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CHAPTER - I

Introduction

1.1 STATE OF PUNJAB

1.1.1 Punjab is one of the advanced state in the country, with highly productive agriculture, a well-developed physical infrastructure and a high human development index with industrious, painstaking and entrepreneur skills. It accounts for almost 1.53 per cent of India's geographical area and 2.37 per cent of its population. State represents a unique example of a fast developing economy based on agriculture despite all physical and developmental odds. State is credited with ushering in the green revolution and white revolution in the country. It today contributes nearly 40% of the wheat and 60% of rice procured for distribution through the public distribution system. An agro-based and agro-oriented industrialization is another prominent feature of the state economy. No less commendable are the efforts to strength the infrastructure, particularly irrigation and power. The cumulative effect of all this is manifest in the high per capita income of the state, a position which Punjab has been holding for most of the years since its formation in 1966.

1.1.2 Development in the state of Punjab has been the outcome of the interplay of a variety of factors including physical, political, economic, demographic and geographic. Being a border state, both external and internal changes have influenced the path of development. Historically, Punjab has experienced many upheavals and turmoils, which, in turn, have influenced building brave and unique character of Punjabis and opened its path of development. The contours of administrative map of Punjab have undergone extraordinary changes in the past. The nomenclature 'Punjab' was widely used during the reign of Akbar (A.D. 1556-1605). It was known as the Kingdom of Lahore during the reign of Ranjit Singh (1700-1839). The British occupied it in 1849 and merged Delhi and the Hissar division of the former Northwest Province (now Uttar Pradesh) with Punjab in 1858. In 1901, Punjab's border districts situated across the Indus were taken away to form the Northwest Frontier Province. Subsequently, Delhi was separated from Punjab.

1.1.3 At the time of the partition of the Indian sub-continent in 1947. Punjab was bifurcated into two parts: West Punjab (Pakistan) and East Punjab (India). Of its 3, 59,179 square kilometers and 29 districts, only 1, 52,649 square kilometers and 13 districts were left with Indian Punjab. The two Punjab's were partitioned on religious

grounds. The most fertile, prosperous and developed western part went to Pakistan and the relatively backward eastern part remained in India.

1.1.4 With massive migration, post-partition Punjab was faced with the daunting task of providing basic infrastructure necessary to accommodate 40 lakh displaced persons. They were put in refugee camps, institutions and other available structures in insanitary conditions. The immediate task was to create the infrastructure to accommodate the refugee population. New towns were constructed and economic projects initiated for the resettlement of refugees from rural areas. The pattern, established during the period, has continued to guide the path of development in the state.

1.1.5 In 1956, at the time of the reorganization of states, the former PEPSU territory was merged with Punjab. In 1966, the state was further reorganized under the Reorganization Act 1966. There was a strong demand for the reorganization of the state on a linguistic basis so that satisfaction of regional sentiments could be harmonized with the process of development. The Punjabi speaking areas were carved out of the erstwhile Punjab on 1 November 1966. The Hindi speaking areas in the north were merged with Himachal Pradesh. The southern Hindi speaking areas were constituted into a new state of Haryana. The Punjabi speaking state was created in 1966, with 11 districts, including Rupnagar. The reorganization reduced Punjab to about two-fifths the size attained after the merger of PEPSU in 1956. This was one-seventh the area of Punjab before Independence. The state now is a linguistic unit inhabited by Punjabi speaking people with 20 districts.

1.2 RAPID URBAN GROWTH

1.2.1 Punjab is urbanizing rapidly and its future seems to be urban. With urbanization standing at 33.95%, Punjab is ranked fifth major urbanized state of India after Tamil Nadu (43.86%), Maharashtra (42.40%), Gujarat (37.35%) and Karnataka (33.98%) and most urbanized states in the northwest region of the country. The percentage of urban population in Punjab has been on the rise continuously.

1.2.2 Looking at the growth of urban population vis-à-vis total population of state during last century (1991-2001) it has been observed that while total population of the state merely increased approximately 3 times (7.5 to 24.28 millions), during this very period urban population recorded enormous increase of 9 times (0.9 to 8.25 million)

indicating a sharp rise in urban population. However, during the same period rural population grew only by 2.5 times (6.61 to 16.2 million). In 1901 when every 8th person was an urbanite, in 2001 every 3rd person came to live in the cities/ towns. The trends of urbanization was slow in the first half of century when urban population merely doubled (0.93 to 1.98 million) in the space of 5 decades (1901-1951). However, it picked up in the post-independence era and urban population grew by more than 4 times (1.98 to 8.25 million) during the second half of century (1951-2001). In absolute numbers, increase in urban population recorded during the last century was 73.11 lakh persons whereas level of urbanization increased merely from 12.39% to 33.95% indicating the massiveness of the state's urbanization. Last decade witnessed a sharp rise of 37.38% in urban population whereas in absolute number the addition to the urban centres was of the order of 22,52,341. From the ongoing trend it can be envisaged that urban growth will be much faster in years to come.

Table No. 1
Trends in Urbannization-Punjab 1901-2001

Census year	Total number of UAs/ Towns	Total population	Total urban population	Percentage of urban population	Decennial Growth		Annual exponential growth rate (urban)
					Absolute	Percent	
1.	2.	3.	4.	5.	6.	7.	8.
1901	76	7544790	934766	12.39	-	-	-
1911	62	6731510	813224	12.08	-121542	-13.00	-1.38
1921	59	7152811	869526	12.16	56302	6.92	0.67
1931	66	8012325	1168413	14.58	298887	34.37	3.00
1941	75	9600236	1657415	17.26	489001	41.85	3.56
1951	110	9160500	1989267	21.72	331853	20.02	1.84
1961	106	11135069	2567306	23.06	578039	29.06	2.58
1971	106	13551060	3216179	23.73	648873	25.27	2.28
1981	134	16788915	4647757	27.68	1431578	44.51	3.75
1991	120	20281969	5993225	29.55	1345468	28.95	2.58
2001	157	24289296	8245566	33.95	2252341	37.58	3.24

SOURCE: CENSES OF INDIA

1.2.3 State of Punjab recorded a population of 2, 42, 89.296 in 2001. During 1991-2001, population of state increased by 40.07 lakhs out of which addition to urban population was of the order of 22.52 lakh (56%) due to the fact that number of urban centres recorded a sharp increase from 120 to 157. Concentration of population in urban areas of Punjab is very high as compared to rural areas. Villages recorded low density

as compared to urban areas giving a density ratio of 1:12 in favour of urban centres. Apparently, Punjab is one of the most densely populated state in India.

1.2.4 It is expected that by 2011, population of the state would be of the order of 305 lakhs out of which urban component would be 40% i.e. two out of every five Punjabis will be urban residents. In absolute numbers the urban population would be around 120 lakhs and decadal addition to urban centres would be 38 lakhs. Thus annual addition to urban population which was 2.3 lakh during 1991-01 would go upto 3.8 lakh during 2001-11 period. This would further result in excessive concentration of urban population.

1.2.5 There has been polarization of population towards class I towns with major contribution coming from these towns. As against 17.38% of population living in Class-I towns in 1901, their share went up to 58.39% in 2001. However, Class-II recorded a marginal growth from 12.97% to 16.45% whereas Class-III towns recorded decline in population from 15.67% to 12.50%. However, decline was sharp in the population of Class IV & V towns whose share came down from 20.45% & 27.47% to 9.82% and 2.52% respectively. Class-VI towns followed the same trend with their population share getting marginalized from 6.06% to 0.33%. Thus the share of Class III, IV, V & VI towns sharply declined from 69.63% to 22.16%. Table 2 shows class wise trends in urban population in Punjab.

Table No. 2

Trends in Urban Population in Different Size-categories of Cities and Towns

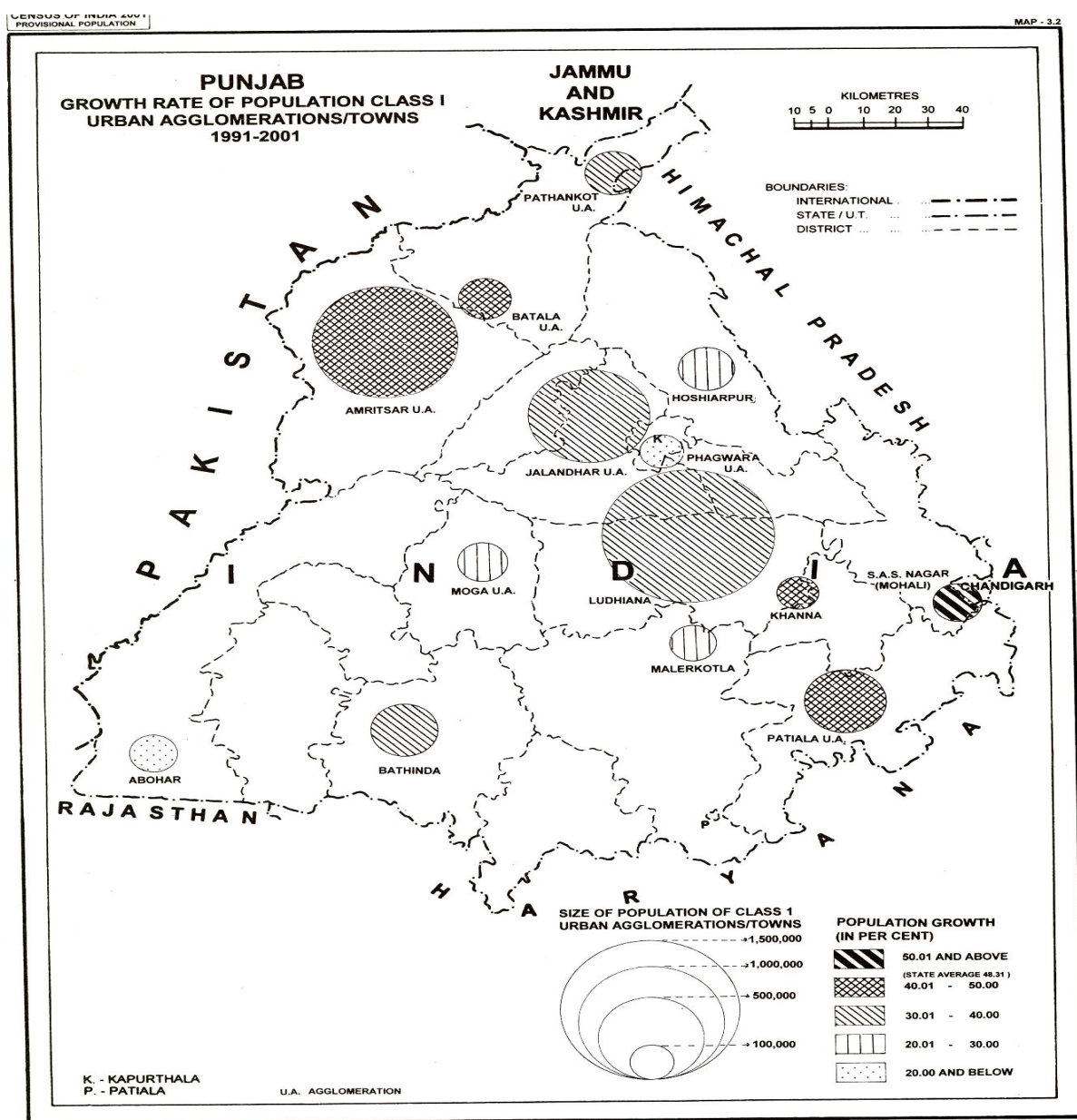
Years	Class I	Class II	Class III	Class IV	Class V	1.1. Class VI	All Classes
1951	3 [33.11] (658,725)	2 [7.73] (153,719)	17 [26.17] (520,558)	20 [14.44] (287,223)	36 [13.18] (262,197)	2 [5.37] (106,845)	110 [100.00] (1,989,267)
1961	4 [38.25] (981,890)	5 [10.15] (260,707)	23 [28.11] (721,684)	20 [10.44] (267,913)	35 [10.38] (266,439)	19 [2.67] (68,673)	106 [100.00] (2,567,306)
1971	4 [40.52] (1,303,128)	8 [15.84] (509,389)	22 [22.20] (714,176)	31 [13.32] (428,413)	29 [6.84] (219,911)	12 [1.28] (41,162)	106 [100.00] (32,161,79)
1981	7 [46.38] (2,155,714)	10 [14.39] (668,780)	27 [20.24] (940,482)	36 [11.28] (524,505)	40 [6.50] (301,905)	14 [1.21] (56,371)	134 [100.00] (4,647,757)
1991	10 [54.16] (3,246,224)	18 [19.91] (1,193,171)	25 [12.92] (774,453)	46 [10.82] (648,230)	14 [1.72] (102,945)	7 [0.47] (28,202)	120 [100.00] (5,993,225)
2001	14 [58.38] (4,814,405)	19 [16.45] (1,356,386)	35 [12.50] (1,030,623)	54 [9.82] (809,366)	28 [2.52] (207,891)	7 [0.33] (26,895)	157 [100.00] (8,245,566)

Source: Census of India, 1951,1961,1971,1981, 1991, 2001

Note:- 1) Number of towns in each category (without bracket),
2) Percentage population in each class []
3) Total population in each class () :

1.2.6 Increase in share of Class I towns in total urban population of Punjab has resulted in over concentration of population and resources in few larger towns majority of which including Ludhiana are situated on the Grand Trunk Road. Map 1 shows spatial pattern of urbanisation and growth rate of Class I towns in Punjab.

Map 1: Spatial Pattern of Urbanization and Growth Rate of Class I Towns in Punjab.



Based upon Survey of India map with the permission of the Surveyor General of India

1.3 LUDHIANA

1.3.1 Ludhiana, the first metropolitan centre of the state of Punjab, located on National Highway 100 km north west of Chandigarh, the capital of Punjab and Haryana, 310 Kms from New Delhi and 150 km from Amritsar, has emerged as the most vibrant and important business centre of Punjab. Positioned at 30° 56' N and 75° 52' E, Ludhiana is located about 10 km south of the Satluj, one of the five major rivers of pre-independent Punjab. Ludhiana, which became first metropolitan town in Northwest region of India, has a long history spanning over 525 years. It was founded in 1481 AD during the reign of Sikander Lodhi. The city has its origin in the "Fort" which now lies in ruins. Village Mir Hota on the bank of River Satluj was first established as a military base by Lodhi Army. With the passage of time, the base grew up in size and came to be known as "Lodhi-ana" meaning the town of Lodhis", which subsequently came to be popularly known as Ludhiana. During his ascendancy (AD 1799-1838), the city was taken over by Maharaja Ranjit Singh (in 1805) during which it attained some political importance. In 1816, city was expanded westwards when Afghan ruler-in-exile asked for refuge. In 1842, city expanded southwards when Afghan Royal family settled there permanently. In 1843, Ludhiana became a revenue district of the British. Local civil administration started during 1853-54 with establishment of Civil Lines. Immediately after this, Grand Trunk Road was aligned to the city's present site. After demolition of buildings around the fort during Indian uprising (1857) natives scattered and formed first slum in Ludhiana. The city of Ludhiana started taking its present shape under the British rule after 1843. The city was connected by rail in 1870. During last quarter of 19th century the machine knitting was started and city developed into a big trade and commerce centre. First water connection was released on 13th July 1907 and city was electrified in 1932. The underground sewerage system in Ludhiana was laid in 1961. The railway network was a milestone development and a catalyst for industrial growth of the city. It also led to the development of sub-urban areas around Ludhiana city.

1.3.2 The history of Ludhiana Municipality began in 1867 when Municipal Committee of Ludhiana was constituted. It became Class II Municipality in 1886. With the increase in population and expansion of city limits, it was made a Class I Municipality in 1949. The Municipal Corporation came into existence in 1977 (March 30th). Now it is the largest Municipal Corporation of Punjab.

1.3.3 Ludhiana city, the district headquarter of Ludhiana district is the only metropolitan city of Punjab. Ludhiana is the largest city in Punjab, both in terms of area and population. The city is spread over an area of 159.37 sq. km and accommodates approximately 14.00 lacs population (2001 Census).

1.3.4 Being the hub of Indian small scale industry especially the hosiery, it is popularly known as 'Manchester of India'. Besides being a commercial hub, the city of Ludhiana is also an important pilgrimage center with a number of Gurudwaras located within and around the place. On the academic front, Ludhiana has some of the most prestigious institutions. There are two Medical Colleges, an Engineering College and the famous Punjab Agricultural University modeled on the "Land Grant of America". It is also known as “Small Scale Industrial Capital of India” The city has its own individuality and character which is the result of its historical growth, physical, economic and social structure, it has acquired during the period of its existence and functional service to the people of the city, state and country.

1.4 Location



Figure 1-1: District Map of Punjab



Figure 1-2: Map of Ludhiana District

1.4.1 The city is located in district Ludhiana, which is the most centrally located district amongst the 20 districts of Punjab State. It falls within the Malwa region of the State of Punjab. Geographically the city lies between north latitude $30^{\circ}34'$ and $31^{\circ}01'$ and east longitude $75^{\circ}18'$ and $76^{\circ}20'$. The city is located on Amritsar-Delhi G.T. Road (NH-1) and Amritsar-Ambala railway line which are considered the back bone of the state. The city is located at the distance of about 100 kms. North-West of Chandigarh, “The Capital of Punjab”. River Satluj flows at a distance of about 8 kms. to the North

of the city. Ludhiana city was founded on a ridge of Budha Nala, which once was a bed of the River Satluj. Previously the urban area was confined south of Budha Nala but due to population explosion, the low lying area between Budha Nala and the River Satluj has now become an integral part of the urban area. . Many villages surrounding the city are now part of the Ludhiana Municipal Corporation.

1.5 Connectivity

1.5.1 The city is very well connected with other areas of the state and country through Air, Road and Rail links. NH1-Grand Trunk road passes through the city and the major road network connecting the city with other parts of the state/country is Ludhiana-Ambala, Ludhiana-Amritsar, Ludhiana-Chandigarh, Ludhiana-Ferozepur, Ludhiana-Malerkotla and Ludhiana-Bhatinda. Similarly, Ludhiana lies on the main broad gauge line and is identified as a junction. The main railway lines passing through the city are Amritsar-Delhi Railway Line, Delhi-Jammu, Ludhiana- Ferozepur and Ludhiana-Dhuri railway line.



1.6 Topography of the town

1.6.1 The topography of Ludhiana city and its surrounding areas is a typical representative of an alluvial plain and it owes its origin to aggravation work of river Satluj. The city is centrally located in the plain region which is marked for its flatness and featurelessness. The elevation of the city and its surrounding areas ranges from about 248.5 meters in the East to 244.0 meters in the west meaning thereby that the gradient of slope from east to west is gentle.

1.7 River and drains

1.7.1 The Sutlej River and its tributary, the Budha Nallah, constitute the chief hydrographic features of the areas. Sutlej river takes its origin from Mansarovar Lake in Tibet. It has been a devastating river during its floody fury. This river has expressed west-north drift during the past times and now it runs to the north of the Ludhiana City

at a distance of about 8 kms. The river has since then a dam constructed at Bhakhra which has considerably checked its flooding menace in the district.

1.7.2. Immediate under the high bank along the old coast of the Sutlej runs a perennial stream called Budha Nallah . It takes its rise near Chamkaur Sahib in Ropar district and enters Ludhiana district near village Bholapur. It is flooding stream during the rainy season but in the dry season, it can be crossed on foot at certain points. The water of the stream becomes polluted after it enters Ludhiana City.

