	Non-polluting manufacturing units, including cottage industries
Crown	8.50	1.70	Hostels, dormitories, guesthouses and supporting facilities for the main activity in the zone
Administration	7.00	1.40	Town Hall, city administration offices and housing
Vocational Training	16.00	3.30	Vocational training centres, research institutions including laboratories

4. Cultural Zone	**96.00**	**19.50**	
Major cultural	91.00	18.50	Educational Institutions, University, sports centres and staff quarters
Crown	5.00	1.00	Shopping, utility, communication and recreation centres and related facilities supporting cultural activities in the zone, including housing
Total	**491.00**	**100.00**	

Green Belt: Proposed Land Use - 2025

	Area in Ha	%	Principal uses
Built (*) (Existing settlements to be retained)	156	10.5	Auroville settlements and village residential areas, service nodes and utilities and main access roads
Unbuilt	1316	89.5	Farming and forest type uses and recreation, bird & wild life
Total	**1472**	**100.0**	

Table 11 summarizes the extent of different land uses in the 'City Area'.

Table 11: Detailed Land Use in City Area – 2025

Use	Extent in Ha	%	Remarks
1. Residential	121	24.64	Residential Zone 80% Other zones 20%
2. Commercial	20	4.10	Mostly in Crown Area connecting the zones
3. Industrial	56	11.40	Industrial Zone/manufacturing units
4. Public & semi-public	159	32.38	
5. Open space & recreation	46	9.36	To be provided in all zones
6. Transport & communication	89	18.12	To serve all zones
Total	**491**	**100.00**	

Notes:
The public & semi public uses include 28 Ha (5.7%) for the Peace Area, 38 Ha (7.73%) for pavilions, 73 Ha (14.86%) for cultural and residential, and 20 Ha (4.07%) for administrative and other uses.

4.5 Principle for Family Location in Zones

The land use provides for persons who are closely associated with activities in a particular zone to live in that zone itself. For instance, those that are closely connected to activities in the Industrial / Cultural / International / Green Belt could live in the respective zones limited only by the population assigned or planned for that zone.

4.6 Integrating Developments

The first steps in starting to build the city is to identify the extent of built environment needed, the planning of infrastructure to support it, and the policies needed for integrating it with the surrounding environment.

The built environment would comprise buildings for all urban uses, including housing, economic, commercial and manufacturing activities, education, health, cultural activities, recreation and public use, as also for various national and international pavilions.

The physical infrastructure would comprise roads and transport, pedestrian and cycle paths, power, water, wastewater conveyance and disposal structures, including those for solid waste management.

The unbuilt or open environment would consist of areas developed for parks, landscaped gardens, sports & recreation, natural forests, and features which would be fully integrated for use with the built environment.

All three components will be designed and developed to complement each other to produce an urban environment which is convenient, pleasant, conducive to economic progress and in a spirit of research and learning for all, irrespective of age or gender. At the same time the aim would be to develop the city with an urban form that is as much innovative as it is aesthetic.

4.7 General Norms for Development

The parameters/norms that should become the basis for the design, execution and operation of built space are summarised below.

- All residential accommodation will be in collective housing complexes or apartments.
- The accommodation/person will not exceed 30 sq.m. of floor area.

- The norms of built space for other buildings, including amenity space, will follow generally the assumptions on which their location and size has been assessed.
- The built-to-open space ratio will be 40:60.
- The built areas will conform to the density pattern and FAR indicated for the areas in question.
- The energy used in construction of buildings will be as minimal as possible.
- The design should be climate responsive to save on energy for artificial lighting and cooling.
- The amenity and facilities spaces should be designed to be multifunctional and as far as possible part of the main buildings.
- Open spaces, historic or heritage sites and areas with special features and utility structures will be suitably integrated with parks and Green Corridors.
- The buildings will be equipped with energy and water saving fixtures.
- The utility and service lines will be designed to connect to neighbourhood level decentralised systems.

4.8 Urban Form

The urban form for the City will generally correspond to the original galaxy plan shape. If it has to be modified in order to suit topography or to overcome unforeseen constraints, it will be through wide-ranging discussion. Within this framework, further detailing has to be carried out.

One of the most important aspects of this detailing process is to prepare urban design guidelines with special emphasis on the features which carry the essence and spirit of the galaxy plan, namely the Lines of Force, the Crown area, and the development along major roads to achieve a harmonious built environment. This urban form along with zoning should provide adequate flexibility and opportunities for innovative and appropriate mixed-use development. The innovative architectural expressions built so far by Auroville have the right ingredients to develop further potential urban forms which are not only unusual and highly pleasing but also functional. The Urban Form here calls for an integration of natural landscape, developed landscape, eco-technologies and built forms. It is foreseen that Auroville will take up pilot projects aimed at achieving such forms.

4.9 Housing

The present housing in Auroville consists of individual dwellings, collective housing, apartments and youth hostels. Collective housing provides for individual and family living spaces with common dining halls and other collective facilities. The average household size is around 2 persons, but there are also many single-person households. At present there are 767 dwelling units of various sizes. Types of houses based on construction materials indicate that the majority have used local materials as well as innovative building materials such as ferrocement for roofs and panels. The housing characteristics are shown in **Table 12**.

Table 12: Existing Housing Characteristics

Material Used	Area of Unit (sqm)		
	30-70	**80-150**	**160 & above**
Local material	111	59	31
Ferrocement	122	165	69
Tiles	56	70	20
Concrete	11	27	26
All types	**300**	**321**	**146**

Since Auroville is experimenting with innovative construction elements, wall materials vary widely from adobe, stabilised earth blocks and rammed earth to fired bricks. Auroville has even experimented with the 'fired brick house' technique, where the entire structure is built in earth and fired from within like a kiln. The architecture here reflects the practice of innovative design and use of alternative building materials. The experiments made in building technology in Auroville can have far-reaching implications in terms of design and choice of materials, of reduction in energy consumption, and adoption of eco-friendly practices. Auroville will continue these experiments. The extent of housing in each zone is shown in **Table 13**.

Table 13: Overview of Residential and Social Built-up Space

Zone	**Proposed residential population**	**Total residential area (Ha)**	**Total area with amenities (Ha)**
Residential	40,000	160	192
Cultural	600	2.4	2.9
Industrial	1800	7.2	8.6
International	600	2.4	2.9
City Centre	5000	20	24
Green Belt	2000	8	0.8
Total	**50,000**	**200**	**231**

Note: The above figures are arrived at on the basis of 40 sq mts built-up area per person for housing, and 8 sq mts built-up area per person for social infrastructure.

4.10 Neighbourhood Level Amenities

One of the main underlying principles of Auroville is to encourage collective neighbourhood living as opposed to living in self sufficient independent households. This

aspect is most crucial for Auroville's development, as in addition to saving on land space Aurovilians will be largely freed from such routine work as cooking, washing, maintenance of buildings, etc, to put all their time into advancing the wider interests of the township; into living a more spiritual collective life; and ultimately into progressing towards the ideal of human unity.

The plan therefore provides for establishing neighbourhood services of a higher order, located close to the residents at neighbourhood level (600-5000 population), ward level (5000-18000 population), zone level (18000-40,000 population) and township level (50,000 population).

Table 14 indicates the planning standards proposed to be adopted in developing Auroville. The most important level to achieve saving in time will be at neighbourhood level.

Table 14: Proposed Standards for Neighbourhood Level Amenities

Population	**Nature of facility**		**Population threshold**	**Area**
Neighbourhood level	Education	Crèche / Tot-lots	1 - 4 sq.m. /person	100 - 400 sq.m.
	Health	Dispensary	1 for 600 pop	0.50 to 0.80 ha
	Culture	Neighbourhood room (hall, office...)	150 - 600 pop	500 - 660 sq.m.
	Services	Common kitchen, dining, laundry.	150 - 600 pop	500 - 2000 sq.m
		Water treatment plants	150 - 600 pop	500 - 1000 sq.m
	Retail	Shops		
	Recreation	Neighbourhood park	--	10% of total area

The proposed standards for neighbourhood amenities for the whole township are shown in **Annexure 5,** while **Annexure 6** shows the comparative analysis of standards at the levels of sector, zone and node. Auroville's proposed standards have been formulated after taking into account the leading modern planning projects and guidelines (UDPFI) provided by the Institute of Town Planners of India.