1.8 Climate

1.8.1 Climatic divisions and seasons and their duration: The cold season is from about the middle of November to the early part of March. The succeeding period upto June is the hot season. July, August and the first half of September is monsoon. Mid September to about the middle of November may be termed as the post monsoon or transitional period.

1.8.2 Temperature: June is generally the hottest month with the mean daily maximum temperature at 44.⁰C and the mean daily minimum at 27.2⁰ C. January is the coldest month. The mean daily Maximum in January is 19.5⁰ C and the mean daily minimum is 6.4⁰C.

1.8.3 Rainfall: About 70 percent of the annual rainfall is received during period from July to September . The rainfall during the period of December to March accounts for about 16 percent of the rainfall . The average annual rainfall in the district is 649.9 mm (25.59”).

CHAPTER-II

NEED FOR MASTER PLAN

The growth and development of urban areas are largely guided by the urban forces and the decisions taken, over a period of time by the individuals, residents, communities, institutions and parastatal agencies. Unless and until these decisions are regulated in a given and pre-defined framework, the growth and development of urban areas cannot be made rational. Accordingly, in order to promote, guide and rationalize the future growth and development of the urban centres, it will be critical to define their growth framework. The future growth framework of the urban centres are defined by the Master Plan/Development Plans which are evolved for each settlement at individual level. Master Plan has been considered as one of the most effective mechanism to promote planned growth of the urban centres. It lays down the road map, agenda and framework within which the city growth is envisioned. It provides a tool for the authorities to take decision with regard to current and future development related issues.

Master Plan provides the framework for rationalizing the orderly movement of traffic and transportation within the city and defines the area for laying down net-work of various services. The plan is used for promoting integrated development of the urban centre by rationalizing its pattern of land use and their interrelationship. It also defines the strategies and solutions for overcoming the existing problems of the urban centres and to overcome its infrastructural and service related inadequacies. In addition, it provides options for accommodating the future addition to population which is likely to come to the urban centre due to natural growth and migration. Master Plan acts as a tool for determining the infrastructure cost which would be required to make the city sustainable. The plans offer futuristic solutions by laying down agenda for its growth and development. It looks critically at the inherent strength of the city and provides agenda for its future growth and development by making optimum use of its strength. It also suggests ways and means to overcome the existing inadequacies and weaknesses of the urban centre to remove all road blocks in the rational development to make the urban centre a vibrant entity. It also envisages appropriate quality of life to all the existing and future residents of the city, including poorest of the poor, by making steady and assured supply of planned and serviced land commensurate with the demand in order to support economic development of the city and provision of affordable housing for the community.

2.1 Context :

2.1.1 As mentioned earlier, Ludhiana town after partition has recorded a phenomenal increase in population as well as in physical growth. At the time of partition of the country, a large number of refugees from Pakistan were rehabilitated in this town as a result of which new industrial and commercial activities were started. With the passage of time, people from other parts of the state also came to this town in search of employment and ultimately settled in this town. In order to come with increasing demand for housing, water supply, sewer, education, health, shopping etc., new areas were developed. Although in the initial stages, a few planned colonies like Urban Estates, Model Town, Development Schemes by Improvement Trust and a few industrial focal points were planned by the govt. but this development was not sufficient to bear the load of population pressure and subsequently a large number of unplanned colonies came to be set up which not only resulted in the haphazard growth of the town but also lacked proper road network, parks and open spaces, spaces for education, health and other social infrastructure. A number of areas were devoid of portable water supply and sewerage facilities etc. The town also lacked planned shopping centres with organized parking which gave birth to mushrooming of commercial activities along the frontage of important roads/streets and the traditional bazaars came to be set up without adequate parking and loading and unloading facilities. The new industrial area also came up in an unplanned manner without required industrial infrastructure.

2.1.2 The unplanned development accompanied by increasing population pressure due to strong economic base of the town resulted in housing shortage, lack of potable water, good sewer system and road network. Unhygienic living environment, congestion of roads, encroachments of roads and public places, lack of open and recreational areas, development of slums and lack of social infrastructure like, educational, health and religious etc.

2.1.3 It was in this background that the Government of Punjab through the Department of Town & Country Planning made an attempt to prepare the Master Plan for Ludhiana City so as to control the haphazard urban sprawl and to bridge the gap between demand and supply of housing stock, commercial and industrial activity, water supply and sewer system, good road network, recreational and sports spaces and other social infrastructure etc.

2.2 Review of past Master Plan

2.2.1 The first master plan for Ludhiana City was prepared for the period of 1971-91. Although no legal framework was available for the preparation of master plan in the State. This master plan was prepared on executive instructions from State Govt. and it was notified vide Notification No.3488-IUDI-76/16188 dated 30-4-1976. In the initial stages, the proposals of this master plan were followed with great spirit by the government and a number of residential Urban Estates, Development Schemes, Town Planning schemes and Industrial Focal Points were set up which conformed to the proposal of this master plan. New Bus Stand and truck stand were also established as per the proposals of the master plan. But with the passes of time due to heavy influx of population in the city because of terrorism in Punjab, the violation of this master plan took place. The Department of Town & Country Planning made a review of 1971-91 master plan and prepared a new Master Plan for the year 1985-2001 which was again reviewed in the year 1992. It was once again reviewed in the year 2000 and a new master plan for the period of 2000-21 was prepared which is still in existence but all these master plans lacked legal backing which has been considered a major obstacle in the implementation of these master plans.

2.2.2 Now with the enactment of the Punjab Regional and Town Planning and Development (Amendment) Act, 2006, simpler legal framework has been provided for the preparation of master plans for towns/cities of the state. Accordingly, the Govt. of Punjab has decided to prepare Master Plans for a number of cities and towns of the state. The preparation of Master Plan for Ludhiana has been taken up on priority by the state. It was in this context that Local Planning Area Ludhiana has been declared vide Notification No. 12/45/2006-4HG1/5553, Dt.18.7.2007 with the objective of preparing Master Plan.

2.3 DELINEATION OF LOCAL PLANNING AREA LUDHIANA 2007-21

2.3.1 As a first step towards the preparation of master plan Ludhiana, Local Planning Area has been delineated and notified u/s 56(i) of "The Punjab Regional and Town Planning and Development (Amendment) Act, 2006" in the official gazette. The Local Planning Area Ludhiana includes 5 cities/towns namely, Ludhiana, Sahnewal, Doraha, Mullanpur and Phillaur and 301 villages. Out of these settlements, 4 towns and 288 villages' settlements fall in the revenue boundary of Ludhiana district and one town and 19 villages' settlements come under the jurisdiction of revenue district Jalandhar. The

total area is 127122 hectares (1271.22 sq.kms.) out of which 117704 hectares falls in Ludhiana district and rest of the 9418 hectares comes under Jalandhar district. The detail of areas, population, schedule of boundaries and map Drg.No. DTP(L)2002/07 dated 30.3.2007 of Planning Area Ludhiana has been shown in Annexure-I.

2.3.2 While delineating Local Planning Area of Ludhiana, the following factors mentioned in Rule 22 of the Punjab Regional and Town Planning and Development (General Rules 1995) have been considered.

- Administrative boundary limits of the villages and the district has been followed for better identification and management of the Local Planning area.
- Geographical features of the area like river Sutlej, Budha Nalah, Sirhind Canal and other physical features like roads and railway lines have been also kept in mind.
- For better accessibility, the means of transportation and communication have been considered for better development of the area.
- The present and future growth trends and distribution of the population is another important factor considered for delineation of this area.
- Industrial location and trends of industrial growth.
- Economic base and commercial activities of the city/towns and their surrounding areas.
- Preservation of historical and cultural heritage of the areas.
- Urban expansion trends and management of periphery areas for ecological and environmental balance have also been kept in mind.
- Dispersal of economic activities to alliviate pressure on Ludhiana City and balanced development of the area is another important factor which governed the delineation of Local Planning Area Ludhiana.

CHAPTER-III

MASTER PLAN OBJECTIVES

Considering the role, impact, growth and contribution made by the city of Ludhiana to the economy, employment and productivity of the State of Punjab, the future growth and development strategies of Ludhiana metropolis needs to be viewed in the larger canvas of regional context. Therefore, the task of preparation of Master Plan, Ludhiana with the perspective year 2021 has been undertaken with the following objectives:-

- i) To make Ludhiana metropolis as the most vibrant economic centre to promote the balanced regional growth.
- ii) To promote state of art physically planned, environmentally sustainable and socially equitable development of the city.
- iii) To minimize haphazard, unplanned and sub-standard growth and development of the city and to achieve planned growth to create healthy environment. .
- iv) To make Ludhiana a city of multi-nucleated structure through planned dispersal of commercial and employment generating activities.
- v) To effectively manage the traffic and transportation within the city thorough the mechanism of rationalizing the landuse pattern defined in the Master Plan.
- vi) To ensure safety, mobility and efficiency of inter and intra-city traffic.
- vii) To improve regional road, rail and air connectivity of the city to make it a global, industrial and economic hub.
- viii) To minimize travel within the city by creating self contained and self sufficient communities,
- ix) To rationalize the distribution of physical and social infrastructure in order to ensure appropriate quality of life to all the residents of the city.
- x) To make land market more effective and efficient by making available sufficient amount of developed land for urban purposes at the most affordable cost..
- xi) To optimize the use of available land resource through well defined development norms and to minimize diversion of valuable agricultural land for non-agricultural purposes.
- xii) To minimize growth of slums by making informal sector integral part of city planning and development process.
- xiii) To create an efficient, comfortable and cost effective road/rail based rapid mass transportation system to minimize use of personal vehicles and to meet the existing and future travel needs of the city.
- xiv) To promote employment and economic development by leveraging on the existing strength of the city as major export centre, hub of small scale industries and financial capital of the State.
- xv) To put in place a healthy and sustainable working , leisure and living relationship for making Ludhiana as the most energy efficient city.
- xvi) To improve the capacity of the existing road net work through redesigned, improved road geometry and removal of encroachments.

- xvii) To promote better urban governance and resource generation for urban infrastructure and planned development.
- xviii) To provide adequate opportunities for crating affordable and cost effective shelter for all sections of society through the mechanism of cooperative housing.
- xix) Adequate parking spaces to be created in the city as an integral part of commercial, industrial and institutional planning and development process.
- xx) To make Ludhiana free from the curse of industrial by appropriately segregating the polluting industries and the residential areas.
- xxi) To decongest the central core of the city through the mechanism of relocation and decentralization of economic activities and to rationalize the distribution of population, community facilities and services across the city.
- xxii) The Master Plan Endeavors to promote an improve living environment and micro climate of the city by :
 - Helping restore, preserve and promote the lost glory of Budha Nallah.
 - Developing and making optimum utilization of existing water bodies and creating additional water bodies by utilizing the low-lying area along river Sutlej.
 - Creating city forest on the land available within the city. .
 - Reducing pollution caused by large movement of vehicles within the core areas.
- xxiii) To identify man-made and natural heritage and to make heritage conservation as integral part of the city planning and development process.
- xxiv) To promote and preserve culture of the city and its special characteristics and to encourage tourism appropriate to city culture and environment.

Chapter -IV

SOCIO-ECONOMIC AND DEMOGRAPHIC PROFILE

4.1 The slogan "Planning is for the people" expresses the shift from physical, design based concept of town planning to that of more socially informed and sensitive which leads to development of more people based planning. Cities possess complex structures containing numerous relationships and overlaps. Planning of cities exhibit a model of city covering socio-economic richness and viability of existing communities. Town planning judgments are not just technical, but rather judgments of value about the sort of urban environment, which affects the lives and interest of whole community. The public participation is meant or implied in terms of citizen power over planning decisions. Urban social problems can be suitably treated by a town planner with physical planning remedies. For example, the study of different ethnic groups, their social and cultural habits, religious requirements and distribution share of different class groups would help in deciding the provision of various kinds of infrastructure.

4.1.1 The economic factors are supreme as nothing can impede the human occupation of an area than its economic incompetence. Development of various economic sectors i.e. primary, secondary and tertiary, form the economic base of the city. Modernization/upgradation of existing industries and special provisions for services and repair centers are pivots. Emphasis should be laid on tertiary sector activities such as commerce, IT applications, development of integrated freight complexes/ wholesale markets and informal sector. The economic viability of an area lies in its carrying capacity and its ability to provide employment opportunities. This in turn would affect not only the size of population but also its spacing. A specific economic system tends to arrange people in a specific distributional pattern. The degree of diversification of economy and density of population are positively correlated. In industrial city like Ludhiana not only the size of settlement is large but also the density of population is conspicuously high when compared with other cities in this region. The technological advancements do add other dimensions to the controls of population distribution and density. Consequently, it may increase the supporting capacity of such areas and may lead to higher density of population.

4.1.2 Demographic profile helps us in determining the demographic character of the area in terms of the population, growth rate, population density, literacy rate, etc. that helps in determining the social as well as the economic character of the area. The study

of Ludhiana city is done decade wise which helps in bringing out the trends of the growth rate, literacy level, sex ratio etc. of the city. The identity of the town depends upon the character of population so, it is an important component for town planning. The phenomenon of population growth has special significance. It values as a vital index of a towns economic development, social awakening, historical and cultural background. The density of population tells us the population per unit area. With the help of the density of the area it is easy to know how dense the area is or is there any need to redensify it. If the density is high then it means that the area needs to be redensify because of congested situation. If density is low then there is capacity of accommodating more people. The study of socio-economic and demographic factors plays an important role in defining the urban limits of a town/city. The following studies related to socio-economic and demographic factors for Ludhiana city has been conducted to know the socio-economic and demographic character of Ludhiana city.

4.2 POPULATION GROWTH

4.2.1 Local Planning Area of Ludhiana

Ludhiana Local Planning Area has 5 major urban settlements i.e. Ludhiana, Sahnewal, Mullanpur, Doraha and Phillaur and 301 villages. LPA experienced virtual explosion in the growth rate during 1991, i.e. 14.73 lacs, with the growth rate of 57%.

Table No.1: Population growth rate of Local Planning Area

S. no.	Year	Population	Decadal growth rate(%age)
1.	1981	938904	-
2.	1991	1473743	57
3.	2001	1944908	32

Source: District Census, Ludhiana

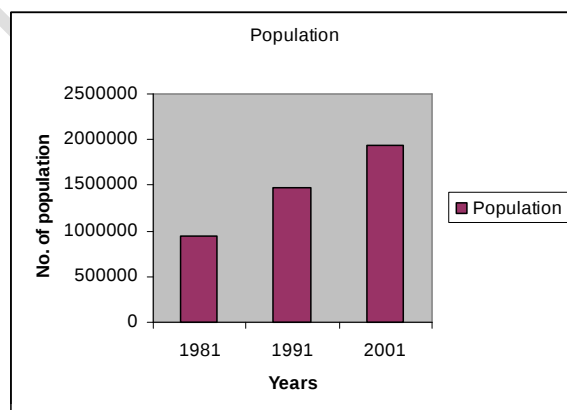


Figure no.1: Decadal Population

Ludhiana is the largest city of Punjab and one of the major settlements of its local planning area, which is playing multi functional role.

4.3 Ludhiana city :

4.3.1 Ludhiana is the first metropolitan centre of Punjab. Ludhiana's share has been highest in total population of Class I towns as well as total urban population of the state. The city has experienced unprecedented growth in its population . Although, Ludhiana was at the bottom among the 23 metropolitan cities in terms of its population, its growth rate (71.77%) had been recorded comparable with the other fast growing Metropolitan cities like Vishakhapatnam (74.27%) and Hyderabad (69.12%) during 1981-91.

4.3.2 According to 2001 census, Amritsar with a population of 1,011,327 became the second city of the state as million plus city. One out of every six urban dwellers (16.92%) in the state is residing in Ludhiana city and one out of every nine (11.83%) in Amritsar city. It signifies that 3 out of every 10 urban dwellers (28.75%) in the state are residing in only these two metropolitan centres in the state. It is significant to note that the industrial hub of Punjab – Ludhiana city, rightly called as the 'Manchester of India', is experiencing rapid growth. It has a density of 8755 persons per sq.km. as per the 2001 census, which is very close to that of Delhi U.T.(9294).

4.3.3 In 1901, Amritsar city with a population of 162,429 was the largest city of the state, whereas Ludhiana, had a population of 48,649, which was nearly one-third of Amritsar city. The gap in the population of these two cities remained almost static till 1941. Post-independence period showed narrowing down of this gap. Since then, Ludhiana has been experiencing virtual explosion in population growth. In 1981, Ludhiana overtook Amritsar and in 1991, population of Ludhiana and Amritsar Municipal Corporations was 1,042,740 and 708,835 respectively. In 2001, population of Amritsar municipal corporation came to be nearly three fourth of Ludhiana municipal corporation. During 1981-91, growth of population in Ludhiana (71.77%) was nearly 3½ times that of Amritsar (19.16%) and 2½ times that of Jalandhar (24.82%). In terms of population, Ludhiana emerged as the largest city in the state in 1981 and maintained its position in 1991 and 2001 as well. The comparative decadal population growth between Punjab state as a whole and Ludhiana metropolitan centre indicates that Ludhiana has grown much faster.

Table No-3**Growth trends - Urban Population in Punjab and Ludhiana**

YEARS	URBAN POPULATION OF PUNJAB (PERSONS)	POPULATION OF LUDHIANA MUNICIPAL CORPORATION (PERSONS)	POPULATION OF LUDHIANA MUNICIPAL CORPORATION AS PERCENTAGE OF TOTAL URBAN POPULATION OF PUNJAB	DECADAL GROWTH RATE OF URBAN POPULATION OF PUNJAB (%)	DECADAL GROWTH RATE OF POPULATION OF LUDHIANA CITY (%)
1901	934766	48649	5.20	--	--
1911	813224	44170	5.43	-13.00	-9.21
1921	869526	51880	5.97	6.92	17.46
1931	1168413	68586	5.87	34.37	32.20
1941	1657414	111639	6.74	41.85	62.77
1951	1989267	153795	7.73	20.02	37.76
1961	2567306	244032	9.51	29.06	58.67
1971	3216179	401176	12.47	25.27	64.39
1981	4647757	607052	13.06	44.51	51.32
1991	5993220	1042740	17.40	28.95	71.77
2001	8245566	1395053	16.92	37.58	33.79

SOURCE CENSES OF INDIA

4.3.4 During two decades of 1951-71, Ludhiana grew 2 ½ times in population (from 1.54 lakh to 4.01 lakh) but more than 5 times in physical size (from 1292 to 6421 Acres) with sharp decline in density from 119 to 62 persons per Acres. Most of city growth was haphazard and unplanned, resulting in highly uneconomical use of agricultural land for urban purpose. Outcome of such a development was visible in serious shortfall in urban infrastructure.

4.4 Population

4.4.1 Ludhiana city had a population of only 30,000 in the year 1947. However due to sudden influx of refugees from West Pakistan, around 75,000 more people descended in Ludhiana. The city population profile indicates that during the decades of 1961-1971 and 1971-1981, it registered a growth of 51% whereas in 1981-1991, the growth in population touched 71.77 %. However, during the period of 1991-2001, the growth rate came down to 34.8% because of normalized social and economic conditions.

4.4.2 The city growth is dynamic and continuous process due to growth of trade and commerce and consequent urbanization. The town today faces multifarious physio-socio-economic and infrastructural problems. These, in turn, lead haphazard growth,

overcrowding, congestion, insanitation, housing shortage, acute traffic problems, thereby further deteriorating the healthy living environment.

4.5 POPULATION DENSITY

Table No. 2: Population density

Year	Population Density	
	Persons/Sq.Km	Persons/hectare
1971	9620	96.2
1981	5519	55.2
1991	7743	77.4
2001	8774	87.7

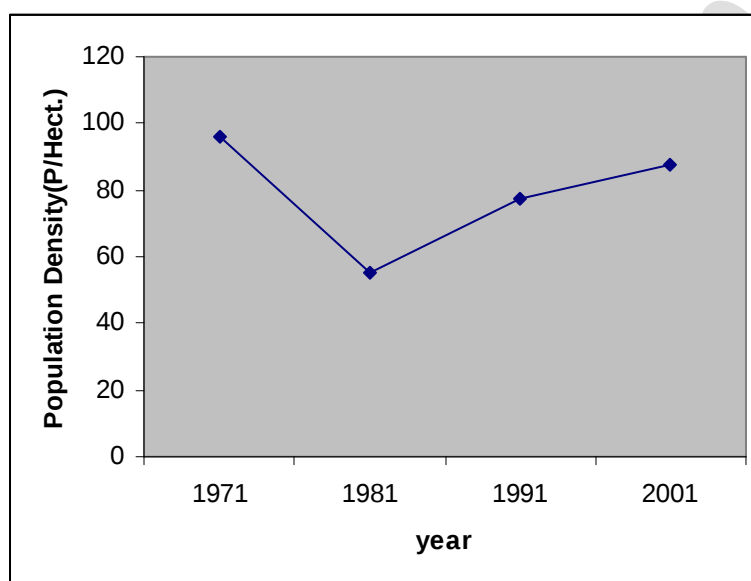


Figure no.2 Population density

4.5.1 Population density of M.C. Ludhiana is increasing i.e. 55.2 persons per hectare in 1981 and 87.7 persons per hectare in 2001. This is because of large scale migration is taking place in Ludhiana city due to the growth of industrial and trade and commerce sectors. Population density in 1981 in Ludhiana city was on lower side as there was tremendous increase in M.C.area i.e. 41.7 sq. km. in 1971 to 110 sq. km. in 1981. Local Planning Area is having 15.3 persons per hectare gross density in 2001.

4.6 AGE STRUCTURE

Table No.3
Age structure

Age group	Persons	%age	Males	Females
0-4	1,13735	8.1	62248	51487
5-19	4,40761	31.5	251167	189594
20-39	5,16250	37	297399	218851
40-59	2,33436	17	132597	100839
60 & above	85,691	6.1	44343	41348
Age not stated	8,594	0.3	5388	3206
Total	13,98467	100	793142	605325

Source: District Census, Ludhiana

4.6.1 The age structure or age distribution of a population is given by age groups. Maximum population is in 20-39 age group (37%) i.e. working age group or working force. So this helps to provide job opportunities to different age groups. At second category population is in 5-19 age group i.e. 31.5%. It helps to provide number of educational facilities at school and college, library, sports related facilities and recreational facilities. 6.1% of population lies in the age group of 60 and above, which helps in assessing various facilities like old age homes, no. of parks, libraries and community centers etc.

4.7 SEX RATIO

4.7.1 The numerical measurement of sex composition of population is often expressed in terms of sex ratio. According to 1981 census, there were 853 females for every 1000 males in Local Planning Area of Ludhiana. In 2001, the sex ratio was 763, which show the sex ratio is declining from 1991 to 2001. The sex ratio of Punjab state is 876 in 2001, which is on higher side as compared to Ludhiana city.

Table No.4
Sex ratio

Year	Total	Males	Females	Sex ratio
1981	938904	511656	427248	835
1991	1473743	810808	662935	817
2001	1944908	1085784	859124	791

Source: District Census, Ludhiana

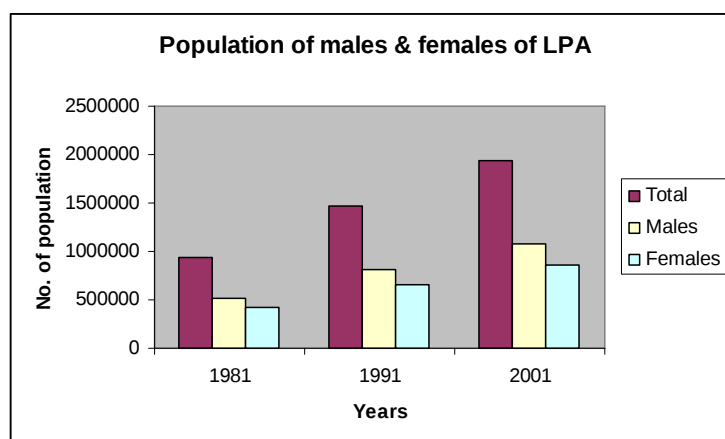


Figure no.3: Population of Males and Females

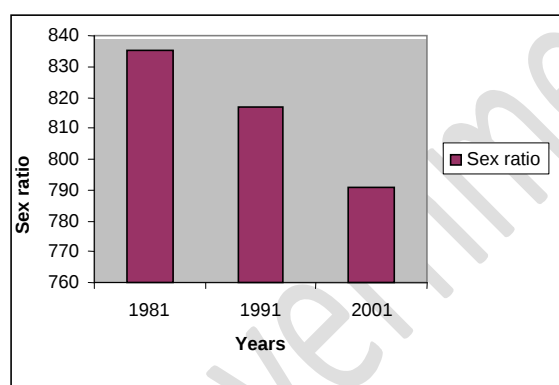


Figure no.4: Sex Ratio

4.7.2 The paucity of females has been attributed to the practice of female infanticide in the past. This legacy of the past is still having its impact felt on the sex ratio of the Local Planning Area of Ludhiana city. This also shows that more male labour has migrated to Ludhiana for job purpose. Thus, the sex ratio puts impact on the occupational structure of the city and its local planning area and it decides the requirement of various facilities and services.

4.8 RELIGIOUS COMPOSITION

Table No.5
Religious composition

Year	Religion							
	Hindu	Muslim	Christian	Sikh	Buddhist	Jain	Other religion & persuasions	Religion not stated
1991	647944	9133	5915	372174	600	6780	Nil	194
2001	904233	31372	8794	437600	1600	14444	186	238

Source: District Census, Ludhiana

4.8.1 Hindus constitute majority i.e.65% in Ludhiana, while 31% are Sikhs, 2% Muslims and rest of the population comprise of other religions. This religious

community composition decides the number, location and area under various religious places like Temples, Gurudwaras, Mosques, and Churches etc. The past trend shows Muslim population is increasing at a very higher rate, hence special planning consideration to be given to their religious sentiments as well as to other respective religious communities.

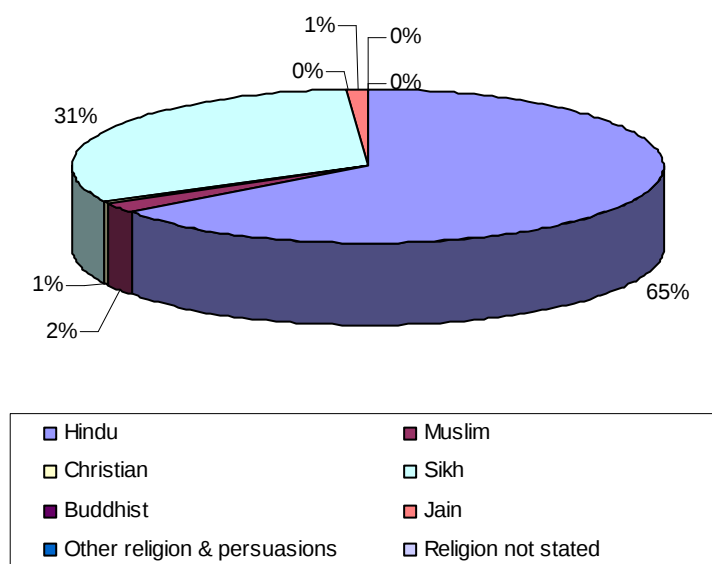


Figure no.5: Religious composition 2001

4.9 CASTE COMPOSITION

Table No.6

Schedule caste population & %age of SC Pop. to total Population

S. no.	Year	Schedule caste population	%age of SC Pop. to total Pop.
1.	981	185523	20
2.	991	275117	19
3.	001	377986	19

Source: District Census, Ludhiana

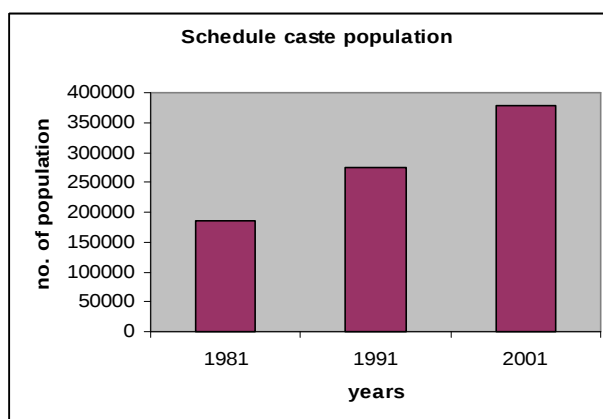


Figure no.6: Schedule caste population

4.9.1 The total SC population in the Local Planning Area of the Ludhiana city is 377986 persons which is 19% of the total population in 2001. Whereas the average of SC population in Punjab state 28.85 % of total population, which shows that the % age of SC population in Local Planning Area, is less than that of Punjab

4.10 LITERACY

Table No-7
Literacy Rate

S. no.	Year	Total	Total literates	Males		Females		Population excluding 0-6 years pop.	Literacy rate (%)
				Number	%age	Number	%age		
1.	1981	938904	527021	315495	60	211526	40	878368	60
2.	1991	1473743	864419	505924	59	358465	41	1252250	69
3.	2001	1944908	1328348	770842	58	557506	42	1704404	78

Source: District Census, Ludhiana

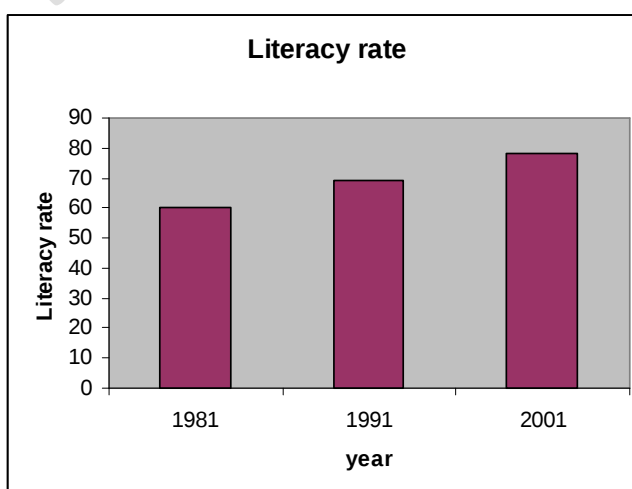


Figure no.7: Literacy Rate

4.10.1 Above table depicts that the literacy rate is increasing According to 2001 census the total literacy rate of Local Planning Area is 78%. Out of the total literate population 58% are male and 42% are females. In comparison with 1981 and 1991 the rate is growing. In 1991 it was 69% where as in 1981 it was just 60%.

4.10.2 Literacy rate is high in comparison with Punjab state i.e. 70 % in 2001; this means the people of this city are more aware about education.

4.10.3 The literacy rate is high in Local Planning Area of Ludhiana city because its resources are been utilized properly and it is developing at a fast pace and people of Ludhiana are aware. The increasing literacy rate is also a potential for the city because with this the civic sense is increasing along with the optimum use of resources. It affects physical and economic development in a positive way.

4.11 ECONOMIC BASE

4.11.1 The economy of the city and its Local Planning Area is based mainly on trade and commerce and on manufacturing industry including hosiery, cycle, sewing machine, textile and other industries. Real estate like multiplexes, malls and other commercial establishments, financial and banking services etc also contribute to the economic wellbeing of the people of the city.

4.12 Occupational Structure

Table No-8
Workers & Non Workers

Year	Total workers	Non workers	
		No	%age
1981	296618	659936	70.3
1991	474516	1001587	67.9
2001	718827	1226081	63

Table No- 9
Detail of Workers

Year	Total workers	Cultivators		Agricultural labourers		Household industries		Others	
		No	%age	No	%age	No	%age	No	%age
1981	296618	39435	13.3	29947	10	13210	4.6	214026	72
1991	474516	43340	9	50905	10.7	2585	0.5	377686	79.6
2001	718827	38943	5.4	33017	4.6	40052	5.6	606815	84.4

Source: District Census, Ludhiana

4.12.1 It helps to determine the economic status of the town. There are only 37% workers in Local Planning Area and 63% are non workers. This shows burden on the working population and economy.

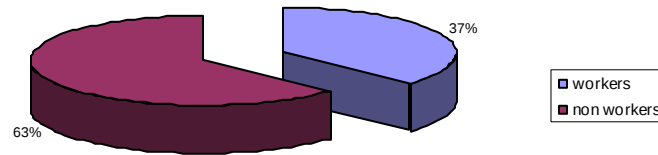


Figure no.8: Distribution of Workers and Non workers

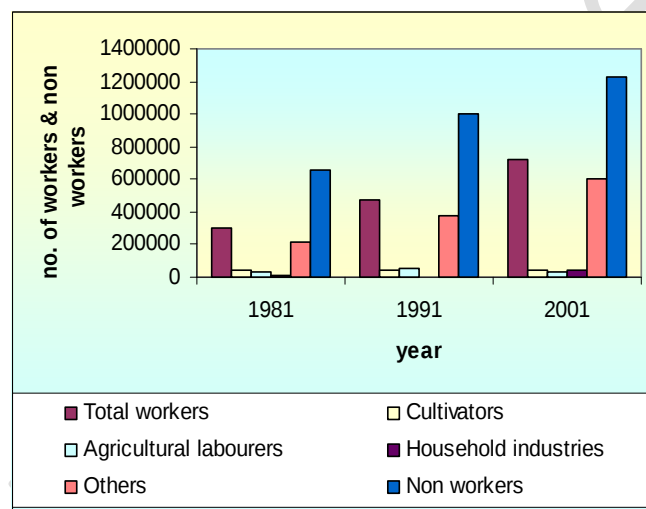


Figure 9: No. of workers & non workers

4.12.2 The percentage of cultivators and agricultural labourers is decreasing due to increasing urbanization and industrialization. Household industries are increasing as people, for more economic returns, are converting residential use to industrial use e.g., ground floor is used for industrial purpose and the rest for residential purpose.

4.12.3 Others workers i.e. workers involved in commercial, transport and communication sectors are growing in number as well as percentage i.e. 79.6% in 1991 and 84.4 % in 2001. This change is due to the development of malls, multiplexes, showrooms and due to promotion in communication & transport sectors. Percentage of non workers is decreasing i.e. 70.3% in 1981 to 63% in 2001. It has positive impact on the economy, 37% of population comes under working class, which requires various facilities and services.

4.13 Industrial base

Table No. 10

Small scale industrial units/Employment

Year	Units	%age growth	Investments (Rs. In Lacs)	Production (Rs. In lacs)
1997	34730	-	65616.06	349928.90
2000	5897	0.91	95663.78	556094.17
2003	36298	0.31	112113.42	822570.78
2006	36823	0.45	126518.17	1286324.12

Source: District Industrial Centre Ludhiana

4.13.1 During the past few years, industry has been feeling pressure of the liberalized economic regime. Resultantly, there has been declining trend in the small scale industrial growth during few last years i.e. number of Small Scale units is increasing with decreasing growth rate. In the year 1997, 34730 industrial units with the investment of Rs. 65616.06 lacs, were set up in Local Planning Area of Ludhiana. The production was merely Rs.349928.90 lacs, and in year 2000, 35897 units were established with the investment of Rs. 95663.78 lacs and Rs. 556094.17 lacs production. But there was decrease in the %age growth i.e. 0.91% in 2000. The average growth rate of the small scale industries is 3 % for the year 1997 till 2006. There has been increase in the growth rate of industrial units i.e. 0.51 % in 2004 from 0.31% in 2003 with the increase in investment and increased production.

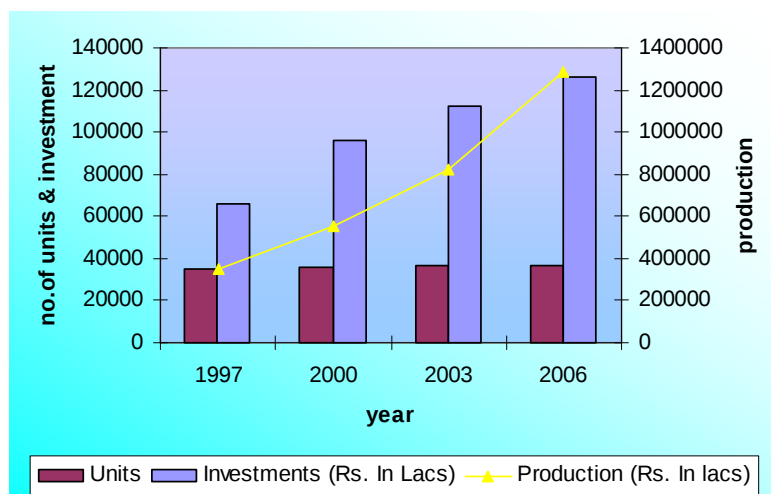
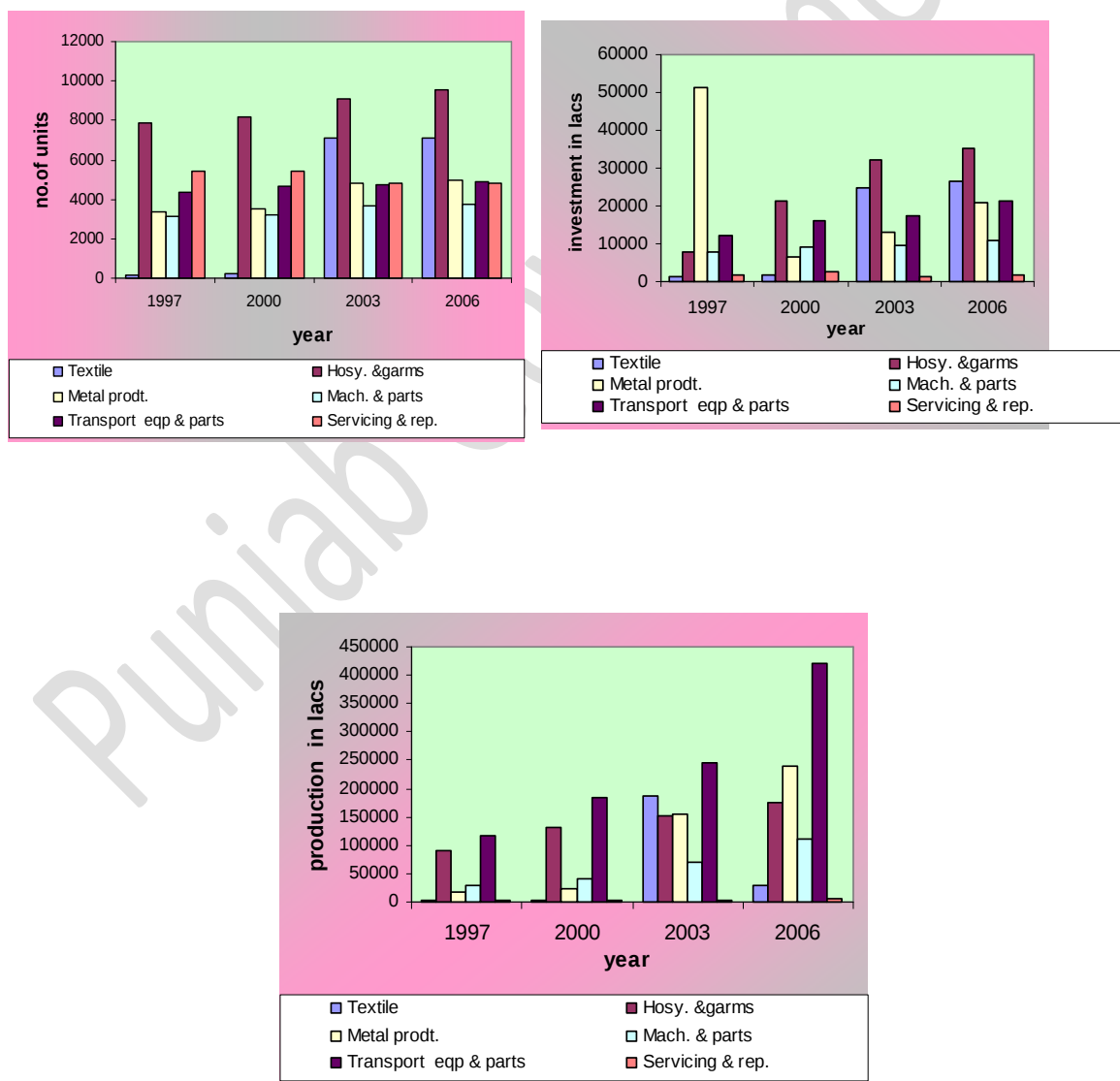