The main principles for the development and management of future neighbourhood services are that they would be designed to establish shared facilities for cooking, washing and maintenance of buildings in order to enhance the quality of neighbourhood life and release time for the bigger objectives of Auroville's development.

4.11 Economic Activity

The current economy of the Auroville Township is mainly based on manufacturing units and services. Although employment in commercial and transport sectors is marginal, it is steadily growing. However, agriculture, which includes allied land regeneration efforts, is also an important sector of the Auroville economy.

Currently there are more than 100 small and medium manufacturing units operating in Auroville. The products manufactured include such modern equipment as computer software, electronic and engineering products, equipment used in alternate and appropriate technologies such as windmills, solar lanterns and heaters, and biogas systems. Cottage type industries producing a wide range of products such as garments, pottery, candle and incense products, printed items, food, etc, also exist in Auroville. The overall turnover of all these units was about Rs. 25.50 crores in 1999-2000.

The service sector includes areas such as construction and architecture, plus electrical, telephone, water, computer maintenance, transport, finance, health and other services. It also includes research and training in various sectors related to efficient resource management, sustainable development, renewable energy and the use of appropriate building materials.

People in the agricultural sector are engaged in food production, mainly fruits, vegetables and dairy products, but also carry out related research and training in the fields of organic farming, soil conservation and water management.

Economic activities in Auroville are a mixture of production, research and training encompassing both traditional and higher levels of learning in the technological, social and ecological fields.

4.12 Future Economic Activities

The working population is mostly in the age group 20 to 59 years. The corresponding work force for a population of 50,000 would be 28,000 people.

The working population having employment (in the normal economic sense) corresponds to the population of the working age, to which is to be added those above 60 pursuing some activity (2,000), and from which has to be subtracted those above 20 who are students and probationers (2,000,) that is 28,000 persons.

Distribution of the working population by activity is shown in **Table 15**.

Table 15: Working Population by Activity for 50,000

Type	Work Force Distribution	Sub Percentage	Number
A	**Production of Goods (30%)**		
	Farming	5	1400
	Industry	10	2800
	Cottage industry	15	4200
B	**Services (45%)**		
	Economic block	20	5600
	Collective service	19	5320
	Administration	6	1680
C	**Cultural Activities (25%)**		
	Education	15	4200
	Research work	10	2800
	Total	**100%**	**28000**

4.13 Physical Infrastructure

Water

The water demand for the ultimate population of 50,000 is estimated to be 10,000 cu.m or 10 million litres/day. This is based on a per capita supply for a population equivalent of 67,000 to provide for industrial and commercial uses also. This works out to 200 lpcd.

Considering the critical groundwater situation and the need to limit withdrawal from aquifers, it has been proposed to harvest stormwater based on the fact that Auroville can get a substantial quantity from the rainfall it receives. Rainwater will be harvested both from rooftops and the open areas. It is estimated that the rooftop area that would be available is of the order of 107 Ha. Recycling wastewater would add additional resources for non-potable use.

Taking note of the above, **Table 16** shows the ultimate water requirement of Auroville which can be met from the following sources -

Table 16: Proposed Water Supply Sources

Direct withdrawal from aquifer	5.0 mld
Rainwater harvesting	4.5 mld
Recycled water	1.5 mld

While water drawn from aquifers will be used for drinking and other essential purposes, rooftop harvested rainwater will be mainly used for non-potable purposes such as toilet flushing, and the recycled water will be mainly used for gardening and irrigation.

The water management plan proposed as a result of the 'Pre-feasibility study for water management for Auroville' (Activity 6.1. of the Asia-Urbs project IND-015) envisages rainwater harvesting from open spaces and paved areas for recharging groundwater, and its subsequent recovery from the first aquifer. It is proposed to locate 60 wells at a radius of 2.4 kms from the centre point in the western part of the Green Belt for drinking water supply. The remaining 40 wells will be located in a well field located at a radius of 2 kms from the centre point, each 200 m apart. All wells will be connected to a pipeline which will be linked to the water works. Another 100 wells for irrigation will be located at the centre of the demand or in areas of high yield within the Green Belt.

Wastewater Treatment

At present there are several different wastewater treatment systems in operation. Individual houses usually treat their wastewater with a septic tank and dispose of it through a soak pit. Larger communities provide septic tanks or Imhoff tanks for the first stage, and root zone treatment plants or ponds for secondary treatment. In the Industrial Zone the first common effluent treatment plant (CEPT) is proposed. In general at present the treatment of most of the wastewater needs to be improved. A highly decentralized sanitation system is not considered appropriate to Auroville's total development, as it is likely to bring down the quality of underground water for potable use. The proposal therefore envisages the setting up of a partly decentralized effluent treatment system in two locations. It is proposed to locate the effluent treatment plants (ETP) in the Green Belt, one on the west side next to the Irumbai tank, and the other on the east side near Pitchandikulam area.

The western wastewater treatment plant would receive the wastewater of 16,000 PE from the northern drainage areas and the wastewater of 34,000 PE from the south-western drainage areas, totalling 50,000 population equivalent. The wastewater treatment plant to the east would also receive the wastewater from a catchment area of 17,000 population equivalent.

The wastewater treatment plant proposed in the west will be in 3 units. One unit will be for the separate treatment of wastewater from the Industrial Zone, with a capacity of 16,000 PE. The remaining sewage, consisting mainly of domestic wastewater, can be treated in two units with a capacity of 17,000 PE. The wastewater treatment plant located in the east can be designed as one unit with a capacity of 17,000 PE.

Map 6 includes the main features of this Plan. More details of the water & wastewater treatment proposals are available in the Kraft report 'A Pre-Feasibility Study of Water Management in Auroville'. **Map 7** shows the proposed infrastructure at township level.

Solid Waste Management

The Auroville strategy for solid waste management consists of a practical framework aimed at moving progressively towards a zero-waste management system. While there is much strength within the current system, such as the Eco-Service collection model, there are other areas that require significant improvement. To achieve the status of a "zero-waste" city, a number of fundamental changes must be made. These include changes to the management of medical and hazardous wastes plus construction and demolition materials, and to residual waste treatment, storage and disposal. In addition to this, Aurovilians and their guests must act to minimise or totally avoid the production of waste, and to keep materials in circulation for the maximum time possible through recycling and other measures.

The strategy envisaged in making Auroville a "zero-waste" city involves a range of measures, such as:

- Introducing an active programme focused entirely on waste avoidance at the micro-level, in business units and within individual communities.
- Improving the management of hazardous waste handling and storage.
- Understanding and documenting the "recycling chain" in order to provide higher quality end-products to attain better prices and create employment locally.
- Introducing a compost advisory service to help communities and businesses to better utilise valuable nutrients from their waste.
- Developing construction site guidelines for improved source separation and the avoidance of ongoing visual pollution.
- Developing future re-use initiatives based on a waste exchange database accessible to all residents.
- As a part of the planned hydrological study, using GIS to identify the most suitable location for an inert landfill to serve Auroville and its environs over the long term.
- Coordinating and delivering a comprehensive and effective neighbourhood "zero-waste" education programme, which will infiltrate all areas where solid waste is produced, processed, purchased, consumed, recycled and discarded, including the local villages.

Energy

An analysis of the present load pattern in the TNEB-sourced power system is extracted from the Energy Master Plan. It is noted that the present total connected load is 3,210 Kw, of which domestic and commercial loads are equally balanced. If we take the energy consumption per month (440,275 Kwh), residential use accounts for about 40% and commercial use 60%. There is only a small component of industrial use (2,490 Kwh), because most of the manufacturing units are of such a nature that they are categorized as "commercial" ones.

Projections based on the above data indicate that the connected load and energy requirement for a population of 50,000 will be of the order of 55 Mw and 7,530 MWH

respectively. For sizing the power-generating source, maximum demand factor is an important criterion. This is projected at 80% to the maximum demand for a population of 50,000 at 44 MW. Fuller description of the proposals are available in the Energy Master Plan report prepared as part of the Asia Urbs project.