Figure no. 10: Small scale industrial units, investment and production



CHAPTER-V

PLANNING PROBLEMS-SITUATION ANALYSIS

5.1 City growth over a period of time is invariably marked in the outward direction under the impact of centrifugal forces. In the process, city structure emerges as a mosaic of different layers which are formed under the impact of time and inter-play of forces which lead the growth of the settlement. Study of these layers, individually and collectively, helps in understanding the peculiarities of growth and characteristics of development of the city. It also helps in identifying the major planning, developmental and management problems faced in the process of their efficient operation and functioning. It also helps in identifying the road blocks in the growth management process and evolving strategies for overcoming the problems and ushering in an era of quality living and sustainability. Accordingly, in order to identify and focus on the emerging problems of planning of Ludhiana metropolis, the city has been divided into three distinct zones:-

- Inner Zone
- Middle Zone
- Outer Zone(Peri-urban zone)

5.2 Inner Zone: This zone comprises of two distinct parts based on the period of development. The old development and the development which can be considered as an extension of the old development. The development is defined by the area falling under the major road (GT Road) and rail net-work(Mumbai-Amritsar) and the bypass to GT Road from Dholewala Chowk-Samrala Chowk-Jalandhar bypass. However, the area between GT Road and the Budha Nallah is the oldest development of the city. It is characterized by old structures, mixed landuses, narrow streets and unplanned development

5.3 Middle zone: The area which is distinguished by the new development and comprises of the area between the inner zone and the existing urban limits of Ludhiana Metropolis. The area is marked by development that largely took place in the post-independence period . Development in this area has been undertaken by parastatal . agencies including, Ludhiana Municipal Corporation, Ludhiana Improvement Trust , Punjab Urban Planning and Development Authority and the Punjab State Small Industrial & Export Corporation in the shape of TP Schemes, Development Schemes,

Urban Estates & Industrial Focal Points. However, the area also has large component of unplanned and haphazard development and is marked by numerous landuse and developmental problems.

5.4 Outer Zone (Peri-urban zone) :

This zone is defined by the area outside the limits of Ludhiana Metropolis which is in the process of rapid transformation from rural to urban. The area has development which is largely unplanned and haphazard. This area also includes number of residential colonies approved by the State Government under the Punjab Apartment and Property Regulation Act, 1995 besides commercial buildings including multiplexes etc. The area has divers kind of problem and for understanding the pattern of growth and development in the peri-urban area more objectively, it has been divided into three distinct pockets which include .-

- Area falling between south –east- north of the Municipal boundaries and include the area enclosed by Ludhiana-Malerkotla Road and G.T.Road leading to Jalandhar beyond Jalandhar bypass.
- Area falling between north and west of the Municipal boundary defined by Ludhiana-Jalandhar GT Road and Ludhiana-Ferozepur Road.
- Rest of the Peri-Urban Area falling between west and south of the Municipal Corporation boundary defined by the area between Ludhiana-Ferozepur Road and Ludhiana-Malerkotla Road.

5.5 The problems of the above zones have been defined individually in terms of:

- Landuse and development pattern ;
- Traffic and transportation,
- Open spaces,
- Infrastructure
- Environment..

5.6 Inner Zone (Old City):

5.6.1 This part of the city includes areas mainly located within old G.T Road, Link Road Jalandhar Bypass road. It comprises mainly Abadies which emerged around

Ghanta Ghar (clock tower), Chaura Bazaar, Gur Mandi, Ghass Mandi, Sarafa Bazaar, Karimpura Bazaar, Mochpura Bazaar, Lakkar Mandi, Kitab Bazaar, Khud Mohalla, Reri Mohalla, Field Ganj, Abadies around Subhani Building, Isa Nagri, Ganesh Nagar, New Madhopuri, Kuldip Nagar, Sunder Nagar, Jagat Nagar, New Atampuri , Sardar Nagar, Jagdish Nagar, Sarvanand Colony, Balmik Nagar, Guru Nanak Dev Nagar, Hargobind Nagar, Dharampura, Madhopuri, Shivaji Nagar, Guru Nanak Pura, Islam Ganj, Saidan Mohalla, Balmiki Ghatti, Bajwa Nagar, Khud Mohalla, Subhash Nagar, Basant Nagar, Gandhi Nagar, Mehmudpura, Tilak Nagar, Wait Ganj, Brahmpuri, Santokh Nagar, Shivpuri, Sudan Mohalla, Badri Mohalla, Wakilan Mohalla, Kajion Mohalla, Kalyan Nagar, Jodhewal Basti, Chaura Bazaar, Bagh Khazanchia, Neem Wala Chowk, Chouri Sarak, Gali Malaria, Sag Wali Gali, Dal Bazaar etc. This pocket has following problems:

5.6.2 Mixed Land Use

In this Zone industry and houses, commercial and houses rub shoulders causing noise, smoke, dust and traffic problems. This zone comprises of Chaura Bazaar, Gur Mandi, Ghass Mandi, Saraf Bazaar, Karimpura, Mochpura, Lakkar Mandi, Bajwa Nagar, Neem Wala Chowk, Chouri Sarak, Gali Malaria, Sag Wali Gali, Dal Bazaar, Madhopuri, New Madhopuri, Kuldip Nagar, Sunder Nagar, Jagat Nagar, New Atampuri, Sardar Nagar, Jagdish Nagar, Sarvanand Colony, Balmik Nagar, Guru Nanak Dev Nagar, New Madhopuri, Tilak Nagar, Sunder Nagar, Daresi Ground, Hazuri Road, Bandian Mohalla, Ghaati Jiva Ram, Kalyan Nagar, Brahmpuri, Chowk Saidan, Wait Ganj, Naughara Mohalla, Chauri Sarak, Sanglanwala Road, Iqbal Ganj, Nimwala Chowk, Gul Chaman Gali, Bagh Khazanchian, Dhalai Bazaar, Lalu Mal street, Mehmood pura, Islamia School Road, Harbanspura, Circular Road, Kashmir Nagar, Gaushalla Road, Janakpuri street no. 1-1/2, Mohalla Taj Gunj, Shiv Puri, New Shiv puri etc.

5.6.3 Dilapidated buildings: There is presence of large proportion of old and dilapidated buildings which suffer from the problems of fresh air, light and ventilation in pockets viz; Madhopuri, New Madhopuri, Tilak Nagar, Sunder Nagar, Dal Bazaar, Daresi Ground, Hazuri Road, Bandian Mohalla, Ghaati Jia Ram, Kalyan Nagar, Bajwa Nagar, Brahmpuri, Chowk Saidan, Wait Ganj, Gali Maleria, Sagwali Gali, Naughara Mohalla, Chauri Sarak, Sanglnwala Road, Iqbal Ganj, Nimwala Chowk, Gul Chaman

Gali, Bagh Khazanchi. Such buildings pose serious threat to human life and liberty besides causing numerous environmental/development problems.

5.6.4 Traffic & transportation : The zone is largely marked by existence of narrow streets with width as small as 3ft. The narrow road net-work is not able to cater to the heavy rush of vehicular traffic in the area . It poses major hindrance to the movement of fire tenders/ambulances in case of emergency The pockets suffering from major traffic bottlenecks include Lallu Mal street, Mehmoodpura, Brahmpuri, Wait Ganj, Madhopuri, Harbanspura, Mohalla Taj Ganj, Chowk Saidan, Talab Bazaar, Janak Puri, New Madhopuri, Chauri Sarak, Hazoori Road, Pindi Street, Gur Mandi, Lakkar Bazaar, Karimpura Chowk, Field Ganj, Amarpura Abadi, Philahi Bazaar, Sarafan Bazaar, Nimwala Chowk, Iqbal Ganj, Shahpur Bazaar, Quila Mohalla, Shivpuri, New Shivpuri etc..

- **Narrow streets:** Bazaars with narrow streets viz; Gur Mandi, Saraf Bazaar, Karimpura, Meena Bazaar Ghass Mandi, Sadar Bazaar, Trunk Bazaar, Mochpura, Field Ganj, Iqbal Ganj, Ghatti Jia Ram Pindi Street, Partap Bazaar, Chaura Bazaar, Gul Chaman Gali etc. without provision of parking remain choked during the day and cause a lot of inconvenience to the public. Due to narrow street pattern in some areas of the old city as mentioned above, it is very difficult to carry on rescue operations during any calamity. No fire tenders or ambulances could enter in these streets as a result, the loss to life/property is always more e.g. in case of fire tragedies of Gurh Mandi and Khud Mohalla.
- **Commercialization of narrow residential streets** with width as low as 6ft. pose serious threat to the effective movement of traffic and transportation..
- There is acute **shortage of parking** spaces in old city. There is only one organized parking lot built by Municipal Corporation Ludhiana in this part of the city which is inadequate considering the number of vehicles requiring parking.
- **Encroachment of road berms** by shopkeepers, rehri/chhabriwalas and parking of auto rickshaws, mini buses, taxis, and private cars on road side in the above said areas reduces the effective width of the available road net-work causing traffic bottlenecks & traffic jams.

- Absence of organized Stands and unauthorized roadside parking of Taxi, Auto Rickshaw and Mini Bus in this part of the city also results in reducing traffic carrying capacity of the existing roads and creating traffic congestions. .
- **Mixed Traffic:** The traffic on old city roads comprises commercial vehicles, hand carts, bullock carts. Rehries, auto rickshaws, cars, scooters etc. The conflict between slow and fast traffic invariably results in the blockade of roads causing frequent jams in the narrow bazaars of the old city.
- **The presence of specialized and wholesale markets** viz; Sarafan Bazaar, Gur Mandi, Kitab Bazaar, Pindi Street (Medicine Bazaar), Lakkar Bazaar, Kesar Ganj Mandi, Boota Shah Mandi, Gujjar Mal Road, Bhadur House Market, Old Jail Road, Partap Bazaar, Talab Bazaar, Shahpur Bazaar, Mochpura Bazaar, Saban Bazaar, Meena Bazaar, Electrical Goods and Hosiery Goods markets etc. in old city attract more customers causing heavy traffic movement in the area.
- The presence of railway and railway goods **booking office** in this area is another major traffic generator. The old G.T. Road from Jagraon Bridge to Budha Nallah remains choked during the day on account of incoming & outgoing traffic from the Railway net-work.
- Irrational **design of elevated road** constructed from Jagraon Bridge to Budha Nallah has not helped much in the movement of traffic from and into Railway Station and Chaura Bazar. It has only achieved a limited objective of catering to the through traffic. .
- The existence of large number of rehris , auto-rickshaws and encroachment of the road space by shopkeepers has further deteriorated the traffic conditions of the G.T. Road especially from Jagraon Bridge to Budha Nallah.
- **Traffic congestion:** The existing Petrol Pump of Hindustan Petroleum Corporation near Jagraon Bridge on old G.T.road is another traffic hazard. The petrol pump is being run within the road portion and does not have an adequate space to accommodate the vehicles visiting this petrol pump. This petrol pump is also a major traffic generator in this area because no other petrol pump is available near this point. It further increases the traffic congestion on this road.
- **Presence of fruit/vegetable market:** The presence of Salem Tabri fruit/vegetable market on Old G.T.road near Budha Nallah is a major traffic hurdle because the loose vegetables stack/trolleys are parked on road side. Fruit/vegetable buyers also park their rehris/vehicles on road. Even stray animals

wander/take rest in the middle of road which not only adds to the traffic chaos but also pose danger of accidents to the travelers.

5.6.5 Parks & open spaces

- **Acute shortage of organized open spaces/parks** force the children to play in streets Even most of the social functions are performed by erecting shamianas in streets/roads causing inconvenience to the public. There are only two major open spaces available in this part of the city namely Daresi Ground and Issa Nagri Ground.

5.6.6 Utilities & services

- **Load on infrastructure:** Although this part of the city is covered by sewerage and water supply system but due to high density of buildings and population in this area. There is acute shortage of potable water especially during summers besides sewerage system remains choked.
- **Sewage leakage:** The many areas of old city namely Saida Mohalla, Ghati Mohalla, Ghati Ravidassian, Brahmpuri, Wait Ganj, Ghati Jiwa Ram, Vakillan Mohalla, Purana Bazaar, Subhash Nagar, Khud Mohalla, Rehri Mohalla, Mehmoodpura etc; have 4' – 8' wide narrow streets. So the water supply and Sewer Lines run close to each other resulting leakage of sewer and mixing with water pipes. More over the streets are covered with R.C.C slabs. The leakage does not appear on the surface, which is difficult to detect by the concerned sanitary official. The underground leakage is the main cause of contamination of water and cracks in buildings in the area.
- **Choking of sewer:** Number of illegal T-Connections, holes in pipes causes blocking/choking of sewers in the streets. The functioning of Mono block/Tullu pump at odd hours soaks water from sewer lines, so the contaminated water is stored in water tanks. In many cases the individual sewers of public are not connected through manhole with street sewer rather they are directly connected to the sewer line further causing leakage & choking of the sewer lines.
- **Old Sewerage/Water supply network:** Sewerage/Water supply network in old city namely Chaura Bazaar, Gur Mandi, Saban Bazaar etc. was laid down approximately 40 years back. Due to improvement of streets from time to time,

this network has gone as deep as approx.12ft. below the existing street level as a result of which the repair/replacement of sewer and water supply lines has become very difficult. This network is very old and the cracks often appear in the pipes resulting contamination of water.

- **Inadequate capacity:** The most of the tube wells installed in the old city doesn't have storage capacity as a result of which during breakdown of tube wells and power failures, the water supply to the city is disrupted.
- There is **no storm water drainage system is available in the area causing numerous problems during the rainy season.**

5.6.7 Environment

- **Water pollution :** Due to the presence of contaminated water in Buddha Nallaha the under ground water specially of areas around Buddha Nallaha viz; Kirpal Nagar, Kashmir Nagar, New Madhopuri, New Atampuri, Balmiki Ghatti, Bajwa Nagar, Guru Nanak Nagar, Kalyan Nagar, Shivpuri, New Shivpuri, Jain Nagar, Gandhi Nagar etc. is severely contaminated which is not even fit for washing of clothes.
- 4 km. stretch of Buddha Nallah is passing through old area and its condition is extremely polluted due to dumping of industrial effluents and city's untreated sewerage water into it. Because of pollution of ground water upto the first aquifer the hand pump water is unfit for drinking. The water taken out from the pumps is yellowish in colour immediately after 5 min
- **Poor sanitary conditions:** The sanitary conditions in the wholesale fruit and vegetable markets are highly chaotic. The waste of vegetable/fruits and filth created by pony, bull cart owners remains scattered all over the area creating unhygienic conditions. This situation becomes worse during rainy season, since there is no provision to drain out rainy water from the market. The roads and auction platforms in shabby conditions. The market remains over crowded.
- There is **poor solid waste management due to absence of garbage collection points.** Garbage can be often seen lying scattered in streets. The garbage points where provided are not being maintained properly. The garbage is not being properly and regularly lifted. Transportation of solid waste from city to

dumping grounds is not proper. The containers carrying solid waste are often not fully covered as a result of which the garbage remains scattered on roads making them filthy and causes foul smell in the area.

- **Choking of sewer** also occurs in this part of city due to throwing of polythene bags & other waste products into manholes of the sewer system leading to emergence of large number of environmental problems.

5.7 MIDDLE ZONE

5.7.1 This zone extends from the Inner Zone to the existing boundaries of Municipal Corporation. The area primarily includes Industrial Area-A,B, areas around Dholewal Chowk, areas around Vishkarma Chowk, Miller Ganj, Muradpura, Nirankari Mohalla, Dashmesh Nagar, Chet Singh Nagar, Janta Nagar, New Janta Nagar, Shimlapuri, Kot Mangal Singh Nagar, Amar Nagar, Dabba Colony, Satguru Nagar, Guru Nanak Nagar, Preet Nagar, Basant Nagar, Ajit Nagar, Industrial areas around Village Giaspura, Vill. Dhandari Kalan, Dhandari Khurd, Sherpur Kalan, Sherpur Khurd, Moti Nagar, Transport Nagar, Urban Estates/Sectors on Chandigarh Road, Guru Arjan Nagar, Vishkarma Colony, Indrapuri, Jamalpur, Kulleiwal, areas on Tajpur Road, Rahon Road, Vill. Ghelewal, areas on Noorwala Road, Bahadurke Road, Kakowal Road, New Grain/Fruit market, Vill. Sekhewal, Jodhewal Basti, Vill.- Karabara, Salem Tabri, areas around Vill. Bhora, Kehar Singh Nagar, Laxmi Nagar, Chander Nagar, Haibowal Kalan, Haibowal Khurd, areas along Sidhwan Bet Road, Civil Lines, Kudanpuri, Prem Nagar, Chowni Mohalla, Bharat Nagar, Shastri Nagar, Ghumar Mandi, Krishna Nagar, Maya Nagar, Sarabha Nagar, Gurdev Nagar, Model Town, Model Town Extension, Atam Nagar, Urban Estate- Dugri, Punjab Mata Nagar, Shaheed Bhagat Singh Nagar, Karnail Singh Nagar, Bhai Randhir Singh Nagar, Rajguru Nagar, Truck Stand, Urban Estates of Sector 32, 32-A, 38, 39, 40, Industrial Focal Points Phase-I to VIII mainly I.T.I., A.T.I., Guru Nanak Engineering College, Military Camp, Industrial Area A,B and abadies Namely Murad Pura, Jujhar Nagar, Dashmesh Nagar, Chet Singh Nagar, Guru Nanak Colony, Partap Nagar, Kot Mangal Singh Nagar, Shimla Puri, Ishar Singh Nagar, Guru Gobind Singh Nagar, Daba, Maan Nagar, Guru Teg Bahadur Nagar, Azad Nagar, Village Gill, Bulara, Jaspal Bangar, Dhandari Kalan, Kanganwal Bhora, Chander Nagar, Azad Nagar, Raj Guru