The above proposals have been arrived at based on the assumption that for economic reasons the use of solar power will be limited. However, knowing well Auroville's record in the field of non-renewable energy, and the possibility of emerging technologies in the field bringing down their cost, Auroville will strive to raise the additional power output through non-renewable sources, including solar, biomass and other emerging non-fossil fuel bases.

Road Network

The future road network both inside the designated area as well as outside, so far as it concerns providing access to the township, is shown in **Map 8**.

Salient Features of Traffic Management

- The Peace Area and the City Centre limited by the Crown Road will form a virtual pedestrian zone. Even cyclists may be partly excluded from this zone.

- The Crown Road will comprise an avenue of large trees to form a 4-6 m wide promenade for pedestrians on each side of the central 7 m wide road. This road, located on the outside of the ring, will be used by cyclists and Auroville's non-polluting traffic.

- The four major radials will be comparable to the Crown Road, allowing similar traffic components. These radials will consist of a pedestrian boulevard, normally 3 m wide, alongside a 6 m wide road for permitted vehicles and cycles.

- Motorised vehicles conforming to appropriate norms of permissible emission will be allowed in the Industrial Zone, but access to the Crown Road will only be for specifically authorised vehicles.

- In all the zones, the design of restricted-access streets will depend upon the local conditions and the architectural layout of the area. For motor vehicles, a maximum speed of 15 km/h will be permitted, and they will be allowed to travel only via the Outer Ring Road, not the Crown Road, to avoid noise and air pollution.

- The Outer Ring Road may be used by all types of vehicles conforming to standards of permissible emissions. The main access roads will join the Outer Ring Road via roundabouts. These will allow secure crossing for pedestrians and cyclists and can function without traffic lights. Each roundabout can easily manage 25,000 to 30,000 motor vehicles per day.

- In order to prevent through traffic from the East Coast Road and Tindivanam-Pondicherry Highway penetrating Auroville, two by-passes are planned, one to the north and the other to the south of Auroville. The State Highways Department will be requested to design and construct these roads.

- In respect to the four existing access roads and proposed new access roads, the State government will be requested to safeguard them from inharmonious development along their length.

- The ultimate objective is to make Auroville a city free of pollution by motorised vehicles. To this end the growth and use of motor vehicles, including two wheelers, will be discouraged. In the interim period movement of non-polluting, low-noise-generating vehicles will be encouraged.

Service Nodes

Four Service Nodes are proposed at the junctions of the main access roads and Outer Ring Road. These nodes will serve as transport exchange areas, offering parking facilities for visitor buses, cars and two-wheelers, and taking the guests and visitors on to their destination within the township by way of Auroville's own public transport system, consisting of non-polluting shuttle buses. The nodes will also connect with Auroville's system of pedestrian boulevards and cycle paths.

Each node will also offer public facilities such as information desks, bazaars, shops, artisan workshops, exhibition areas, toilets and health facilities for the convenience of visitors and guests. They will also combine a rent-a-cycle station with general cycle parking.

The limited size of the township, requiring compact development of the built-up part within 5 sq kms (1.25 kms radius), makes it possible to achieve a city where different parts can be easily accessed by cycle, pedestrian ways or the above mentioned public transport, thus facilitating the creation of a car-free city.

Map 9 shows the directions for transforming most parts of Auroville into car-free and eco-transport-only zones.

Communication

The requirement of 10,000 telephone lines for Auroville is based on the fact that it will have a proportionately larger number of resource persons engaged in activities of sustainable development, which naturally means that use of computers would be more or less universal. Accordingly, the Auroville Telephone Service is negotiating with the Department of Telecommunications to fulfil this future requirement.

However, in the rapidly changing communication development scenario, involving the use of wireless, cableless phones and computer systems, the proposals may require appropriate modification as time go by. The thrust of future development in the communication field will be on encouraging cableless communication systems, powered by solar energy.

Chapter 5: Building the City Centre

5.1 Supporting Studies

This plan will provide a definitive framework for the projects to be completed over the next five years, and will therefore serve to give a coherent direction to furthering the growth and development of Auroville.

The plan is conceived within the larger framework of the Perspective Master Plan, and the medium term imperatives of developing such a unique city. In its formulation, large numbers of studies made earlier, as well as the specific studies under the Asia Urbs project in almost all the sectors embracing human settlement development, have been utilised.

The list of studies consulted may be seen in Annexure 1. The construction of the Centre for Urban Research (Town Hall Annex) as a part of the project has given an impetus to consolidating the efforts in planning and development made by Auroville earlier, and give it an opportunity to march forward to the achievement of the next levels of the planned township. The plan provides a strong foundation for starting to build the city in a systematic, professional and humane way.

5.2 Development Policies & Strategies

Resulting from its original location on a barren plateau, and the need to make the area fit for a city of this size, the present population of around 1,700 in residential communities and economic activities has been widely dispersed over the years, not only over the 20 sq kms of designated area but also outside it. In fact Auromodele, located outside the designated area, was originally conceived for providing the needed experience to build the township, without disturbing the planned form of it. This has led to a situation where there is no identifiable physical framework on the ground to facilitate the development of the city in its proposed urban form. The first step therefore is to establish a firm physical identity within which the new developments can take place.

The plan is to locate most of its residential, economic and neighbourhood level developments in and around the City Centre, and only to the extent required to support such developments has the utilization been proposed of lands in the immediate vicinity of the Crown i.e. in the four principal city zones viz Residential, Industrial, Cultural and International. The areas required for such priority development are indicated in **Map 12**.

This map indicates the areas designated for the development of housing, economic activities, educational, cultural & health facilities, international pavilions, recreation and other amenities required at neighbourhood as well as City Centre level. In determining these locations certain criteria such as availability of infrastructure have been taken into account. In particular the CIRHU (Centre for International Research in Human Unity) project, the Centre for Urban Research and the Habitat next to it, plus the location of

electric transformers, potable wells and linkable roads, is going to help to concretise the emergence of the City Centre at an early date.

The areas of land now identified should not only meet the requirements of the next five years, but include also lands required in the next phases. This provides for enough flexibility in locating future projects without tieing them to specific sites, at the same time avoiding developments in a widely dispersed way.

The principal policies for developing this urban form include –

- demarcation and utilisation of the Crown Road alignment for the interlinking of the facilities and improved mobility.
- accessing the City Centre mainly by way of non-polluting public transport in order to provide a safe and clean environment.
- development of the principal parks and interlinking Green Corridors to provide for movement of pedestrians and cyclists.
- improving accessibility to Auroville from the East Coast Road and Pondicherry-Tindivanam Highway.
- establishing infrastructure systems for water and wastewater removal on a decentralized basis, but in such a way as to fit in with the ultimate infrastructure plan.

5.3 Development of Built Environment

The living, working and recreation environments call for the provision of covered built spaces and open areas. The main guiding principle in Auroville's development is to maximize the open areas and interlink the built & open spaces into an integrated living and working pattern. The living and working space requirements are worked out basically for a resident population of 5,000 in the next phase of development, with a working population of 3,335, excluding the current residential and existing workforce. **Table 17** summarises the built-up space to be developed in the next five years in the different city zones.

Table 17: Summary of Built Space in Zones

Zone	Built-Up Space (sqm)					
	Total	**Housing**	**Economic Activity**	**Amenities**	**Pavilions**	**Others**
Residential	183410	150000	3410	30000	-	-
Industrial	17400	12000	3000	2400	-	-
International	6850	4000	1000	800	1050	-
Cultural	5800	4000	1000	800	-	-
All Zones	**213460**	**170000**	**8410**	**34000**	**1050**	**-**
Crown	5800	4000	1000	800	-	-
Inner City	20300	14000	3500	2800	-	-

City Centre	**26100**	**18000**	**4500**	**3600**	**-**	**-**

The policies for current development will follow the general guidelines indicated in the earlier chapter, plus other guidelines indicated under each sector. The guidelines are ultimately oriented towards achieving Human Unity and Sustainable Development.

5.4 Housing

Most of the new housing will be located in Sectors 1 and 2 of the Residential Zone. The next level of concentration will be in the City Centre. The population in the Industrial, International and Cultural Zones totals only 600, mainly to support the emerging activities in these zones.