Nagar, Anandpuri, Gagandeep Colony, New Gagandeep Colony, Janta Colony, Kailash Nagar, New Kailash Nagar, Vishnu Nagar, Basant Nagar, Varinder Nagar, Taraf Kara Bara, Baldev Nagar, Krishna Colony , Tilak Nagar, Taraf Gehlewal, Kakowal, Nurwala, Bahadurke and Bhattian Dogran, Friot/Vegetable market Chhauni Mohalla, Manna Singh Chowk Kailash Nagar, localities around Brindaban Road, Prem Nagar, Deep Nagar, Salem Tabri, Neta Ji Nagar, Kartar Nagar, Ashok Nagar, Gurnam Nagar, Guru Nanak Pura, Civil Lines, Pritam Nagar, Civil City, Chander Nagar, Laxmi Nagar, Rishi Nagar, Haibowal Kalan, New Kichlu Nagar, Partap Singh Wala, Barnhara, Talwara, Baloke, Chuaharpur, Jassian Model Gram, Gurdev Nagar, Sarabha Nagar, B.R.S.Nagar, Raj Guru Nagar, Aggar Nagar, Model Town, Dugri Urban Estate, Atam Nagar, Shaheed Bhagat Singh Nagar, Basant Avenue, Basant City, Janta Enclave, Jot Enclave, Nitish Vihar, Green City, Punjab Mata Nagar, New Panjab Mata Nagar, Karnail Singh Nagar, Passi Nagar, Moti Bhag Nagar, Friend Colony, Kiran Vihar, Plam vihar, Preet Nagar, Top Enclave, Liberty Enclave, Anand Enclave, Singla Enclave, Central Town, Professor Colony, Wadhera Colony, Guru Angand Dev Nagar, New Bhai Randhir Singh Nagar, Nand Singh Nagar, Himmat Nagar, Deep Nagar Kartar Nagar Mall Road, Railway Colony, Police Lines, Govt. College for Boys, Govt. College for Girls, Rose Garden, Rakh Bagh, Guru Nanak Stadium the only stadium of the city, Ghumar Mandi, Civil Lines, Krishna Nagar, Kitchlu Nagar, Udham Singh Nagar, Tagore Nagar, Maharaja Nagar, Dashmesh Nagar, Rishi Nagar, Maya Nagar, Gobind Nagar, Rajpura village, Patel Nagar, Avon Nagar, Mandeep Nagar, Parvela City, Professor Colony , Sukhdev Singh Nagar, Sukhmani Enclave, South City, Mahavir Enclave, Ashapuri, Ajit Vihar, Sunview Enclave, Shamsher Avenue, Sunil Park, Friends Colony, Country Home Civil Lines, Tagore Nagar, Udham Singh Nagar, Kitchlu Nagar Civil Lines, Tagore Nagar, Udham Singh Nagar, Kitchlu Nagar etc. The area has major problems in terms of :-

- 5.7.2 Mixed land use** is the major characteristic of this zone. The commercial & industrial activity co-exists with housing in certain pockets causing air, noise and smoke pollution. The commercial traffic in these areas causes inconvenience to the public. This problem is commonly found in areas like Chet Singh Nagar, Dashmesh Nagar. Janta Nagar, New Janta Nagar, Shimlapuri, Nirankari Mohalla , Partap Nagar, Sunder Nagar, Jodhewal

Basti, Sawtantar Nagar, Kot Mangal Singh, Shakti Nagar, New Shakti Nagar, Saini Colony, Moti Nagar, Bhagat Singh Colony, Beantpura, Kundanpuri, New Kundanpuri, Prem Nagar, Guru Arjan Dev Nagar on Chandigarh road, Indra Colony, & Bhagat Singh Colony Beantpura, Indra colony abutting Chandigarh road from Samrala chowk to Vardhman Mill and Jamalpur village, Mundian Kalan Beantpura, Arya Colony, Gajja Jain Colony, Deep Singh Nagar, Shakti Nagar Muradpura, Jujhar Nagar, Chet Singh Nagar, Nirankari Mohalla, Moongphalli Mandi, Vishavkarma Colony, Partap Nagar, Janta Nagar, New Janta Nagar, Kot Mangal Singh and Amar Nagar Chhauni Mohalla, Manna Singh Chowk, Civil Lines, Guru Nanak Pura, Haibowal Kalan Jassian road, Ashok Nagar, Gurnam Nagar, Husain Pura Indra Colony, Guru Arjan Dev Nagar, colonies on 33' road in Mundian Kalan, Sarpanch Colony, Atal Nagar etc. which causes dust, smoke, noise and traffic congestion in this area.

5.7.3 Unplanned colonies: Due to haphazard & unplanned growth of residential areas in this part of the city, there is acute shortage of wide roads, open spaces & spaces for the infrastructure like schools, dispensaries, janj ghar/clubs & religious places etc. The road circulation in unplanned colonies do not have proper linkages and connectivity.. There is also absence of well defined road hierarchy..

5.7.4 Slums: There are large number of slums existing in the area. Slums are largely located on the lands encroached by slum dwellers, adjoining Phase-I, Dhandari Kalan, railway line, Power Grid Station, Jamalpur and on Convent School road in Sector-38. The mushrooming of slums on a sector road of focal point meeting Chandigarh road and the main focal point road opposite Nahar Industries is another major problem in the area as they use illegal electricity/water connections. Due to absence of sewerage system with them, they litter along roads causing unhygienic conditions for the nearby industries and the commuters on the road. Slums are a major source of nuisance to the residents of the planned colonies. These slum dwellers are using illegal water supply/electricity connections. In absence of sewerage system, these slum dwellers litter in the nearby areas, thus causing unhygienic conditions for the residents. Moreover, these slum dwellers park their rehris, rickshaws along side roads and their children also play on roads which cause traffic hindrance.

Apart from creating unhygienic conditions in an area, these slums create environmental and developmental problems.

5.7.5 Mushrooming of commercial activity on road fronts without provision of adequate parking is another major traffic problem in certain pockets of this area like Mall Road, Rani Jhansi Road, Ghumar Mandi, College Road, Symmetry Road, Brindavan Road, Kochhar Market, Jawahar Nagar Camp, Link Road, Model Town Road, Pakhowal Road, Dugri Road, Gill Road, Tajpur Road, Rahon Road, Bahadurke Road, etc.

5.7.6 With a view to have a deeper insight into the existing planning, development and management issues in this zone, a detail study of the area has been undertaken. The study revolves around major road net-work available in the middle zone which include Chandigarh Road, G.T.Road, By-Pass Road, Focal Point, Jalandhar Road, Rahon Road, Road leading to Sidhwan Bet, Ferozepur Road, Pakhowal Road, Road from Bharat Nagar Chowk to Dhuri Railway Bridge, Dugri-Dhandran Road and Southern Bye-Pass.

5.7.6.1 Ludhiana-Chandigarh Road:- It is National Highway No.-95 as well as a scheduled road connecting Ludhiana to Chandigarh, the capital of Punjab. It is one of the major roads of city with heavy volume of traffic on it. The road is facing problems as detailed below:-

- **Mixed traffic:** The mixing of slow moving traffic like cycle rickshaws and auto rickshaws etc. with fast moving traffic also causes traffic hindrance and traffic congestion. The road width varies between 80'-100' which is not sufficient for providing service lanes, footpaths cycle tracks etc. as a result the slow moving traffic mixes with the fast moving traffic on this road causing traffic hindrance.
- **The encroachments** of road by shopkeepers for displaying their articles, reduces the width of carriageway of busy road. The encroachments lead to the congestion on road which sometime results in the traffic jams. This problem is acute near Samrala Chowk and Jamalpur Chowk.
- **No organized parking** or a bus stop, auto rickshaw stand (except one at sector-32) is provided anywhere on this road which is another reason for traffic congestion and jams particularly at Samrala Chowk, Jamalpur chowk, Mundian Kalan.

- **Absence of storm water drain** near Samrala chowk and Vardhman mill leads to a water accumulation on the road during rainy season which indirectly affects the traffic speed on Chandigarh road and also causes unhygienic conditions.
- **Mushrooming of Commercial/Industrial activity** on this road without adequate parking has resulted in traffic chaos on this road.
- **Traffic jam:** The parking of buses meant for Chandigarh, Samrala, Ropar etc. on Chandigarh Road at Samrala Chowk is a major traffic bottleneck which often causes traffic jam in Samrala Chowk.
- **Accident prone areas:** Due to a number of unplanned area like Beantpura, Indra Colony, Bank Colony, a number of streets open directly on this major road which not only becomes a traffic hindrance but sometimes also results into an accident.

5.7.6.2 Ludhiana-Ambala G.T. Road originating from Dholewal Chowk: This is a National Highway No.1 with the divided carriageway. Although, the road width is about 200 feet which is quite sufficient to handle the traffic load but still it has the following problems:-

- **The mixed traffic** particularly from Dholewal Chowk to Giaspura Phatak causes hindrance in the movement of fast moving vehicles especially near Dholewal Chowk, Sherpur Chowk etc. Absence of service lane on left hand side of this road from Sherpur Chowk to outskirts of the city leads to a mixing of slow moving vehicles with fast moving vehicles causing hindrance to the traffic movement.
- **Encroachments:** Although the service lane has been provided on both sides on the road from Dholewal Chowk to Dada Motors which is a very small section, yet it is not properly used because of the encroachments of road by the vehicles of the shopkeepers.
- **Traffic congestion:** The service lane on right hand side of the road is provided from Sherpur Chowk to Dhandari Railway Station, but due to its encroachment by the industrial/ commercial activity/car show rooms etc. and due to poor condition it remains underutilized and the local traffic uses the main carriage way of the road causing traffic congestion on the main road. Because of non

provision of bus queue shelters on this road, except the one provided near Sherpur Chowk which is not effectively used, the buses and auto rickshaws often stop, almost in the centre of road which not only causes traffic hindrance but they also cause accidents. The traffic rotary provided at Sherpur Chowk on this road is not able to handle the growing traffic properly as a result traffic jams like situations may often be seen on this spot. The other junction near the Giaspura Railway crossing, due to a busy Ludhiana-Ambala railway line, the level crossing at Giaspura generally remains closed for maximum time of the day and the vehicles are stopped on both sides of the level crossing for a long period, resulting in the accumulation of vehicular traffic on main Ludhiana-Ambala G.T Road causing hindrance to the traffic movement.

- **Absence of cycle tracks:** Although this road is about 220 feet wide and have sufficient space available on berms but no cycle/rickshaw tracks have been provided even within municipal corporation limits where a large no. of industrial labour travel on cycles on this road.
- **Absence of under pass/foot bridge** for pedestrians on this road, not only put the pedestrian at risk crossing this road but also causes traffic hindrance/congestion especially at Sherpur Chowk, Giaspura Chowk, Dhandari Railway Bridge.
- The green belt is mostly encroached by commercial and industrial establishment abutting on this road and few section of this green belt has become a dumping place for refuse, garbage and industrial waste etc.

5.7.6.3 Ludhiana-Ambala Bypass from Sherpur Chowk to Jalandhar Chowk:

It is a section of National Highway no. 1 which has been constructed to bypass the traffic coming from Delhi and going to Jalandhar side and vice versa. But with the growth of city it has become an internal road also, as a result this road is being used by the local and through traffic. Due to the mixing of local traffic and growth of urban activity on both sides of this road the following problems have been crop up on this road.

- **Mixed traffic:** Though the road is wide enough but no provision is made to segregate the slow moving traffic from the fast moving traffic. No service lane, foot path or cycle rickshaw tracks are provided.
- **Encroachment:** The road berms are encroached by car/truck mechanic shops especially near Samrala Chowk and Truck Stand causes traffic hindrance. Due to non availability of parking space in the truck stand because of dumping of building materials and other goods meant for loading and unloading encroach the parking space thus forcing the transporters to park their trucks along the road which causes traffic hindrance.
- The green belt is mostly encroached by commercial and industrial establishment abutting on this road and few section of this green belt has become a dumping place for refuse, garbage and industrial waste etc especially near Buddha Nalah .
- **Traffic jam:** The Oswal Hospital chowk, Tajpur Chowk, Basti Jodhewal Chowk, Nurwala Chowk, Shiv Puri Chowk, Tibba Road, Bhadhar Ka Road and Truck Stand junctions are the major obstructions to the traffic on this road. The traffic from Focal Point and Industrial Area joins at Oswal Hospital Chowk and the traffic gets choked particularly during morning and evening hours. Although a number of Bus Queue Shelters have been provided on this road, but the buses and auto rickshaws oftenly stop their vehicles in the centre of the road which not only causes traffic hindrance but they also cause an accidents. This problem is severe on road junctions namely Nurwala, Bajra, Samrala Chowk, Basti Jodhwal Chowk etc.
- **Absence of under pass/foot bridge** for pedestrians particularly at Samrala Chowk, Basti Jodhewal Chowk, Tajpur Road, Noorwala chowk on this bypass road, not only put the pedestrian at risk crossing this road but also causes traffic hindrance/congestion.

The colonies falling in the above area have following problems:-

- Due to **unplanned development**, roads/streets have narrow width and poor road circulation. The streets in Jeevan Nagar, Guru Bagh Colony etc. varies between 10'-25' width which results in the congestion.
- Due to **lack of organized parking** in an area, the vehicles are being parking along the road which reduces the carriageway hence resulting in the slowing/traffic movement.

- Due to **encroachment** of road by shopkeepers for displaying their articles further reduces the carriageway, resulting in chaos and traffic jams on roads.
- **Traffic jam:** The loading/unloading of goods on roads by the industrial units often results in traffic jams for e.g. Street No.5 & 6 in Gajja Jain Colony are more prone to traffic problem as it has large number of small industrial units and also the few streets of Industrial area -B. The colonies mentioned above are without any open space, organized parks/play grounds etc. except in Moti Nagar.

5.7.6.4 FOCAL POINT:

- **Traffic hindrance:** Focal Point is a planned area for industries. Though being an industrial area, it has commercial activities on few roads like from Aarti Street Industries to Dry Port and from main focal point road to Giaspura Railway level crossing road. The encroachments and the inadequate parking facilities in front of these commercial establishments causes traffic hindrance on roads. Traffic hindrance is also caused by the loading and unloading of goods on roads. This problem is generally seen in the internal roads of all the phases of focal point where the industries have not left any setbacks or the parking facilities for e.g. the Kay Jay Industry road beside Focal Point Power Sub Station.
- Focal point area lags school/college and sports facility. No recreational facility or a centre is provided for the labourers working in the industries.

5.7.6.5 Malerkotla Road: This road also known as Gill Road starts from Vishavkarma Chowk on G.T.Road and goes to Malerkotla Town of District Sangrur. The width of the road is 100'. This is a State Highway as well as Scheduled Road. The road from Gill Chowk to Sua Road has been constructed as 4-laning with central verge, but it has the following problems:-

- Road frontages upto Gill Village have commercial activity without parking facility namely Cycle Market, Loha Market, Sale & Purchase shops of two-wheelers, Taxi Stand and show rooms etc. Only Cycle Market and Loha Mandi

have its own organized parking. But this parking is encroached by the shopkeepers by displaying their mercantile. This made the road more congested because the vehicles of shop owners and of their customers are parked on road side. This problem is more severe near Gill Chowk and I.T.I. The width of the road is not enough to provide service lanes or parking lots on road side. As a result, the presence of slow moving traffic like cycle, rickshaw, bullock carts and auto rickshaw etc. on this road causes traffic congestion since they affect the speed of fast moving vehicles. The mushrooming growth of rehri and fruit/vegetable khokhas along this road especially near Sidhwan Canal is a major traffic hindrance. Due to unplanned areas like Muradpura, Dashmesh Nagar, Chet Singh Nagar, Vishavkarma Colony, New Janta Nagar, Shimla Puri etc. a number of streets join this road directly causing major threat to traffic on this road.

- **Encroachments:** The shopkeepers from both sides of this road display their articles on footpaths and road berms further reducing the traffic carrying capacity of the road which results in traffic congestion. There is no proper provision for the movement of pedestrian on this road, no zebra crossings are marked on road junctions.
- **Absence of traffic signals:** The existing junctions without traffic signals with roads namely Jaimal Singh Road, Janta Nagar, Pahwa Road, Sidhwan Canal causes jams on the road.
- There is **no organized Taxi Stand, three-wheeler stand or bus queue shelter** on this road. Hence the taxis are parked on road side near I.T.I. Similarly, the auto-rickshaws are parked here and there on the road without bothering about the traffic hindrance caused by them. Even buses running on this road made stops anywhere on the road again causes traffic hindrance.

5.7.6.6 JALANDHAR ROAD

Starting from Jalandhar Bypass upto the outskirts of the city, the width of the road is 220ft.. This is a NH-I as well as Scheduled Road with four lane divided carriageway. Although the road width is quite sufficient to handle the traffic load but still it has the following problems:-

- **Mixed traffic:** Although the road width is sufficient enough but no provision of service lane (especially on eastern side) has been made. Moreover, there is no provision to segregate the slow moving traffic from the fast moving traffic. Due to absence of service lane on eastern side areas like village Bhora, Akash Nagar etc. as number of streets join this road directly causing major threat to traffic on this road.
- **No provision for parking:** The construction of Marriage Palaces, Hotel etc. near Bhora village and near Amaltas Hotel without adequate parking on this road is another problem because the vehicles of their customers are oftenly parked on the road berms which sometimes become a hindrance in the traffic movement. Without any Bus Queue shelters at Jalandhar Bypass Chowk, the buses and auto rickshaws often stop their vehicles almost in the centre of the road, which causes traffic hindrance and traffic jams especially on Jalandhar Bypass Chowk.
- **Absence of road infrastructure:** A number of Mega Projects/Multiplex like Festival City, Omax Plaza, Aareon City, Gold Soak, RAP Media etc. are coming up on this road but no up gradation/augmentation of existing infrastructure has been done which is going to pose major traffic and other civic problems on this road.

5.7.6.7 RAHON ROAD

This road starts from Rahon Bypass Chowk (Basti Jodhewal Chowk) and goes to Rahon Town of Nawanshahar District. It is a major district road. The total width of the road varies 60'-75'. The fronts of this road have developed mainly commercial (except a few industries) especially upto village Meharban.

- **Mixed traffic:** There is no provision of central verge (except Jodhewal Basti Chowk to Kailash Nagar) on this road. As a result the presence of mix moving traffic like rickshaws, pony carts, two wheelers, three wheelers, mini buses etc. causes traffic congestion.
- **Absence of parking provision:** The commercial construction on this road without parking and other provisions related with commercial activity have

made this road more congested because the vehicles of shop owners and of their customers are parked on road side.

- Due to **narrow width of the road**, there is no space for providing service lanes or parking lots on this road. This whole area (except New Fruit/Vegetable market) is unplanned having irregular street pattern varying between 8-30 feet. The narrow width of street especially in area of Kailash Nagar, Basant Nagar etc. is a major hindrance for the movement of traffic. Moreover, the road circulation is not properly linked to each other and lacks road hierarchy system.
- The mushrooming growth of rehries, **vegetable/fruit shops** near Krishna Nagar also a major traffic hindrance. The shopkeepers from both sides of this road display their articles on road berms, further reducing the traffic carrying capacity of the road which results in traffic congestion.
- **Shortage of social infrastructure:** There is acute shortage of open spaces & spaces for infrastructure like schools, dispensaries, janj ghar/club & religious places etc. Most of the functions/activities are performed in streets which causes traffic problems. There is no stadium/play ground available in this pocket. **Lack of planned markets** in this part of the city has resulted haphazard growth of commercial activities on road points causes environmental and traffic problems.
- Besides this, four major roads namely Bahadurke, Nurwala, Kakowal, Bajra having width of about 20'-35' and pass through this area. All these roads carry mixed type of traffic viz. Mini Buses, Trucks, Cars, Three Wheelers, Rehras, Tempos, scooter/cycle etc. Both the sides of these roads namely Nurwala, Kakowal, Bajra have developed commercial activities. In the absence of any parking place on these roads, the vehicles are parked on road berms. Moreover, roads are also encroached by shopkeepers by displaying their products, which further reducing the already narrow width of these roads. While the industrial activities are located on sides of Bahadurke Road, the loading and unloading of goods on the road side causes traffic hindrance on this road.

5.7.6.8. Sidhwan Bet Road

This road starts from old court chowk and goes to Sidhwan Bet village of this district. It is a major district road. The width of this road is approximately 100ft. Although this road has been constructed as four lane with central verge but due to commercial construction on this road up to M.C. limit without parking and other provisions related with commercial activity have made this road congested because the vehicles of shop owners and of their customers are parked on road side especially near Tagore Nagar, Vivek Nagar. The road width is not adequate for providing service lanes or parking lots on road side. The presence of slow moving traffic like cycle, rickshaw, two wheelers, auto rickshaw etc. on this road causes traffic congestion, that affect the speed of fast moving vehicles.

- A number of streets from the unplanned areas namely civil lines, Haibowal kalan, Rishi Nagar etc. join this road directly here and these causing traffic hindrances.
- **Encroachment:** The shopkeepers from both sides of this road display their articles on footpaths and road berms, further reducing the traffic carrying capacity of the road which results in traffic congestion. The existing foot path is encroach by shopkeepers; pedestrians are forced to move on metal led portion of the road causes hindrance in the free movement of traffic their safety is left at the mercy of the vehicle drivers. The growth of rehries and fruit shops near Dayanand hospital is also a major traffic hindrance.
- **Absence of parking facilities:** Brindabad road is another important commercial road of this area. The road width is just about 24' to 41'. Both sides of the road have developed as commercial but there is no space available for the parking of vehicles as a result, the vehicles are parked on road causing traffic hindrances.
- This is a through road which runs between Shingar Cinema and Rajpura (Sidhwan Bet Road). Being a through road, it invites more traffic to pass through these roads which further make this road congested. Kailash Cinema, an old cinema in this area is located on the start of Brindaban road where a narrow T-junction is formed. The Cinema Hall is without adequate parking facility. So

at times when the cinema hall is full, it passes major traffic problem to this area. Besides this, the areas located in this area have the following planning problems:-

- The Industrial Units are located in residential areas namely in Ashok Nagar, Gurnam Nagar, Husain Pura causes smoke, foul smell/air pollution and traffic problems in these localities.
- **Narrow streets/road circulation:** The urban growth in this pocket is almost unplanned having irregular, zig zag street pattern. The street in Chhauni Mohalla, Guru Nanak Pura, Manna Singh Chowk and Civil Lines etc. varies between 4-25 feet wide approximately which is quite inadequate to take mixed traffic and as a result, the streets remain over busy during the day.
- The area is **devoid of any planned commercial** market, it has resulted in mushrooming growth of commercial activities on streets/roads in residential colonies causing environmental and traffic problems.
- **No parking provision:** All the commercial streets/bazaars in this area like Chhauni Mohalla, Bazars in Civil Lines, Haibowal market and Chander Nagar market etc. are devoid of any organized parking. So the haphazard parking of vehicles and narrow width of streets deteriorate traffic problems
- **The dairy complex** in this area on Sidhwan Bet road has become another environmental problem for this area because of dumping of cow –dung here and there and due to non-maintenance of the roads etc. the stray cattle wander on roads causing traffic problems. The living conditions in dairy complex are very unhygienic.

5.7.6.9 Ferozepur Road:- Starting from Jagraon railway bridge upto the outskirts of the city, the width of the road is 200'. This is a NH-95 as well as Scheduled Road with four lane divided carriage way upto M.C. limit. Although the road width is quite sufficient to handle the traffic load but still it has the following problems:-

- The **mix traffic** particularly from Jagraon bridge to Sat Paul Mittal road T-junction causes hindrances in the movement of fast moving vehicles, specially near Bharat Nagar Chowk, Mini Secretariat, Bhai Bala Chowk, Aarti Chowk etc. Although the road width is sufficient enough but no provision has been made to segregate the slow moving traffic from the fast moving traffic and no cycle/rickshaw tracks are provided.
- **Missing links & encroachments:** Although provision of service lane from Jagraon bridge to M.C. limit has made in the development plan of this road but so far it has been provided from Bharat Nagar Chowk to Aarti Chowk, that too has certain missing links as a result of which the service lanes along this road are either encroached by shopkeepers or are not being used by the public. The footpaths provided along this road are encroached by shopkeepers especially between Hotel Gulmohar to Bharat Nagar Chowk, Bhai Bala Chowk to Sat Paul Mittal road T-junction. The parking lots constructed by M.C. Ludhiana on the berms way of this road are either being used by private parking of Hotel/Marriage Palace owners or are encroached by motor/scooter repair shops along this road.
- The **mushrooming of multiplex, Shopping Mall, Hotel & Marriage Palace** culture without adequate parking on this road is another problem because the vehicles of their customers are oftenly parked on road side which sometimes becomes a major hindrance in the traffic movement. This problem is quite frequent near Hotel Park Plaza, near Aarti Chowk, Ansal Plaza, Vishal Mega Mart, Hot-Millian and Marriage Palaces (especially during marriage season) beyond M.C. limits. Although a number of Bus Queue Shelters have been provided on this road, but the buses & auto rickshaws often stop almost in the centre of the road which not only causes traffic hindrance but they also cause accidents. This problem is more severe from Jagraon Bridge to Aggar Nagar area.
- **Traffic congestion:** The Bharat Nagar Chowk as well as Bhai Bala Chowk situated on this road, though signaled, are very busy junctions especially during peak hours. It takes quite a long time to cross these junctions. There is **no**

underpass/foot bridge for pedestrians near Bharat Nagar Chowk, Mini Secretariat, Bhai Bala Chowk and Aarti Chowk as a result of which not only the pedestrians crossing this road are always at risk but it also causes traffic hindrance/congestion.

5.7.6.10 Pakhowal Road: -

This road starts from Bhai Bala Chowk on Ferozepur road and goes to Raikot Town of this district. It is a major district road. The total width of this road is 60' (except in Shahid Bhagat Singh Nagar where the road width is about 80ft.). Although this road from Bhai Bala Chowk to village Phullanwal Octroi Post has been constructed as four laning with central verge but due to commercial constructions on this road, specially from Bhai Bala Chowk to village Daad without parking and other provisions related with commercial activities have made this road congested because the vehicles of shop owners and of their customers are parked on road side. This problem is more frequent near Nehru Sidhant Kender, Imperial Hotel, Sarabha Nagar Puli Chowk, Punjab Mata Nagar Chowk and near Octroi Post. Due to the narrow width of the road, there is no space for providing service lanes or parking lots on road side.

- **Mixed traffic:** The presence of slow moving traffic like cycle, rickshaw, pony cart and auto rickshaw etc. on this road causes traffic congestion. They affect the speed of fast moving vehicles.
- **Parking problem:** The change of landuse from residential to commercial being allowed by M.C. Ludhiana on this road without the provision of parking is a major problem of this road.
- **The mushrooming of rehri and vegetable/fruits shops** on the road berms especially near Sidhwan Canal and Punjab Mata Nagar Chowk also become major traffic hindrance. Due to unplanned areas like Punjab Mata Nagar, Karnail Singh Nagar, Vikas Nagar, Kohinoor Nagar etc. a number of streets join this road directly causing major threat to traffic on this road.

- **Encroachment:** The shopkeepers from both sides of this road display their articles on road berms, further reducing the traffic carrying capacity of the road which results in traffic congestion.
- The upcoming City Centre (Commercial Centre) at Shaheed Bhagat Singh Nagar and Indoor Stadium of International Standard on Pakhowal Road will attract huge traffic in the near future which will increase the burden on this road. The mushrooming of marriage palaces namely South End Garden, Rivera Resorts, Nagpal Resorts, Blessing Resorts, Sterling Resorts, Cristal Resorts, Sanyog Banquet Hall without adequate parking facilities on this road is another major problem especially during marriage seasons.
- The railway crossing on Pakhowal Road in another dimension to the traffic problem of this road, because of increasing frequency of railway traffic on this line causes frequent closer of railway Phatak which further results in the accumulation of vehicles traffic on this already congested road. The traffic congestion on this road near Sidhwan Canal Bridge (Southern Bypass), Sarabha Nagar Pulli , Punjab Mata Nagar, Phullanwal Chowk etc. creates hindrance to traffic.

5.7.6.11 ROAD FROM BHARAT NAGAR CHOWK TO DHURI RAILWAY BRIDGE:-

5.7.6.11.1 This road also known as link road is another important road which not only connects the different parts of the city but also services as inter city road. The road is commercial in nature with the main bus stand located on it. The road width is 120' and posses the following problems;-

- **Centrally located bus stand:** The main bus stand of the city is located on this road as a results of which this road invites heavy rush of buses and other passengers traffic about 6000 buses daily enter/leave the bus stand because of which the road remains busy throughout the day causing traffic congestion especially near bus stand.
- **Mixed traffic:** The road width of 120' which is not sufficient for providing service lanes, foot paths, cycle tracks etc.as a result the slow moving traffic on this road especially cycle rickshaws, hand-carts (rehris) and auto rickshaws

causes hindrance in the free movement of heavy traffic especially buses on this road. Due to bus stand in this pocket a large no. of rehris selling fruit and other eatable items are present on road berms especially near bus stand which is another traffic nuisance for this area.

- **Loading unloading:** The growth of commercial activity on both sides of this road without having parking and loading /unloading facility has further to the traffic congestion by parking their vehicles on road and by displaying their mercantile on road berms. This road has developed commercial activity in the nature of very big furniture show rooms/ timber stores who sometimes stack their furniture/ timber items in the right of way of the road further reducing the traffic carrying capacity of the road. Due to the presence of main bus stand on this road, a large number of auto rickshaw/cycle rickshaws use this road and due to lack of proper auto rickshaw stand, these vehicles are parked on this road in large number. Besides this, a no.of buses are also stopped opposite Bus Stand on this road causing traffic jams like situation especially opposite Bus Stand. Also there is a no organized taxi stand in this part.
- The **lack of underpass/foot bridge** near Bus Stand and Bharat Nagar Chowk on this road , the pedestrians using the Bus Stand has to cross the busy traffic road without any traffic safety which is not only risky for the pedestrians but also causes traffic hindrance. **Encroachment:** The foot path provided along the road is encroached by the shopkeepers for displaying their articles.

5.7.6.12 DUGRI-DHANDRA ROAD

5.7.6.12.1 Starting from link road near Preet Palace goes to Dugri and Dhandra villages. The total width of this road varies between 60'-80' upto Sidhwan Canal. From Sidhwan Canal to inner ring road width is 100' and then reduces to 33' upto village Dhandra and onwards

- **Parking problem:** Although this road has been constructed as four lanes with central verge upto Sidhwan Canal but due to commercial activities on this road, without parking spaces road becomes congested because of the parking of

vehicles on road side. At the start of Dugri road, there are car accessory shops due which cars are parked on road for repair which cause traffic hindrance. The existence of rehri & vegetable/fruit shops on road berms especially near T-junction of Gulati Chowk, near Walia Chowk, near Urban Estate Phase-I, T-junction as another major traffic hindrance.

- The traffic congestion on this road near Sidhwan Canal Bridge (Southern Bypass) crossing creates hindrance to traffic. The marriage palaces like Marriot & Taksons without adequate parking facilities on this road are another major problem especially during marriage seasons. The shopkeepers from both sides of this road display their articles on road berms further reducing the traffic carrying capacity of the road which results in traffic congestion.
- The presence of slow moving traffic like cycle, rickshaw, and pony cart and auto rickshaw etc. on this road causes traffic congestion. They affect the speed of fast moving vehicles.
- The width of road reduce to 33' at Dhandra road from inner ring road with commercial activity along road, the carriage way width reduces which cause traffic hindrance. Due to narrow road width especially from inner ring road on wards and due to the mushrooming of unplanned colony at Dhandra road like Deep Singh Nagar, Sant Nagar, Sood Enclave, Kartar Enclave, Bhagat Singh Nagar, Manak Enclave, Gulmohar Enclave, Tara Nagar, Sat Jot Enclave, Sandhu Vihar, Ekta Colony etc. on this road is an other traffic problem.

5.7.6.13 Southern Bye-Pass:-

5.7.6.13.1 It connects Ludhiana Ferozepur road to Malerkotla road along the Sidhwan canal having a destination point at Doraha which is connected to National Highway no.1. Though this road was constructed to bye pass the traffic coming from Ferozepur/Faridkot to the Delhi and vice versa. But with the growth of city it has become an internal road and as a result this road is being used by the local and thru traffic due to which the following traffic problem crops up on this road:

- **Traffic congestion:** The junction at Dugri canal bridge, Sarabha Nagar bridge, Pakhowal bridge, Jawadi bridge, Railway phatak etc. are the traffic congestion points on this road. The mushrooming of commercial activities especially by the motor workshops along the road not only has encroached the land but also cause traffic hindrance. Due to varying nature of traffic on this road and the mixing of slow and fast moving vehicles causes traffic problem. Due to non provision of parking space along the road , the haphazard parking during sbazi Mandi held in a week and other festivals in BRS Nagar on Sarabha Nagar canal bridge disturbs the traffic on this road. In areas like Kochhar Market, Malhar Road, B.R.S.Nagar's main roads in which change of landuse from residential to commercial allowed by M.C.Ludhiana without provision of parking is a major problem on these roads. In these areas, the large schools for example Sacred Heart School, R.S. Model School, Guru Nanak Public School, DAV School etc. having no adequate parking space which causes traffic hindrance on road specially at opening and closing hours of the schools.
- **Missing Road link:** In this pocket, inner ring road 200' wide starting from Ferozepur Road to Urban Estate Phase-II & III is missing for about 700 meter length at village Phullanwal due to which inner ring road not only remains under utilized but is also a major traffic bottleneck.
- **Missing road hierarchy:** On the outskirts of this pocket, unplanned residential growth has not maintained road hierarchy. In unplanned areas, there is no neighborhood unit concept following, the basic facilities like school, parks, community centre, open spaces, recreational areas etc. are not available in these areas.
- **Encroachment:** The Jawahar Nagar Camp area opposite bus stand encroached by local resident, which cause hindrance to traffic and block the road circulation. The Ghumar Mandi main road is commercial and busy road of this pocket. The encroachment by shopkeepers for displaying their articles/ rehris reduces the carriageway of the road which in turns causes traffic jams.

- **Parking problem:** Feroze Gandhi Market, the only planned commercial centre so far in the city, is facing severe parking problems. Due to increase in the height of SCO's from the previous sanctioned height and presence of Car Bazar in this pocket, the parking lots in these pockets remain choked throughout the day. The concentration of major corporate offices, banks, stock exchange etc. in this pocket has further aggravated this problem. As a result the vehicles are parked on road sides further choking the roads in this pocket. The footpaths provided for the movement of pedestrians in this area have either been removed or reduced in width to accommodate the increased vehicular traffic, leaving the pedestrians at the mercy of the motor/car drivers. The Nehru Sidhant Kendra (a cultural/social centre) in Feroze Gandhi Market is also a major trouble shooter in this area because this Kendra does not have adequate provision for parking neither for its shops nor for its hall. At the time of any function at this Kender, large no. of vehicles are parked either on Pakhowal Road or on roads in Feroze Gandhi Market causing traffic hindrances/congestions.
- **The mushrooming of a slum** in Shaheed Bhagat Singh Nagar Block E and G and near Sidhwan canal on Pakhowal road is posing major environmental problems to the surrounding residential localities. They not only use illegal electricity/water connections, but due to absence of sewerage system with them, they litter along roads and railway tracks causing unhygienic conditions for the nearby residents and the commuters on the road.
- **Misuse of green belt:** The green belt along the railway line is being misused by the public for disposing off their solid waste due to non-presence of solid waste points in unplanned colonies.
- **The unmanned crossing** at Ludhiana-Ferozepur railway line in Shahid Bhagat Singh Nagar near Housefed flats is a major accidental point. A number of accidents have taken place on this crossing in the past. Besides this, the berms along this railway line are being used for the dumping of Solid Waste especially in Shahid Bhagat Singh Nagar which is a major environmental problem of this area.
- **Lack of infrastructure:** A no. of colonies like Patel Nagar, Avon Nagar, Mandeep Nagar, Professor Colony, Mahavir Colony, Ashapuri, Country Homes, Sunil Park, Green Enclave, Rose Garden, Kartar Nagar, Daljit Nagar, Sukhdev

Nagar, Shivalik Enclave, Ranjit Nagar, Malkit Avenue, Kohinoor Park, etc. are unplanned and haphazard which lack proper space for civic/social infrastructure like school, dispensaries, junj ghar, club and religious places etc. Mostly, the functions/ activities are performed in streets which cause traffic problems.

- **Lack of planned markets** has resulted in haphazard growth of commercial activities on road fronts like commercial activity on Brindaban Road, National Road, Ghumar Mandi, Old DMC Road causing environmental and traffic problems. In this pocket, roads namely Mall Road, Ashan Road, Old DMC Road, Ghumar Mandi Road, Sheep Shank Part-C, National Road, though has been declared commercial roads by M.C. Ludhiana as a result, a no. of commercial complexes/shopping malls have come up with nil or inadequate parking as a result, vehicles are parked along the road side causing traffic jams.
- **Mushrooming of shopping malls** at Mall Road namely Ebony, Capital Plaza, First Mall, Red Cross Bhawan, Surya Tower, Elite Tower etc. without adequate parking has created a traffic chaos on the Mall Road.
- The Dayanand Medical College and Hospital, the famous hospital of state and does not have a good direct approach. All the roads to the hospital have encroachments like on Sidhwan Bet Road and also have a narrow width. The congestion on these approaching roads to hospital causes problems not only to the patients but also to the people living around the hospital.
- **The existence of temple** on Stadium Road near Jagraon Bridge is a major traffic hindrance due to the haphazard parking of vehicles and encroachments by the flower sellers/beggars on the road in front of the temple. The National Level Stadium the only organized sports facilities in the city. But during tournaments/games, there occurs traffic hindrances on the road due to inadequate parking facilities in the stadium.
- The traffic rotary provided at Fountian chowk on this road is not able to handle the growing traffic properly as a result traffic jams like situations may oftenly be seen especially during peak hours.
- No of constructions in non construction zone of master plan around 900 meters periphery of 17 FAD Baddowal have come up in violation which not only pose

security risk to the FAD but the residents themselves are at risk from ammunition depot.

- **The concentration of major educational institutions** like Khalsa College for Women, Khalsa College for Boys, Govt.College for Boys, and Govt.College for Girls in busy areas of which also create traffic related problems by acting as major traffic generators.
- **The unplanned growth of residential colonies** has narrow and zig zag street pattern. These colonies lack proper connectivity with the surrounding areas. The road/street hierarchy is also missing in these colonies.
- **Irregular road circulation:** Except sector 32,32-A & 33 all other colonies are unplanned and haphazard due to which the road hierarchy is missing and roads/streets are narrow, irregular & street pattern is zig zag. There is no proper connectivity in unplanned colonies with each other. The average width of streets in the above areas varies from 18'-25' which creates problem for traffic circulation and make the life uncomfortable for the people of these areas.
- Due to **lack of planned commercial markets**, it has led to the development of commercial activities on streets/roads fronts in residential colonies causing not only traffic problems but also making the living environment uncomfortable. The only organized market is in sector 32-A urban Estate in this pocket. Due to lack of organized parking in this area, the vehicles are parked along the road/street side which hinders the traffic movement. The encroachment of roads by shopkeepers by displaying their mercantile outside the shops, parking of rehris on road berms etc. often results in traffic jams in these areas.
- **Unhygienic living conditions:** The road condition particularly in colonies around 33' road Mundian Kalan, like Geeta Colony etc. is very poor. Mostly, the streets are brick paved. And due to absence of storm water drainage system, it worsens road/street condition particularly during rainy season because of accumulation of rain water on roads/streets, which indirectly hits the traffic movement and creates unhygienic living conditions.
- **Narrow Road Circulation:** The street/road circulation in unplanned colonies which located in between of Ludhiana –Malerkotla road and Ambala road varies between 8-30 feet approximately which is not able to take heavy rush of vehicular traffic. Daba Road which connects the traffic from Malerkotla Road

to G.T.Road, having width of 15-30 feet. Mostly commercial (a few industrial) activities are located on this road. The loading and unloading of goods on the road side and unregulated movement of three wheelers causes smoke, dust and congestion on this road.