The zone-wise distribution of the additional population of 5,000 envisaged is given in **Table 18.**

Table 18: Basic Proposed Typology for Housing in Auroville

Housing Type	**Population Distribution (%)**	**Nos**	**Total Area**
Student (Single)	4	200	5200
Adult Single	13	650	21125
Couple	30	1500	58500
Family (with 1 child)	33	1650	64350
Family (with 2 children)	12	600	23400
Family (with 3 children)	8	400	15600
Total	**100**	**5000**	**188175**
			18.81 Ha

e proposed distribution of housing and required areas for housing as well as social infrastructure for the assigned population in the various zones is given in **Table 19**.

Table 19: Proposed distribution of housing in the various zones

Residential	**%**	**Population (nos)**	**Sub total**	**No of units @ 2.5 people/ family unit**	**Res. area @ 40 sq mt/person as BUA**	**Sub Total**	**Social infrastructure @ 8 sqm/person as BUA**
A - Individual Houses	20	750		300	30000		
B - Group Housing - low rise	40	1500		600	60000		
C - Apartment - high rise	40	1500	3750	600	60000	150000	30000
Cultural							
B - Group Housing - low rise		100	100	40	4000	4000	800

Industrial							
B - Group Housing - low rise	40	120		48	4800		
C - Apartment - high rise	60	180	300	72	7200	12000	2400
International							
C - Apartment - high rise		100	100	40	4000	4000	800
Habitat (City Centre)							
C - Apartment - high rise		350	350	140	14000	14000	2800
Crown (City Centre)							
C - Apartment - high rise		100	100	40	4000	4000	800
Green Belt		300	300	120	12000	12000	2400
Total		**5000**	**5000**	**2000**	**20000**	**200000**	**40000**

All residential accommodation will be in group housing and apartments, either in low or high-rise structures following the population distribution patterns shown in **Annexure 7,** which primarily follow the directions of the Perspective Plan. The maximum accommodation area/person is calculated as 30 sqm (carpet area) or a built area of 40 sqm excluding special amenity or infrastructure needs - estimated at an additional 8 sqm/person - giving a total of 48 sqm/person of built space. The number of units to be built is worked out on the assumed percentage of needs for various categories based on past experience. The total built space to be provided is of the order of 240,000 sqm, and at an average FAR of 1.5 will mean utilization of 150,000 sqm or 15 Ha in a total site area of about 35 Ha.

Besides the general norms specified in the earlier chapter, in addition the following guidelines will also be taken into account in providing housing.

- Archaeological historic features, paramboke lands and special topographic features will be identified, conserved and be included within the total design.
- Invariably residential communities will provide for work studios, neighbourhood meeting places, a crèche, kindergarten and primary school, a clinic, kiosks & convenience stores, common kitchens, dining and laundry facilities, parking spaces, children's play lots and parks and playgrounds, and utility service centres, as per the norms specified.
- The amenity buildings should as far as possible be designed to be multi-functional and part of the main built space.
- Infrastructure planning will maximize resource efficiency and correspond to best practice in its design, performance and maintenance.

5.5 Economic Activity

It is proposed to locate the main economic activities in the designated area in the Industrial Zone. **Table 20** indicates the assessment for the Auroville working force and associated external workers, including the required work areas.

Table 20: Work Force and Area Requirement

Sector	AV Work Force	External Employment Factor	External Employment	Total Work Force	Work area requirement @ 10 sqm /person (BUA)	Remarks
Small scale Industry	875	3.0	2625	3500	35000	Fully located in Industrial Zone only. 50% ground coverage = 17500 * 40% (to get the plot area) = **2.5 Ha**
Services						
Crown Residential	788	1.0	788	1575	15750	G+2, 25 mts effective bldg width = 200 mts length of Crown
Administration zone	473	1.0	473	945	9450	
Crown Cultural	315	1.0	315	630	6300	G+2, 25 mts effective bldg width = 84 mts length of Crown
Education	525	0.5	263	788	0	This area to be included in the school areas
Research	350	1.0	350	700	10500	@ 15 sqm /person
Farming	175	2.0	350	700	0	Working in the Green Belt
Total	**3500**	9.5	**5163**	**8838**	**77000**	

5.6 Development in Other Zones

Apart from the Industrial Zone, which is set aside specifically for economic and related research activities, development in the Cultural Zone will focus on activities related to education and all forms of art and sports, while in the International Zone the activities will have a thrust towards development aimed at bringing about better understanding of the diverse nature of the various parts/countries of the world. The plan has identified the priority areas for development in these zones to accommodate the component of the CIRHU project and pavilions.

5.7 Infrastructure

Most of the developments contemplated in the next 5 years will be in and around the City Centre, apart from the identified pockets in the Residential and Industrial Zones. The supporting infrastructure requirements are indicated for these areas in the next chapter.

The proposed features for the Five Year Plan (population projections, related workforce, built-up area and supporting infrastructure requirements for energy, water, waste) are

shown in **Annexure 8 (parts A, B, and C)** while **Annexure 9** provides a glimpse of existing built development trend, in the form of an example. **Annexure 10** shows the set of assumptions and calculations for the distribution of area and amenities.

A description of the "Administrative Area" that highlights the basic principle, its potential uses and development pattern, may be seen in **Annexure 11.**

Chapter 6: Infrastructure Support

6.1 Infrastructure Systems

The offsite infrastructure systems discussed in this chapter relate to Water & Wastewater Management, Solid Waste Management, Roads & Transport, and Energy and Communication. In the first phase they will be generally designed as decentralized systems, excepting the electricity supply from TNEB grid and telecommunication network of BSNL. However, necessary considerations will need to be taken into account in order to connect the decentralized systems to the final systems emerging later. For example, all wastewater flow will be connected to the two treatment plants proposed, one in the east and the other on the west side of the city, located in the Green Belt. Similarly the residual waste from domestic garbage, biomedical waste and hazardous waste will be treated in a centralized treatment system.

6.2 Energy

As at September 2002, there were 681 grid connections in Auroville. The number of connection keeps on increasing with the construction of new buildings and the addition of new economic activities. Though the average load per connection works out as 5.6 kW, in reality it varies considerably.

As at September 2002, there were altogether 27 transformers in 15 sub-stations supplying Auroville, with a cumulative capacity of 3,282 kVA. Two standard size transformers are in use, either 63 kVA or 100 kVA. A few customers from Auroville are also connected to the transformers supplying electricity to the neighbouring villages.

In addition to the electricity supplied by TNEB, Auroville has also opted for solar photovoltaic installations, mainly to satisfy water pumping requirements and meet some essential and emergency needs in case of grid power failure. The use of solar generated electricity is not new to Auroville, as the first installations are over 2 decades old now. However, solar power generation has been introduced in a big way during the last 6-7 years. A survey of the solar installations in Auroville shows that the total installed power generation capacity for pumping applications would be 190 KW. The standard solar PV arrays installed in Auroville are either 900 W with surface pumps, or 1,800 W with submersible pumps. In addition to pumping, solar panels are used for charging batteries and meeting the basic lighting and other essential needs of some residential communities.

The total electrical energy consumption in Auroville as at 2003 for a total resident population of 1,700 people and 5,000 workers is 2.39 million KWH/year. The energy for different uses is shown in **Table 21**.

Table 21: Existing Energy Usage - 2003

Domestic	:	1.03 million KWH (21.5%)
Commercial	:	1.27 million KWH (26.5%)
Industrial	:	0.91 million KWH (2.0%)
Total	:	2.39 million KWH (50.0%)

The likely energy requirement for a population of 50,000 people works out at approximately 45 million KWH/year. The maximum demand of Auroville ultimately is expected to be 58 MW.

Energy Five Year Plan

Based on the estimate of total consumption of energy and its different uses, a 5-year energy plan has been worked out for a next-phase population of 5,000 with corresponding increase in workforce. The break-up for different purposes is indicated here in **Table 22.**

Table 22: Proposed Energy Usage for Next 5 Years

Domestic	:	2.45 million kwh (23.6 %)
Commercial	:	1.90 million kwh (18.4 %)
Industrial	:	1.50 million kwh (14.5 %)
Total	:	4.50 million kwh (43.5 %)

The anticipated demand for a population of 6,700 is expected to be about 5.8 MW

Although Auroville ultimately wants to use only green power, in line with its vision of being an advanced eco-city, the current cost in terms of solar power generation for lighting and pumping is substantial. The option in the short term is to draw power from the Tamil Nadu grid to the extent required, while trying to increase input from solar and other sustainable sources. At the same time Demand Side Management measures are expected to reduce grid consumption progressively. The extension of renewable energy systems calculated for the next phase of development is indicated below.