- **Absence of fencing along Railway line:** Ludhiana-Dhuri Railway Line passes through the residential area. The railway track is without any boundary wall/fencing. Most of the houses/shops open towards the railway line. So inhabitants cross the railway line to move from one side to another. Moreover, children also play in this area, which is not only safe for them and may result in an accident.
- **The growth of Small Scale Industrial Units/Commercial activity** in narrow streets of width upto 10 feet is another major traffic problem viz. in Muradpura, Jujhar Nagar and Sant Nagar etc.
- The **non provision of parking** space by USPC Jain Public School in their premises leads to encroachment of the road berms and footpaths by the students/staff/school vehicles. Inadequate provision of parking of vehicles which comes to pick & drop the students leads to chaos on roads in morning and afternoon. Due to lack of parking provision in Suraj Nagar, Shimla Puri, Gobind Nagar, Daba Colony, Amar Kot, Krishna Nagar, Satguru Nagar and Kot Mangal Singh the vehicles are parked on road berms resulting in road encroachment which causes traffic hindrances. Bazaars with narrow streets in the abadies of Kot Mangal Singh, Daba, Suraj Nagar, Shimla Puri, Gobind Nagar etc. without provision of parking remain choked during the day and cause a lot of in convenience to the public. All these streets/bazaars are devoid of parking spaces
- **Encroachments:** The above mentioned commercial roads not only lack parking provisions but are also encroached by the shopkeepers by displaying their products. Rehris, rickshaws, autos etc. are also out on road berms further reducing the traffic carrying capacity of the roads. In this part of the city has also mixed traffic on roads. The mixing of slow & fast moving traffic in areas mentioned above cause's traffic hindrances. Although certain roads passing through this part of city like Ferozepur Road, G.T. Road, Malerkotla Road, Link Road, Chandigarh Road etc. are wide enough (100-300 feet approx.). But there is no provision for the segregation of slow & fast moving vehicles on these

roads. The mixing of slow moving traffic with fast moving vehicles reduces the traffic carrying capacity of these roads.

- **Lack of planned markets** in this part of the city has resulted in mushroom growth of commercial activity on road fronts in a haphazard manner which has created environmental & traffic problems in the area.
- **Unplanned commercial areas:** The market like Feroze Gandhi Market, Sarabha Nagar market, Model Town, Model Town Extension, B.R.S Nagar, Rajguru Nagar, Shaheed Bhagat Singh Nagar and commercial markets of Urban Estates on Chandigarh road and Dugri road are the only planned markets available in this part of city which have been found quite insufficient to cater to the commercial needs of the public as a result unplanned commercial areas on road fronts have come up causing traffic and other related problems. The presence of commercial malls/centers, Hotels & Marriage palaces without provision of adequate parking has further deteriorated the road circulation available in this area because the vehicles are parked on road berms causing traffic hindrances.
- **Encroachment by shopkeepers:** The footpaths provided along main roads like Ferozepur Road, G.T. Road, Malerkotla Road, Pakhowal Road, Old Rajpura Road, Mall road, Link Road, and roads in markets like Ghumar Mandi, Kochhar market, Feroze Gandhi Market & many other areas have been encroached by the shopkeepers by displaying their articles on it as a result, the pedestrians have no space to walk along busy roads which not only causes accidents but traffic on the roads also gets interrupted.
- The parking spaces provided along major roads like Ferozepur road, G.T.road, Jalandhar Bypass Road, Malerkotla Road etc. have been encroached on many places by traders. This part of the city also lacks organized stands for Mini trucks/Tempos, Auto rickshaws, Taxis and rickshaws etc. due to which these vehicles are parked on road sides which cause traffic hindrance. The existence of Main Bus Stand in this part of the city attracts a lot of traffic as a result of which the major roads of the city like G.T.road, Ferozepur Road, Malerkotla Road, Chandigarh road etc. remain over busy due to the movement of Bus traffic. The study shows that about 6000 buses daily to & fro from this bus stand.
- **Absence of provision for pedestrians:** There are number of points like New Courts, Bharat Nagar chowk, Bus Stand, PAU, Aggar Nagar, Gill Chowk, Samrala

Chowk, Basti Jodhewal chowk, Jalandhar Bypass chowk, Fountain chowk, Govt.College for Women etc. where no. of pedestrians cross the roads but there is no provision for underpasses or over bridges which not only causes traffic hindrance but causes accidents also.

- **High traffic volume:** The volume of traffic on roads in this part of the city is such that the signaled functions at Bharat Nagar Chowk, Gill Chowk, Samrala Chowk, and functions at Basti Jodhewal Chowk, Fountain Chowk, remains choked particularly during peak hours on the whole day.
- **Traffic hindrance at railway crossing:** Railway level crossing at Shastri Nagar, Pakhowal Road, Sidhwan Canal near Lodhi Club on Ferozepur Railway line level crossing on Sidhwan Canal on Dhuri Railway line, and level crossing at Giaspura on Ludhiana-Ambala railway line are another traffic hindrances because to frequency of trains, these crossings oftenly closed resulting in traffic jams. There is only one Truck Stand situated in this part of the city. With the growing no. of trucks/Mini trucks, this truck stand has become inadequate to handle the load of trucks and booking agencies as a result of which a no. of trucks are parked on road sides. The missing link of inner ring road between Pakhowal road and Dugri Urban Estate road is another traffic problem because of which the existing 200 feet wide inner ring road from Ferozepur Road to Dhandra Road remains under utilized.
- **Parks & open spaces-**Ludhiana being the only Metropolitan city of the State has only one “Sports Stadium located in this part of the city and there is no Mela Ground etc. in this part of the city. There is acute shortage of organized open spaces/parks in area along Malerkotla road. Most of the social functions are performed by erecting shamianas in streets/roads causing inconvenience to the public. Children are forced to play in streets which not only cause traffic problems but also cause accidents sometimes.
- **Utilities -Unserved areas:** The areas which are located adjoining to the M.C. boundary are unserved in respect of sewerage network. These localities are Aman vihar, Friends colony, Gurnam nagar, New gurnam nagar, Manoj colony Navneet nagar, Croal bagh, New croalbagh, Varyam nagar, Ashok nagar, Dera udhoo ram, Gurbux colony, Amoorah bagh colony, Dying complex, Veer nagar, New veer nagar, Sharmal colony, Sanias nagar, Deep vihar, Preet vihar, Bajring vihar, Vihar colony, Bawa colony, Royal estate, Jaswal colony, Nanda colony,

Greeneel estate, New sarwan park, Gautam nagar, Amarjeet colony, Charan vihar, Grewal colony, Raju colony, Gopal colony, G.K. colony, Charan nagar, Namdev colony, New namdev colony, Star city, New star city, Mahatma colony, Sharkar colony, National colony, Puneet colony, Prince colony, Mahajan vihar colony, New sukhdev nagar, Khurana colony, Bachittar nagar, Raja garden, Sawan vihar, Beant colony, Jwala nagar, Guru nanak nagar, Mohalla new guru nanak nagar, Sohan singh nagar, Ram nagar, Harjap nagar, Satguru nagar, Kinal colony, New ram nagar, Preet nagar, Sikander colony, Adarsh colony, Moga colony etc. The outskirts areas lack water supply and sewerage facilities especially on Dhandra Road, along Pakhowal road, and area near Phullanwal village, village Tharika and village Daad.

- **Absence of storm water drain** near Samrala chowk and Vardhman mill leads to a water accumulation on the road during rainy season which indirectly affects the traffic speed on Chandigarh road and also causes unhygienic conditions.
- **Choking of sewage:** The colonies have water supply & sewerage system, but the sewer is oftenly choked in areas like Beantpura, Kishlash Nagar and few streets of Gajja Jain Colony where the presence of dairies is a major factor responsible for choking of sewer because the cowdung of these dairies is being washed away into the sewers.
- **The presence of dairies** in unplanned areas viz. Daba, Lohara, Shaheed Sukhdev Nagar within municipal limits and the villages namely Gill, Bulara, Jaspal Bangar, Kanganwal out of municipal limit causing foul smell, unhealthy environment & choaking of sewerage available in Daba, Lohara and Shaheed Bhagat Singh Nagar. Though the sewer line exists in an area, but choking of sewer is a routine matter in all the phases of focal point. The most affected phases from this problem are Phase-VI & VII, where the accumulation of sewer water on roads has deteriorated the roads.
- **Load on utility network:** The presence of labour quarters particularly in Kailash Nagar, Jeevan Nagar, Gajja Jain Colony not only creates unhygienic conditions but also puts burden on the existing Water Supply & Sewerage system as the large no. of persons live in a small plot as result, the sewer oftenly remains choked.
- **Absence of solid waste dumping place,** the refuse, rubbish and garbage is generally thrown on roads or in some vacant plots by the residents which not

only causes unhygienic conditions but also sometimes results in choking of sewers. There is shortage of garbage collection points in the area namely Daba, Daba Colony, Guru Gobind Singh Nagar etc. Garbage is thrown in open plots, road corners etc. The garbage points where provided are not maintained properly. Even the garbage is not lifted timely it causes ugly looks as well as unhealthy environment.

- Due to **poor storm water system**, the water accumulates on the road particularly during rainy season and with the passage of heavy trucks on these roads, the road condition is deteriorated ,which is not repaired periodically. Also, the non availability of parking space in the truck stand because of dumping of building materials and other goods meant for loading and unloading and also due to the increased volume of trucks day by day forcing the transporters to park their trucks along the road which causes traffic hindrance. Due to accumulation of sewer water on roads, the heavy moving vehicles causes pot holes on these roads, which are used by the industries to dump their waste particularly the forging industry.
- **Sewage leakage:** Many areas namely Muradpura, Jujhar Nagar, Dashmesh Nagar, Partap Nagar, Kot Mangal Singh etc. have 8-16 feet wide narrow streets. The water supply and sewerage lines run close to each other resulting leakage of sewer and mixing with water pipes. The underground leakage is the main cause of contamination of water in the colonies. Number of illegal T-connections, holes in pipes causes blocking/choking of sewer in the streets. The functioning of Monoblock/Tullu pump at odd hours soaks water from sewer lines, so the contaminated water is stored in tanks. In many cases, the individual sewers of public are not connected through manhole with street sewer rather they are directly connected to the sewer line further causing leakage & choking of the sewer lines.
- **Limited tubewells:** Although, this part of the city is served by water supply but due to limited tubewells in the areas namely Kakowal, Bajra, Nurwala, Taraf Gehlewal, Ekta Colony, there is shortage of potable water especially in summer season All the area of this part of the city is covered under water supply. But due to heavy pressure of population and limited number of tubewells, there is shortage of potable water especially in the areas of Hussainpura, Jassian and Laxmi Nagar.

- **Choking of sewer** is the main problem in number of localities especially Anandpuri, Gagandeep Colony and Kailash Nagar and streets/commercial bazaars of Haibowal and Chander nagar of this area. This is due to throwing of polythene bags, rubbish and other waste products into manholes.
- In the **absence of storm water** drainage system, the existing sewerage system fails during heavy rains, leading to water logging in most streets/roads of the area. There is no storm water drainage system. The Budha Nalah is the main source to dispose the storm water of residential areas located along the Nallah. Water clogs in rest of the areas. The flooding of Budha Nallah during rainy season is another sanitation problem of these areas.
- **Solid waste management:** The garbage collection point provided in this part of the city are not well maintained and here also the transportation of solid waste is due through open trucks which is unhygienic and spreads foul smell on roads.
- **Environment -Water pollution:** The Budha Nalah which passes through the residential areas namely Salem Tabri, Hargobind Nagar, Chander Nagar, Deep Nagar, Prem Nagar, Manna Singh Chowk, Haibowal, Civil Line, and Guru Nanak Pura etc. is another cause of contamination of water, unhygienic, foul smell and dampness. The underground water of the colonies like Geeta Nagar, Jeevan Singh Nagar, Preet Nagar and Dairy Complex etc. is so polluted due to pollution of water in Budha Nallah that it is hardly fit for human consumption.
- **Unhygienic conditions:** The garbage collection locations are not provided in a few colonies namely Laxmi Nagar, Preet Vihar, Gurnam Nagar etc. The residents dump their garbage in open plots/roads. It creates unhygienic environment.
- **Poor solid waste management:** The non-maintenance of green belt and parks e.g. the parks on a focal point sector road going towards Veer Palace on Chandigarh road and the green belt on a road from Jiwan Nagar chowk to Phase-VIII & VI has become a dumping place for a solid waste i.e. refuse, garbage etc. and the industrial waste. This not only creating an unhygienic condition but from environmental point of view, it is causing a serious problem as the untreated waste is dumped which may harm the surroundings.
- Opposite Central Jail on Tajpur Road, on the back side of the Sewage Treatment Plant, is an open solid waste dump of the Municipal Corporation. This is

another major source of environmental pollution in this area. The solid waste is dumped in the open ground without adopting environmental pollution safety measures as a result the environmental condition of the area is chaotic and people of the adjoining localities not only face foul smell but also face the stray animals like dogs, cows etc. The presence of Tajpur Dairy Complex is a major source of environmental pollution. There are large no. of dairies in this complex. The cow dung remains scattered here and there, the heaps of cow dung and solid waste are commonly seen in this pocket. The storm water drain/sewers are full of cow dung/cow urine. The cattle fodder is seen scattered in streets. Almost nil cleanliness of the Dairy Complex not only spreads foul smells but also invites mosquitoes/flies causing diseases.

- **The lack of rain water harvesting knowledge** among public leads to the wastage of water resources and hence resulting in the depletion of ground water at a faster rate as people are extracting water from ground by installing bore wells in their respective houses where water supply by the Municipal Corporation is absent without recharging the ground water .
- **Air pollution:** The residential areas namely Amar Nagar, Maan Nagar, Sadhu Singh Nagar, Kartar Nagar, Giaspura, New Giaspura, Atma Singh Nagar, Guru Teg Bahadur Nagar, Dhandari Kalan, Guru Ram Dass Nagar, Kanganwa , Bazigar Mohalla, Village Bhora, Raj Guru Nagar, Azad Nagar, Bajra, Ekta Colony etc. are surrounded by Industrial Units face the problem of air pollution, smoke, foul smell and traffic.

5.8 OUTER ZONE (PERI-URBAN AREA)

- On the main approach roads connecting the main seven roads of the municipal corporation of Ludhiana, marriage palaces have been developed upto a distance of 15 km from the periphery of the Ludhiana city. Sewerage system is already short of the requirements, water supply system is not uniformly distributed, road network is only 9% of the open area, and there is no periphery master plan. As a result the future status of the peripheral area is left at the owners wish who may utilize it for commercial/domestic/ agricultural purpose. This undeveloped growth of the peripheral area is bound to cause impact on the infrastructure in the near future.

- Although the Sewerage Treatment Plant exists in this area at Village Baranhara yet the colonies namely Pritam Nagar, Gurnam Nagar, Tarsem Colony, Laxmi Nagar and the residential areas outside municipal limit are devoid of sewerage facility. It causes unhygienic living environment in the colonies.
- Number of slums and unauthorized colonies are cropping up in periphery of Ludhiana city. These areas are unserved by water supply and sewerage network. These slum dwellers are using illegal electricity connections.

Punjab Government

CHAPER-VI

Slums and Poverty in Ludhiana:

6.1 Urbanization has been found to have high degree of positive co-relationship with the processes of industrialization and globalization and urban poverty and slums have largely emerged as a corollary of urbanization. Urban Poverty is a multidimensional problem of contemporary India. 'Poverty amid plenty is the urbanization's greatest challenge' The urbanization of poverty is very significant trend because majority of the poor people live in urban areas'. 'Poverty, not only refers to deprivation with reference to a minimum basket of goods and services but also includes socially perceived deprivation with respect to individual basic needs including education, health, inadequacy of shelter and deprivation associated with rigidities in social stratification' National Commission on Urbanization (1988), observed that, 'the most demanding of urban challenges, unquestionably, is the challenge posed by urban poverty; the challenge of reducing exploitation, relieving misery and creating more humane conditions for working, living and growth for those disadvantaged people who have made the city their home already or are in the process of doing so. The task of adequately feeding, educating, housing and employing a large and rapidly growing number of under-nourished, semi-literate, semi-skilled, underemployed and impoverished city dwellers who are living on pavements, in unhygienic slums, in illegal squatters and other forms of degraded and inadequate settlements and who are struggling to make a living from low paying and unstable occupations, in a reasonable time span is the essence of development challenge facing the Indian planners today'

6.1.1. Slums represent multiple human deprivations in urban settlements and majority of urban poor seems to reside in the slums and squatter settlements. With the industrialization , slums and slum population have multiplied as cities have been unable to support the large number of migrants who can't buy a house or a plot of land for their own shelter. This has been creating stretch on urban resources as poor unskilled migrants with negligible income find it convenient to create a temporary shelter on government or private land without security of tenure. Generally these settlements do not have any basic civic amenities, and people live under unhygienic and unsanitary conditions. The Census of India (2001) defines slums as, "all areas notified as slums by the state/local government under any Act; and all areas recognized as slums by

state/local government, which have not been formally notified as slum under any Act and a compact area of about 300 population or about 60-70 households or poorly-built congested tenements in unhygienic environment, usually with inadequate and lack of any proper sanitary and drinking water facilities.”

6.1.2. While the available evidence points out an overall improvement in the income of the urban people, the incidence of poverty in urban areas has been quite a disturbing phenomenon. Evidence shows that other manifestation of poverty in terms of access to housing and basic services is equally serious’. The crucial thing is that number of slums and magnitude of slum population does not seem to decrease. The social, environmental and physical fabric of cities is under heavy stress due to segregation and deprivation in slums, which rather should be an integral part of the urban civil society.

6.1.3. Punjab is not exception to national urban poverty scenario. The percentage of urban poverty in Punjab has gone down but number of urban poor is still very high. The slum population is also staggering in towns and situation is worst in class I towns including Ludhiana. The city has long history of slums, in which most of the urban poor have been residing without adequate infrastructure, services and livelihood. At the time of independence, large number of refugees having entrepreneurial skills migrated to Ludhiana. The refugees started variety of industrial activities which later became a major feature of city’s economy. Ludhiana is a major industrial town of northern India. According to City Development Plan, ‘the city is famous for its hosiery goods, woolen garments and leather items. Machine tools, dyes, cycle parts, mopeds, sewing machines and motor parts are also included in the list of items exported from Ludhiana’. Ludhiana has witnessed enormous industrial growth during last two decades.

6.1.4. The problems of city are outcome of unplanned urban development. Slums can be seen near almost all residential areas. Ludhiana has experienced rapid population growth and large-scale migration and poverty. This places immense pressure on urban infrastructure services, natural resources and local government. The formal sector is unable to accommodate all workforces migrating to the city. Of now a majority of migrants are engaged in the informal sector and their income is very low. Poor migrants stay in slums, as they cannot afford costly housing. The haphazard growth of slums and squatter settlements in Ludhiana is the root cause of uncontrolled pollution and poverty’.