Table 23: Proposed Renewable Energy Usage in next 5 Years

Solar Energy	:	1.45 MW (25% increase)
Bio gas	:	0.58 MW (10% increase)
Wind Energy	:	0.29 MW (5% increase)
Total	:	2.32 MW

Energy Management Guidelines

In all future developments, and in existing developments wherever possible, these guidelines will apply. Consumers and developers will be encouraged to:

- use compact fluorescent lamps to reduce peak demand.
- use solar panels as an alternative power source in buildings.
- use energy-saving and efficient equipment, specially fridges, fans, pumps, etc.
- use only solar water heaters in residential buildings and guest houses.

6.3 Water

The water requirement for the first phase of development (including the current population) is estimated on the basis of 200 lpcd, of which 130 lpcd will meet domestic requirements and 70 lpcd other uses such as gardening, construction, etc. The requirement for a total population of 6,700 (existing 1,700 plus proposed 5,000) is therefore 1.32 million litres/day. This works out at 482, 000 cu.m /annum.

An analysis of local water resources has come to the conclusion that the situation is quite serious, with water already becoming scarce, specially in the immediate Auroville area. It has therefore been recommended that only part of the total requirement should be drawn directly from the aquifers, and significant amounts should be sourced through rainwater harvesting from rooftops and paved & unpaved areas, and through recycling of treated wastewater.

This report also indicates the best use of such water sources for various purposes. From the suggestions made, and emerging possibilities for future use of water, it seems clear that the harvested water from rooftops can, in the first phase, be used for flushing toilets and cleaning purposes; the recycled wastewater for gardening, construction, etc; and the aquifer-drawn water for drinking, cooking and similar needs where the quality has to be at a high level for health reasons. One important point to note is that the Auroville annual average rainfall of 120 cms can meet all water needs if properly harvested. With this background the source of water for different needs in the first phase has been determined.

Table 24: Potential Water Sourcing for Next 5 Years

From aquifers	100 lpcd	255,500 cu.m/annum
From rainwater harvesting & wastewater recycling		
i. Rainwater harvesting	100 lpcd	229,950 cu.m/annum
ii. Wastewater recycling		25,550 cu.m/ annum

To satisfy the projected demand in each zone, 11 wells in close proximity to the areas are to be developed. **Table 24** shows the quantity of water that will be used for various purposes according to the source.

Table 25: Use-wise water sourcing (cu.m/annum)

	Drinking	**Cleaning & toilet flushing**	**Other domestic uses**	**Industrial uses**	**Garden -ing**	**Constr-uction**	**Other**	**Total**
Aquifer	1,53,300	-	25,550	51,100	-	25,550	-	2,55,500

	(60%)		(10%)	(20%)		(10%)		(100%)
Rooftop rainwater harvesting	-	68,980 (30%)	23,000 (10%)	45,990 (20%)	45,990 (20%)	45,990 (20%)	-	2,29,950 (100%)
Recycled waste water	-	2,550 (10%)	-	5,100 (20%)	12,800 (50%)	2,550 (10%)	2,550 (10%)	25,550 (100%)

Table 26 exhibits the overall water demand for future population, including present inhabitants and expected future workforce for each zone.

Table 26: Zone-wise consolidated water requirements

Zone	**Total water requirement (in ,000 cu.m)**	**Sourcing from**	
		Aquifer wells	**Others**
Residential	265	132	132
Cultural	40	20	20
Industrial	150	75	75
International	30	15	15
Total*	**485**	**242**	**242**

** Excludes water needs for irrigation in the Green Belt.*

The location of wells, their safe yield and the areas they would serve - as obtained from Harvest, Auroville's Water Resource Management Agency – is shown in Table 27.

Table 27: Location of wells, safe yield and served zone

Location of well	**Safe yield (output per hour in litres)**
Residential Zone 1.	2200
Residential Zone 2.	2200
Residential Zone 3.	2200
Residential Zone 4.	2200
Residential Zone 5.	2200
Residential Zone 6.	11000
Cultural Zone 1.	2200
Cultural Zone 2.	22000
Industrial Zone 1.	11000
Industrial Zone 2.	22000
International Zone	11000

Map 13 shows the location of wells from which water will be drawn and the location of different underground reservoirs with basic details of capacity for distribution. The location of underground reservoirs and the distribution system will be integrated with the alignment of Green Corridors.

Water Treatment

Presently the groundwater is pumped into underground or overhead tanks and then supplied to the houses and other buildings where it is needed (in some cases after chlorination). Some of the houses/buildings have additional online purification facilities.

It is proposed to install chlorination facilities at the source of supply, namely wells, where such treatment is called for. For this purpose periodical testing will be carried out by a laboratory already operating in Auroville, equipped with up-to-date equipment. In this regard Auroville will follow the Indian Standards indicated in **Annexure 11.**

Water Use Guidelines

In all future developments, and in existing developments wherever possible, these guidelines will apply. Consumers and developers will be encouraged to:

- install rooftop harvesting systems.
- limit use of aquifer-drawn water to 100 lpcd or less per day.
- install onsite plumbing equipment which will avoid wastage of water.

In addition, developers/communities will be required to:

- use HDPE pipes for distribution purposes.
- ensure online chlorination/purification where required.
- regularly monitor the source as well as distribution systems for correction of defects.
- Seal all borewells properly.
- Clean water tanks periodically to ensure that there is no possibility of contamination.

6.4 Wastewater Treatment & Disposal

A recent survey conducted to find the efficacy of the systems indicates that the performance of most of the treatment units is satisfactory, but improvements are required to make them more eco-friendly and ensure that the quality of treated wastewater matches the standard set by INDS for discharge into various receiving bodies. It has therefore become vital to establish at this stage the appropriate treatment methods that would avoid any risk of aquifer contamination, while at the same time minimising land use and ensuring cost effectiveness, freedom from odour, and the production of water of a quality which can be used for gardening, toilet flushing and construction purposes.

The type of treatment methods used in Auroville and their performance may be seen in **Annexure 3.** Indian Standards for effluent quality discharge in different receiving bodies are given in **Annexure 13**. The tolerance limits of impurities from industrial effluents discharged into surface water, land for irrigation and public sewer are detailed in **Annexure 14**.

Table 28 presents the estimated quantity of effluents from the developments proposed in the main zones.

Table 28: Estimated Quantities of Effluents

Zone	Effluents (cu.m)
Residential	510
Industrial	120
Cultural	30
International	20

Based on these estimates it has been proposed to provide three decentralized effluent treatment plants in the Residential Zone, two in the Industrial Zone and one each in the Cultural and International Zones. The developers would be encouraged to determine the type of treatment needed at primary, secondary and tertiary levels to meet INDS standards.

A detailed proposal has been worked out for the plant in the Industrial Zone, so this can be the first to become operational. A brief description can be seen in **Annexure 15**. All the plants will be placed and integrated within Green Corridors.

Wastewater Use and Guidelines

Developers would follow the following additional guidelines.

- Avoid the establishment of wastewater treatment units for individual buildings.
- All future developments should contribute to the setting-up of the identified plant, and should be connected to the sewerage outlets to this system.
- Measuring devices should be provided to determine the quantity and quality of outflow of the treated wastewater.
- Periodical analyses of the inflow and grab samples from the outflow should be done.
- At least 50-75 lpcd of treated effluent should be generated as recycled water for re-use.

The locations of these proposed plants can be seen in **Map 13**.

6.5 Solid Waste Management

Auroville at present is a small city-in-the-making, but its activities in the economic fields are substantial and diverse. Still, it produces waste at a lower level than other urban centres, the quantity being only 0.41 kg/person/day. The total quantity of waste currently generated is around 0.66 tonnes/day, or about 242 tonnes/year. **Table 29** indicates the estimated quantity of waste currently generated.

Table 29: Estimated quantities of waste generated in Auroville

Waste	Tonnes/year	Tonnes/day	Kg/day	% of total	Kg per capita per day
Recycled	12	0.03	30	5	0.02
Organic	104	0.28	280	43	0.17
Soil, construction and dry organic	120	0.33	330	50	0.21
Residual	6	0.02	20	2	0.01
Total	242	0.66	660	100	0.41

Source: SWM research document, Willis Chirgwin, May 2001

Auroville has been practicing a progressive solid waste management policy since the establishment of Auroville's Eco-Service in 1992. This service is responsible for waste collection, recycling operations and servicing of all residential communities, businesses and other units.

Waste is separated at source itself, basically into organic and non-organic waste. The organic waste is either composted directly within the Residential Zone or transported for agricultural use in the Green Belt. The non-organic waste – plastic, paper, glass & metal - is collected by approved waste collectors once or twice a week, depending upon the amount generated. The collected wastes are brought to two storerooms located at Kuilapalayam and Verite, where they are sorted and disposed of in the following manner.

Re-usable / recycleable material	Sold to recycling industries
Hazardous material (batteries, etc)	Stored for now in sealed containers
Non-recycleable waste	Incinerated
Organic waste	Composted
Non-compostable and residual wastes	Land fill

Annually about 100 cu.m of waste has been disposed of through landfill at the Kuilapalayam site.

Five Year Proposal

Based on current waste generation trends, an estimate of total waste generation and its broad composition has been made for a population of 6,700 with corresponding increase in work force, student researchers and visitors. The estimated quantity of waste generated is of the order of 990 tonnes/year or about 2.71 tonnes/day.

Table 30: Estimated quantity of future waste generation in Auroville

Waste	Tonnes/year	Tonnes/day	Kg/day	% of total
Recycled	49	0.13	130	5
Organic	426	1.17	1170	43
Soil, construction and dry organic	496	1.36	1360	50
Residual	20	0.05	50	2
Total	**990**	**2.71**	**2710**	**100**

According to a recent residual waste survey 50% of the present waste stream could be avoided.

Improvement of Waste Management System

Under proposed waste management improvements, waste avoidance will be instituted in all future development activities, and Auroville's Mahasaraswati Free Store (a unit which acts as a free redistribution facility for anything not wanted by individuals throughout the township) activities will be enlarged to encourage maximum re-use of materials. At the same time recycling methods will be investigated and instituted for plastics, rubber, 'pet' bottles, polystyrene foam, etc.

Organic waste management will continue to be decentralized, and local composting through vermi-composting, using worms, and other aerobic/non aerobic methods will be encouraged. The possibility of central control and marketing of compost as a soil enricher will be pursued.

Construction and demolition debris will be managed by the creation of a waste exchange database to facilitate its re-use in road building and clean-fill.

Medical waste management will follow the guidelines issued by Government of India for incineration at high temperatures, using autoclave/microwave technology.

Hazardous waste will continue to be stored safely until a suitable method of dealing with it becomes available. Residual waste disposal will be carried out through a sanitary fill method

Education and awareness-building will be a continuous process using Auroville's internal communication media, specially the weekly Auroville News and AuroNET!

In the next phase of development, using DSM measures, the aim will be to reduce waste generation by about 20%. **Table 31** summarises the quantities of solid waste to be managed, the reduction proposed through DSM measures, and the means of final disposal.

Table 31: Proposed waste generation to be managed and its disposal

Waste	Estimated quantity (tonnes/ year)	DSM measures	Qty to be managed (tonnes/ year)	Disposal methods
Recycled	49	-	-	-
Organic	426		426	To be composted
Soil, construction & dry organic	496	30% recovered & re-used	298	To be used for landfill site, filling material for plinth level structures and road formation works
Residual	20	50% of waste fully recoverable	10	To be recycled by modern methods and re-used
Total	**990**		**734**	

Infrastructure Facilities Proposed

With the existing landfill at Kuilapalayam no longer usable because it had already exceeded its capacity, an urgent need for a new landfill site was felt. In October 2002, a barren 3.5 acres of land near AuroAnnam Farm was made available for this purpose, and an 11 x 9 x 3 metres deep pit was dug, sufficient to serve Auroville for the next 3 to 5 years. The entire area has been fenced and secured.

Considering the future generation of solid waste, two additional storerooms are required for storage and separation purposes in the existing location of Verite community. One more sorting point is to be constructed at Prarthna in the Residential Zone.

At present only two persons are engaged in the garbage collection and separation. This manpower is not sufficient for the next phase of development, so three more persons are to be recruited, one each for collecting in the Residential and Industrial Zones, and the third for separation and disposal work. One mini-tractor and ten collection bins will also be put into operation for future collection of waste and separation.

Solid Waste Management Policies

With the cooperation of residential communities, services and business units the following policies and guidelines will be actively pursued:

- finding practical and ecological packing alternatives to reduce non-degradable waste.
- begin using the landfill site already identified.
- sorting waste at source into 5 or 6 streams - paper, plastic, metal, glass, organic, and batteries.
- consumer education regarding what packaging can be recycled.
- promoting the concept of zero-waste.
- converting recyclable waste into useful products. This would include conversion of compostable material to soil enrichers.
- using building debris as road / building material.
- the discovery and development of existing and new technologies able to recover materials that currently exist in the residual waste stream in Auroville.
- strengthening the existing collection and recycling systems.
- introducing waste avoidance at source in business and residential communities, from the micro-level upwards.

6.6 Roads & Transportation

Apart from two narrow tarmac roads passing through the southern and western fringes of the township area, all the roads, tracks and cycle paths throughout Auroville are mud/earth, so can be quite rough. Their alignment is mostly based on the location of early communities, the network being extended as each was established. They are dusty in summer and often muddy in winter. The main roads can also be full of erratic riders and drivers. Specially busy times for 2-wheelers are around 8am and 4.30pm daily when local employees arrive for work or go home respectively. 4-wheelers are most active around 2-4pm, when visitors come up from Pondicherry and elsewhere to see the Visitors Centre and Matrimandir, and 5-6.30pm when the same people go home. The total PCU on weekends is of the order of 350 PCU/hour

Auroville's Road and Transport plan for the next five years is discussed broadly under two heads:

- Access roads into Auroville
- Auroville's own internal system of roads, cycle paths and pedestrian ways.

Access Roads into Auroville

The Auroville Perspective Plan has identified four entries into Auroville, two from the ECR entering through the Residential & Cultural Zones, and two from the NH66 highway connecting Pondicherry & Tindivanam, giving entry through the International and Industrial Zones. It is important that the alignment and width of these entries are protected from obstructions which could prevent effective improvements being carried out in a phased manner. The plan therefore has determined the alignments, providing for a right of way of 30 metres. The 30 metre width is identified on the basis of a central

carriage way of 7m having on each side of it a 1.5m wide cycle track, a berm of 5m for trees, and another 5m beyond the berms for rainwater harvesting channels, cabling ducts and other structures. A building line of 5m on either side of the road is provided for setting back buildings for the purpose of safety & convenience and the amenity of occupiers along these alignments.

Some of the entry roads are narrow at some points, with buildings close to the edge, and the plan therefore includes proposals for realignment of these stretches.

The plan also visualizes two bypasses to divert traffic from the ECR to NH 66, one to the north of Auroville and one to the south. The State Government department in charge of these roads will be requested to protect the alignments now determined and utilise State funds for their upgradation.

These proposals would increase opportunities for planned economic and social development for the neighbouring villages through close interaction with Auroville, the major growth centre for the region.

Internal Mobility System

The roads, tracks and pathways inside the designated area, particularly in the city area of 5 sq.kms, are presently all dirt surfaced. They were formed in the early phase of Auroville's development, when the entire Auroville area was being regenerated by planting of trees and the construction of Matrimandir, to facilitate movement of Aurovilians and workers from their place of residence to their place of work, or to other activities. The main roads and cycle tracks and pedestrian pathways may be seen in **Map 8** juxtaposed in relation to the planned system of circular and radial movement corridors.

Five Year Plan

Internal mobility needs to be improved in order to achieve:–

- emergence of the City Centre focus.
- Non-polluting motorised traffic around Matrimandir.
- mobility of workers from their villages to their work places.

It is proposed to achieve these objectives through:

- de facto establishment of the Crown Road.
- linking the Crown Road with the three radial roads in the Residential, International and Industrial Zones to ensure mobility.
- providing convenient cycle and footpaths (to ensure non-motorized travel) for the workers from the nearby villages, which means primarily from Kottakarai, Alankuppam, Kuilapalayam, Edayanchavady and Bommaiyapalayam.
- Establishment of two service node, which will include transport exchange opportunities, one at Abri corner and the other at the Visitors Centre.
- establishing routing patterns for an eco-friendly public transport system.

In order to move towards the goal of making Auroville a non-polluting traffic area, Auroville should start acquiring state-of-the-art non-polluting or electrically operated buses or similar vehicles for shuttle services to reduce the use of individualised transport.

6.7 Communication

The township is served by a local telephone exchange with a present capacity of 2,500 lines, of which the 1,000 lines allocated to Auroville are now almost fully utilised. There is also a small post office located in Bharat Nivas which exclusively serves Auroville. AuroNET!, Auroville's internal e-mail and electronic bulletin board network, which provides communication both within Auroville and the outside world, has currently about 750 subscribers. The township also has its own internal messenger service, delivering various papers and written messages on a daily basis, and the weekly Auroville News provides information about the happenings in Auroville to all residents.

Auroville publishes for internal as well as external circulation two regular newsletters in English (the monthly 'Auroville Today' and quarterly 'Auroville Outreach Newsletter'), and one in Tamil ('Kaliveli Nilam'). Auroville is equipped to handle its information and outreach through well-established printing and multimedia resource units.

The projected eventual requirement of 10,000 telephone lines for Auroville is based on the fact that it will have a proportionately larger number of resource persons engaged in sustainable development activities, which naturally means that computer use would be more or less universal. Accordingly, the Auroville Telephone Service is negotiating with the Department of Telecommunications to meet its future requirement.

Chapter 7: Beyond the City

Chapters 5 & 6 have focused on the five year plan for development of built environment and supporting infrastructure. For these to be effective in taking Auroville to the next stage of growth, it is necessary to give attention to the likely impact of such growth beyond the city - in the Green Belt, surrounding villages and wider bioregion. There are already tell-tale signs of unregulated and environmentally unsustainable development in these areas, triggered by Auroville's past growth, even though that has been comparatively slow to date. In order to counter these tendencies it is important to develop and protect the environmental sources around Auroville. This is the subject matter of this chapter.

7.1 Green Belt

The Green Belt surrounding the city area, covering about 1,440 ha, is an integral part of Auroville's development plans, and its proper use is crucial to fully achieving the objectives of the township. Many of the material researches that are necessary to promote sustainable development, both within the designated area and outside, necessarily have to be carried out in the Green Belt, which should therefore be secured as a matter of priority against speculative urban development and activities not in line with Auroville's aims. It has to be maintained predominantly as an area set aside for agriculture, forestry and wildlife conservation, so that it is not only integrated with the existing village settlements, but also with environmental activities supportive of the township's aims and objectives.

Land Use in the Green Belt

The unbuilt areas in the Green Belt will have three broad categories of land use, viz. agriculture, forestry & land regeneration, recreation, and wildlife conservation. It will also accommodate city level utility requirements where needed. Their development is designed to promote bio-diversity, land regeneration, water management, environmental restoration and upgradation, and technology transfer of the above activities for wider application. This will make the Green Belt not only a valuable asset able to benefit Auroville and the surrounding villages, but also a national model for sustainability.

The protection and appropriate development of the Green Belt of about 15 sq kms has been a matter of concern for some time now, since about 70% of the land is still under private ownership. What has been happening lately is that speculators, seeing Auroville's successful growth and development, have begun to buy some of this land for themselves, seeing it as an opportunity for personal financial gain. In some cases they have even gone so far as to build on land which Auroville's Master Plan has designated as 100% "green", which is giving Auroville grave cause for concern.

The State Government has expressed equal concerned over such development around Auroville, with the result that two major programmes have been initiated in which Auroville will have an important role to play. They are:

- constitution of a Local Planning Area for the Auroville-Mylam belt.
- requiring all land owners in designated areas to obtain a 'No Objection Certificate' from Auroville for any developments proposed by them.

These two programmes are to be pursued, along with a time-bound schedule for purchasing lands for development of the Green Belt, covering about 250 Ha. This will supplement the 380 Ha of land already owned by Auroville in the Green Belt, and will ensure Auroville's plans for the whole area can be implemented in their entirety. Concurrently a pilot scheme is proposed for joint development of agriculture, forestry, etc, by local villagers and Auroville, as earlier mentioned in Chapter 3. The pilot project will be a 50-acre compact block on the west side of the township. If successful it will be extended progressively to the other lands that could be jointly developed.

(a) Agriculture and Farming

The western part of the Green Belt, consisting of 500 Ha of eris, natural drainage channels and village settlements, is reserved for intensive agricultural development. At present these lands are vacant or marginally used. They will be utilised to set up prototype farms for raising appropriate crops that can also be efficiently produced in differing geographic conditions by other farmers in Tamil Nadu. The geographic regions will correspond to the five-fold traditional regional classification in Tamil Nadu, namely Kurinji, Mullai, Marudam, Neithal and Palai.

Auroville's ongoing work in water management, soil conservation, organic farming and seed collection, which is being carried out in collaboration with state, national and international research institutions and agencies, is aimed to promote food security and optimise the agro-economic potential both locally and nationally.

(b) Regenerated Land and Plantations

The eastern part of the Green Belt, which has already been developed with dense plantations of trees, acts as a barrier against cyclonic-force winds coming from the coast, which – allied with heavy rainfall - have until recently been connected with the degradation of the area by way of massive soil erosion and gully formation.

These lands occupy about 560 ha. They will be utilised to strengthen the ongoing work of land regeneration, to re-establish indigenous forest vegetation, to propagate biodiversity through gene pools and seed banks, and to institute zero-runoff parameters and practices. This part of the Green Belt will also serve the Auroville township by acting as an area for wastewater treatment and recycling, solid waste management and experiments in the production of alternate energy through use of biomass and other compatible waste forms. Towards this end Auroville is already collaborating with state and central government agencies.

(c) Recreation

One of the important aims of the Green Belt is to provide open-air recreational facilities for the inhabitants. A total area of 256 ha. has been designated for this purpose, which will also include a botanical garden and agro- and social-forestry projects for the benefit of neighbouring villages.

d) Utilities

Much of the water needs of Auroville will be met from Green Belt sources, where catchment facilities and treatment plants will be sited, as explained under the infrastructure chapter. Similarly the sewage treatment plant for recovering the water for irrigation in the Green Belt area will be located here, as also will other city level utility buildings. These utility structures would be designed in such a way as to be in harmony with the surroundings. Within this zone a modern burial and cremation 'park' will also come up on the site already earmarked for it.

Five Year Plan

The five year plan for the Green Belt area proposes the inclusion of several activities embracing research, biodiversity development, water and renewable energy management. They include

- setting up of prototype farms for promoting climate-related agriculture in the State of Tamil Nadu.
- upgrading the botanical garden, the herbal gardens and seed farms as banks for indigenous and exotic plant species. Also as sanctuaries and observation sites for birds and other animal species.
- developing aquifer recharge and recovery wells for enhancing water availability.
- Installation of a pilot bio-mass energy unit.

7.2 Village Planning

Auroville's development is closely linked with that of the surrounding villages, which were classified in 1984 as part of a "backward area in need of development" by the Tamil Nadu Government. Auroville cares for the neighbouring villages by developing their human and environmental resources, providing education and health care, and offering training and employment opportunities. Instead of draining raw materials and human energies from the rural area, Auroville aims to develop the entire bioregion into a lush and prosperous area, largely by encouraging and empowering the local population to improve their own social, economic and environmental situation.

Demography

There are 13 villages in the immediate area of Auroville, comprising about 40,000 people, and a total of 40 villages in the wider bioregion. Six villages and two colonies are actually located in the Auroville township area. The growth rates for 1991-2001 indicate that Kottakarai has the highest rate (83.18%), followed by Alankuppam (40.10%). Only

one village settlement, Annai Nagar, had diminished in size (-13.44%). Compared to the previous decade the growth rate has quadrupled in Alankuppam village, and increased by approx 30% in Kottakarai village. The population and growth rates of villages & colonies in the Auroville township area are given in **Table 32**.

Table 32: Population & growth rate of villages & colonies in Auroville township area – 1971 -2001

	Villages & Colonies in AV Township Area	Population				Growth rate		
		1971	1981	1991	2001	1971-81	1981-91	1991-01
	Auroville	**300**	**461**	**715**	**1601**	**53.67**	**55.10**	**123.92**
1	Alankuppam	790	895	985	1380	13.29	10.06	40.10
	Alankuppam - Annai Nagar	315	450	610	528	42.86	35.56	-13.44
2	Edayanchavadi	2215	2460	3480	4272	11.06	41.46	22.76
3	Irumbai	480	490	580	657	2.08	18.37	13.28
	Irumbai – Chitoor	280	300	315	408	7.14	5.00	29.52
4	Kottakarai	465	570	880	1612	22.58	54.39	83.18
	Kottakarai - Ambedkar Nagar	310	405	510	650	30.65	25.93	27.45
5	Rayapettai	680	745	780	1028	9.56	4.70	31.79
6	Sanjeevi Nagar	905	950	1030	1188	4.97	8.42	15.34
	Total							

Among the villages in the Auroville township area, Edayanchavadi is having the highest population of 4,272, and Alankuppam - Annai Nagar the lowest, with a total of 528. Alankuppam - Annai Nagar is having the highest density, and Kottakarai the lowest. The population, area and density of these villages and colonies is given in **Table 33.**

Table 33: Population, Area & Density of Villages & Colonies in the Auroville Township Area

S.No	Villages & Colonies in Auroville Township Area	Population	Area		Density Persons/ha
		2001	in sqm	in ha	
1	Alankuppam	1,380	93,075.29	9.31	148
	Alankuppam - Annai Nagar	528	14,148.96	1.41	373
2	Edayanchavadi	4,272	327,703.99	32.77	130
3	Irumbai *	1,065	104,539.21	10.45	102
4	Kottakarai	1,612	194,158.04	19.42	83
	Kottakarai - Ambedkar Nagar	650	62,319.81	6.23	104
5	Rayapettai	1,028	54,603.00	5.46	188
6	Sanjeevi Nagar	1,188	98,410.98	9.84	121
	Total	****11,723**		****94.89**	

* Area for Irumbai includes Irumbai - Chitoor area

** Excluding Auroville population & area

Almost 5,000 local people are employed by Auroville, from cleaners, gardeners, cooks, masons and carpenters to handicraft artisans, metalworkers, accountants, engineers and others. Most of them have been trained in Auroville to improve their qualifications and skills. Auroville provides for the young of the rural area a real and viable alternative to migration to the cities and urban centres, which is so often the only option for those seeking self-improvement and employment from such backgrounds.

- More than 500 children from neighbouring villages attend Auroville schools; another 900 attend Auroville classes in their village schools.
- More than 20,000 people from the neighbouring villages receive health care from Auroville every year.

Village development has been a major activity of Auroville since its inception. Over the past 13 years, the Auroville Village Action Group, Auroville Health Centre, Pitchandikulam Bio-Resource Centre, Harvest Water Service and Palmyra have been engaged in a variety of development programmes for the neighbouring villagers, some completed, many ongoing. With funding from a number of national and international organizations, the overall programme aims to:

- improve the health situation through education, preventive care and treatment.
- empower women.
- encourage in each village the growth of community spirit by ensuring people's participation in development programmes.
- raise the standard of living of the local population through vocational training and self-employment.
- involve the villagers in a cooperative effort of wasteland reclamation, watershed management and environmental regeneration.
- provide education for the village children.

At present, there are five major educational programmes for village children - at New Creation (with boarding facilities), Ilaignarkal, Isaiambalam, Life Education Centre and Arul Vazhi. In another programme, Auroville sends teachers to the village schools for regular classes and special activities.

On the employment front, the number of jobs that Auroville provides both directly and indirectly to the neighbouring villagers is projected to increase to 10,000 over the next five years, with an increase also in opportunities for training and self employment.

Planning Parameters for Improvement of Village Atmosphere

A dialogue has already been initiated by Auroville with the local Panchayats and residents of two villages – Kottakarai (within the designated area of the township) and Kuilapalayam (on the south-east fringe of Auroville, near the ECR) - for a joint planning exercise. Auroville has already assembled significant basic data including topographical data and maps. It is now in a position to assist these villages to identify their main problems and to draw up medium term (10 year) and shorter term (5 year) plans for their solution plus overall development. This programme would be pursued with the collaboration of Tamil Nadu Directorate of Planning, the State Rural Development

Department, the Collector of Villupuram District and the main stakeholders and headmen in the village settlements.

7.3 Bio-Regional Planning

Auroville's impact and influence on the bioregion is steadily increasing. Auroville has been collaborating with State and National agencies to formulate a bioregional partnership for an area of nearly 800 sq kms, embracing the Kaliveli Tank (lake) and watershed area.

With the additional inputs to Auroville's development under the proposed plan, the bioregion surrounding it is likely to come under intense pressure for unsustainable exploitation. In order to direct developments in the right direction the following steps have been initiated.

- To identify and declare the entire Kaliveli watershed area as a Biosphere Reserve.
- To declare this area - including Auroville - as a future World Heritage Site
- To further identify and declare this area as a Wetland Ecosystem, to be conserved and managed with maximum sensitivity.

UNESCO, the Government of India, the Government of Tamil Nadu and several national and international organisations have shown deep interest in these proposals, and have offered to support any attempts for conservation and development of the natural ecosystem, for human welfare as well as environmental sustainability.

Chapter 8: Imperatives for Implementation

8.1 Overview

The fulfilment of the plans set out in the earlier chapters, though not excessively ambitious, is still a challenging task which will require intense effort by all concerned.

Meanwhile there is one main concern

How to finance the several developments of housing and infrastructure that necessarily have to be created for Aurovilians to live in reasonable circumstances, if they are to be able to put in their best efforts towards achieving the high ideals and overall dream of Auroville for humanity.

A few approaches have already been mentioned in Chapter 3. It is imperative to explore more possibilities and put them into operation. For this purpose a special group of present Aurovilians with appropriate skills has to be put together. This work would be one of the priority tasks for the recently constituted Planning and Development Council.

8.2 Implementation and Monitoring

The organizational structure for planning, implementation, monitoring, resource mobilisation and funding as suggested in the Perspective Master Plan is appended.

This structure is not yet in place, but discussions have clearly brought out the need to strengthen Auroville's Future (the present town planning office) with more persons with professional skills, not only in planning and urban design but also in infrastructural planning and construction and project formulation linked to resource mobilization. This would help in taking up further the proposals made, and concretising the projects suggested in the five year plan.

It is necessary that this group should have a clear mandate, and for this purpose it requires the full support of the Aurovilians through their representative bodies. Proposals are afoot to consolidate such a body, the Auroville Planning and Development Council (APDC), to guide, support and monitor the implementation of the present directional plan. The first step for this council should be to work out a coordinated action plan of interlinked activities which would initiate the process of building the city as proposed in this plan.

Two supplemental activities also have to be initiated to help Auroville move progressively towards the objective of becoming a genuine and viable eco-city.

1. Organising a Building Material Centre to help developers source low energy building materials, plus electrical and plumbing fixtures, which can assist in the conservation of resources. This may be followed with setting up of a permanent service of such materials on a large scale.

2. Work out a time-bound programme for minimising polluting motorised transport – both passenger and goods - and inducting non-polluting vehicles for movement of both.

Future Directions:

- To develop research on soil characteristics and suitability for building.
- To improve traditional architecture and experiment with innovative technologies, so as to establish architectural and construction guidelines.
- To develop more efficient equipment capable of producing higher quality materials.
- To transfer the theoretical knowledge acquired by the research organizations into the field for contractors, etc.
- To educate decision-makers and the public (contractors, self-builders, etc) concerning the acceptability of earth as a building material.
- To experiment in and search for new ways of achieving the ideals of sustainability and ecological living in Auroville.