6.2. Slums in Ludhiana :

6.2.1. General characteristics of slums in Ludhiana:

6.6.1.1 Ludhiana had an urban population of 1398467 comprising 268700 households. The slum population was 314904 comprising 61822 households, which is 22.52 percent of the total urban population. Average size of the household in slums was 5.09 as compared to 5.23 in non-slum areas. There is preponderance of male population in the slum areas. The data suggests sex selective migration of males to the slum areas of the town. The sex ratio of population in slums is 759 females per 1000 males, which is lower than that of the non-slum urban area (764), with overall sex ratio of 763. Child population in slums is 41000, which is 13.02 percent of total slum population. This ratio is considerably higher in slum areas when compared to non-slum areas (11.84 percent) and urban areas (12.10 percent). Interestingly the child sex ratio in slum areas is better at 826 than non-slum areas (816). Generally the proportion of Scheduled Castes population is found to be comparatively of higher order in the slums to non-slums. Interestingly the slum areas of Ludhiana do not have very high percentage of Scheduled Castes (15.22 percent) as in non-slums of Ludhiana (39.1 per cent). The sex ratio of the SC population in slums is 818 as compared to 836 in non-slum areas. Ludhiana slums have recorded the highest Work Participation Rate (WPR) for total (35.61 percent) as well as male workers (57.08 percent). There are in all 209 slums in the Ludhiana. Majority of these slums are located on the private land. Mushrooming of slums have been witnessed in the post independence period particularly during the last three decades. Concentration of slums have been found to be high in the unplanned area as compared to planned area.

(Table-1)

Table No. 1
Socio-economic & Demographic Indicators-Ludhiana (Slum & Non-Slum Areas)

Sr. No.	Indicator	Ludhiana	Slum Area	Non-Slum Area
1.	Households	268700	61822	206978
2.	Population	1398467	314904	1083563
3.	Average Household Size	5.2	5.09	5.23
4.	Sex Ratio	763	759	764
5.	0-6 Population (%)	12.10/169214	13.02/41000	11.84/28293
6.	0-6 Sex Ratio	819	826	816
7.	SC Population (%)	13.09	15.22	12.47
8.	SC Sex Ratio	832	818	836
9.	Percentage of Literacy			
	Persons	79.84	77.9	82.28
	Male	81.97	80.37	82.37
	Female	77.02	74.31	77.79
10.	Total Workers (percentage to total population)			
	Persons	36.67	35.61	36.99
	Male	57.89	57.08	58.13
	Female	8.88	7.32	9.33
11.	Main Workers (percentage to total workers)			
	Persons	94.92	93.41	95.33
	Male	96.39	95.53	96.63
	Female	82.36	71.70	84.78
12.	Cultivators Workers (percentage to total workers)			
	Persons	0.48	0.54	0.46
	Male	0.43	0.51	0.41
	Female	0.93	0.89	0.94
13.	Agricultural Laborers Workers (percentage to total workers)			
	Persons	1.30	1.65	1.20
	Male	1.31	1.66	1.21
	Female	1.24	1.56	1.17
14.	Household Workers (percentage to total workers)			
	Persons	5.49	5.44	5.50
	Male	5.25	5.33	5.23
	Female	7.48	1.56	7.69
15.	Other workers (percentage to total workers)			
	Persons	87.65	85.78	88.17
	Male	89.39	88.03	89.78
	Female	72.71	62.59	75.01
16.	Marginal Workers (percentage to total workers)			
	Persons	5.08	6.58	4.66
	Male	3.61	4.47	3.36
	Female	17.63	28.30	15.21
17.	Non-Workers (percentage to total workers)			
	Persons	63.32	64.39	63.01
	Male	42.11	42.91	41.87
	Female	91.12	92.68	90.67

Source: Census of India, 2001.

6.3. Distribution of slum population :

6.3.1 The city of Ludhiana is the largest city in Punjab, both in terms of area and population. The rapid and immense industrialization of Ludhiana city has resulted in the emergence of several slum colonies in and around the city. Many people migrate to Ludhiana for employment in industries (from other cities of Punjab as well as other States of India). There is no formal housing for industrial workers, due to which there are many slums that have come up near the industrial areas. Ludhiana metropolis houses the largest population in Punjab accounting for 1.39 million persons according to the Census of India, 2001. Ludhiana had an urban population of 1398467 comprising 268700 households in 2001. The slum population was 314904 comprising 61822 households, which is 22.52 percent of the total urban population. Average size of the household in slums was 5.09 as compared to 5.23 in non-slum areas. Table 2 shows the slum population in Ludhiana in the context of total slum population of the state.

Table No- 2
Slum Population Distribution in Punjab and Ludhiana city, 2001

Particulars	2001
Population living in slum pocket/areas in the state/Ludhiana city (in lakh)	11.52/3.15
Total population of the 28 towns in which slums have been identified/Ludhiana city (in lakh)	58.88/ 13.95
Percentage of slum population of 28 towns to the total population of these towns/Ludhiana	19.56/22.5

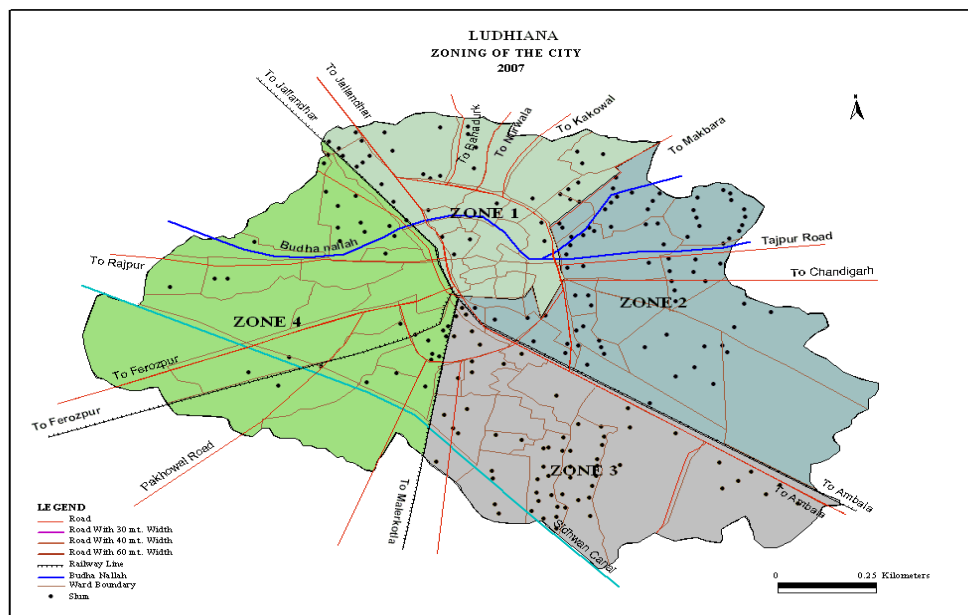
Source: Census of India, 2001

From the above table, it can be seen that the largest proportion of slum population among the urban centres is housed in Ludhiana. Ludhiana accounts for approximately 1/4th of the total slum population of the State. If in the State of Punjab every 5th urban dweller is a resident of slum, every 4th resident leads a degraded life. Population of slum dwellers has been found to be much higher for Ludhiana city (22.5 percent) as compared to the State average of 13.95 percent. Ludhiana city alone accounts for 27.5 percent of slum population for the State. Emergence of slums is largely due to migration of poor population from rural areas and other smaller towns of Punjab, Haryana, UP, Bihar and Rajasthan etc who are unable to live in costly flats/ houses. The urban poor largely inhabit slums, the segregated urban settlements. 'With the rapid growth of population in urban areas, interlinked problems of houselessness, slums and poverty have been acquiring alarming dimensions. Despite a quantitative increase in the housing stock over successive decades, the housing situation continues to be unsatisfactory. Since housing is beyond the affordability of the poor, encroachment of

government land has become common, and there is a mushroom growth of unauthorised slums’.

6.4. Location of Slums

6.4.1. It has been seen that 209 slums existing in the city are spread over the entire city with major concentration on the north-east side of the Jalandhar-Ambala Rail-Road link. Budha Nallah has been found to be the most favorable location for the slums and accordingly a large number of slums is located on the water body. Ludhiana –Ambala Railway line has also been found to a favorite place for development of slums. Large concentration of slums has also been found between the Budha Nalla and Tajpur Road. Similar concentration has been observed in the area between GT Road and the Sidhwan canal. However, lower proportion of slum development has been observed in the area zoned by the road leading to Sidhwan Bet and Malerkotla Road. Lower number of slums in this area can be largely attributed to majority of development schemes and planned development undertaken by the parastatal agencies in the area.



6.5. Ownership pattern

6.5.1. As per the data made available by Ludhiana Municipal Corporation there are in all 209 slums existing in the city. Majority of these slums have been found to be located on the private land as compared to the Government lands. Only 15.8% of the slums are located on Government land whereas the balance 83.2% occupy the land owned by the individuals or private sector. Out of 209 existing slums, 174 slums are located on purely private land and 33 slums have come up on government land belonging to Municipal Corporation, Ludhiana, Improvement Trust, PWD and PUDA. The land ownership of the slums of Ludhiana is as in Table 4.

Table No-4
Ownership of Land in Slums in Ludhiana

Sr. no	Ownership of land	Number of slums	%Age
i.	Government land	33	15.8
ii.	Private land	174	83.2
iii.	Not available	2	1.0
	Total	209	100

Source: Municipal Corporation Ludhiana 2007

6.5.2 Looking at the location of the slums, it has been observed that majority of the slums are located in the residential areas. Component of slums located in the residential area is of the order of 87.1 percent whereas 12.9 percent slums are located in the industrial and commercial areas. Most of the slums located in the Industrial areas have been found to be on the vacant lands available in the industrial zone which have been encroached by the migrants. Table -5 gives the broad distribution of slums as per the landuse.

Table No-5
Slums according to the landuse

Sr. no	Location	Number of slums	%Age
1.	Residential	182	87.1
2.	Industrial	23	11.00
3.	Commercial	4	1.9
4.	Total	209	100

Source: Municipal Corporation Ludhiana

6.5.3. The existence of majority of slums on the private land can help in finding appropriate solution for the removal of the slums with the involvement of the owners of the land based on providing higher incentives and subsidies for creating appropriate shelter for the slum dwellers occupying such lands. Slum dwellers occupying the land can be treated as coparceners in the entire process by asking them to contribute part of the cost of the shelter. On its parts, parastatal agencies can be asked to waive off all the charges and fees levied for construction, sanction of the building plans etc.

6.6. Household Profiles

6.6.1 Out of the 3,30,522 households recorded in the Census 2001 in Ludhiana Metropolis, it has been observed that 61,822 households are occupied by slum dwellers whereas the balance 2,68,700 households are under the occupation of non-slum dwellers. Accordingly, 18.7% of the household stock in the city belongs to the slum dwellers whereas 81.3% is occupied by the non-slum dwellers.,

Table No- 6
The Profile of the Households

Category	Total No. of Houses	%age of total households
Slum Areas	61,822	18.7%
Non Slum Areas	2,68,700	81.3%
Total	3,30,522	100%

Source: Census of India, 2001

6.7. Type of Housing Structures:

6.7.1. Wide varieties of housing structures have been found to exist in the Slum areas of Ludhiana. The table 7 below shows that 65 % of the houses are pucca structures whereas only 12% have been depicted as kutcha houses. The remaining 23% are made up of both partially kutcha and partially pucca houses.

Table No- 7
Type of housing structures

Sr. No.	Category	Percentage
1	Pucca Houses	65.0
2	Semi-Pucca Houses	23.0
3	Kutcha Houses	12.0
	TOTAL	100.0

Source: TCPO

6.8. Evolution of Slums:

6.8.1 It has been observed that history of slums is synonymous with the growth and development of the Ludhiana city. Growth of slums have been found to be marginal in the pre-independence era. Most of the slums have mushroomed in the post independence period. However, the growth of slums was slow in the initial period of independence but it picked up the pace got accelerated during the eighties. With regard to the duration of existence of slums it has been found that majority of the slums have emerged during the last two decades. Out of 209 slums existing in the city, more than 2/3rd slums have their origin during this period.. This clearly shows that growth of slums have kept pace with the growth of population and pace of industrialization of Ludhiana metropolis. Period ranging from 1997 to 2000 accounts for growth of more than 85 % of the total slums of the city. It clearly shows that during this period much of the development in the city was both haphazard and unplanned. During this period the city attracted most of the migrants and the poor in search of employment .

Table No-8
Evolution of slums

Sr. no	Year of establishment	Number of slums	%age
1.	Before 1970	14	6.6
2.	1971-1980	30	14.5
3.	1981-1990	74	35.4
4.	1991-2000	75	35.8
5.	2000+	5	2.4
6.	Not Aware	11	5.3
	Total	209	100

Source: Municipal Corporation Ludhiana, 2007

Table No-9
Demographic data on slums in Ludhiana

Category	Number	Percentage
*No of Slums (MCL)	209	-
*Total Households	83538	-
*Total Population	398290	-
**0-6 years		13.02
**No. of literates		67.7
**Male literates		70.5
**Female literates		64.2
*Number of women headed household	1249	-
*Number of Disabled person	253	-
*Number of homeless	2398	-

Source: *Municipal Corporation Ludhiana, 2007

** Slum Population, Census of India, 2001

Table No-10
Slums according to total population

Sr. no	Population	No. of slums
1.	<500	32
2.	501-1000	54
3.	1001-2000	52
4.	2001-3000	40
5.	3001-5000	18
6.	5001-10000	11
7.	10000-15000	2
	Total	209

Source: MCL, 2007

6.9. Poverty:

6.9.1 In Punjab, ratio of urban poverty has declined but the number of urban poor has remained on higher side. It is quite a disturbing phenomenon as sharp inequality in terms of per-capita income, access of housing, education and employment is affecting social fabric of urban settlements. The Government of Punjab has been unable to support urban local self-government institutions to address the problems of urban poverty. Table 11 shows status and trends of Urban Poverty in Punjab.

Table No-11
Trends in Urban Poverty in Ludhiana

Year	Total Population (Lakhs)	Number of the Poor (Lakhs)	Percentage to Total Population
1991	10.42	1.35	12.95
2001	13.95	1.5	10.75
2006	16.65	1.62	9.7

Source: CDP, Ludhiana

6.9.2. The poverty ratio has declined but the absolute number of urban has increased considerably in Ludhiana. In addition to inadequate release of funds for poverty alleviation, the lack of weak institutional and regulatory mechanism has been affecting the pro poor growth and urban settlements in Punjab including Ludhiana. The Table 12 shows grants released by the Government of India & state government to urban local bodies for urban development and infrastructure 2001-02 to 2005-06.

Table No-12

Grants released by the Government of India & State Government to Urban Local Bodies for Urban Development and Infrastructure 2001-02 to 2005-06

Sr. No.	Name of the Scheme	GOI (Total 2001-02 to 2005 -06)		GOP (Total 2001-02 to 2005-06)		Total (Total 2001-02 to 2005-06)	
		Allocation	1)	Allocation	Released	Allocation	Released
A	Urban Development Schemes						
1	Swaan Jayanti Shahri Rozgar Yojana (75:25)	11.56	1.07	3.35	2.21	14.91	3.28
2	Assistance to Urban Slum Development Programme (ACA)						
3	National Urban Information System (CSS 75:25)						
4	Training of elected Women Representatives in the Urban Local Bodies of Punjab (50:50)	0.15	0.07	0.07		0.22	0.07
5	Jawaharlal Nehru National Urban Renewal Mission (50:20:30) (JBIC)						
6	Integrated Development of Small and Medium towns (50:50)	19.92	8.34	7.44	4.78	27.16	13.12
7	National Slum Development Programme (NSDP) 100%	47.56			22.65	47.56	22.66
	Total (A)	78.99	9.48	10.86	29.65	89.85	39.13
B	Urban Water Supply						
1	Prevention of Pollution of River Sutlej	323.07	78.38	89.46	51.41	392.53	129.79
2	Accelerated Urban Water Supply Scheme (50:50)	10.12	2.12	6.48	2.12	16.60	4.24
3	Prevention of Pollution of River West Bein (70:30)	21.00	9.74	13.50	3.00	34.50	12.74
4	World Bank Aided Water Supply & Sewerage Projects			0.13		0.13	
5	HUDCO Aided Water Supply & Sewerage project for Moga & Amritsar			303.11	2.86	303.11	2.86
6	Prevention of Pollution of River Ghaggar				0.02		0.02
7	Integrated Development of Urban Infrastructure in Bathinda City	20.00		40.00	40.00	60.00	40.00
8	Shri Guru Ramdas Development Project Amritsar (JBIC)						
9	Model Village & Model Basties Adarsh Basties in Urban Area under HUDCO Assistance	0.91	0.24	0.36	0.33	1.27	0.57
	Total (B)	375.10	90.48	453.04	99.74	828.14	190.22
	Grand Total (A+B)	454.09	99.96	463.90	129.39	917.99	229.35

Source: Report of the Third Punjab Finance Commission

There have been negligible grant for urban poverty alleviation and slum development in Punjab. Similarly Ludhiana has spent very nominal money on urban poverty reduction and slum development during last five years. The implementation of urban poverty alleviation schemes has not been effective due to poor institutional mechanism for poverty alleviation and many other factors as highlighted in the evaluation study.

6.10 Deficiencies in implementation of poverty alleviation schemes

6.10.1 The Urban Basic Services for the Poor (UBSP), Prime Minister's Integrated Urban Poverty Eradication Programme (PMIUPEP) and Nehru Rozgar Yojana (NRY), centrally sponsored poverty alleviation programmes which converged into Swarna Jayanti Shahari Rozgar Yojana (SJSRY) in 1997 could not make any remarkable dent in this crucial problem. An evaluation of different poverty alleviation programme by IDC (1998) indicated following deficiencies in their implementation:

- i. Slum identification was not done according to well-accepted criteria and similarly identification of beneficiaries was not according to the norms specified.
- ii. Inadequate support structure due to non-representation of beneficiaries, lack of intersectoral representation and co-ordination with line departments, untrained and non-responsive resident community volunteers (RCVs), lack of networking within community organizations and poor community mobilization/participation.
- iii. The quality of training was poor and training provided for skill-upgradation was a mere formality. Such services as drainage and sanitation were poor in slums.
- iv. Sanctioning of loans was arbitrary and beneficiaries were not identified according to the criteria of the scheme. Judged by established norms, the majority of beneficiaries of loans, training and other facilities were found ineligible.
- v. Leakages of loan money were as high as 12 per cent. Delay in processing of loan applications, inadequate raw material inputs and poor marketing of products, were the other shortcomings.
- vi. Skill-upgradation was poor as training of women beneficiaries was limited only to stitching and sewing. Once trained, they were unable to utilize their skills, since there was no linkage between skill-upgradation and setting up of micro enterprises.

6.10.2. Most of the deficiencies in implementation of urban poverty alleviation programmes in Punjab in general and Ludhiana in particular are due to weak functional and fiscal base of municipalities. The poverty alleviation is joint responsibility of Government of India as well as state governments (Seventh Schedule of the Constitution) and is a major subject in Directive Principles. It is also listed in the Twelfth Schedule of the 74th Constitution Amendment Act, 1992, which has made

poverty alleviation one of the 18 functions of municipalities. But unfortunately they have been unable to play the effective role in alleviation of urban poverty due to variety of reasons. LMC has not been serious about implementing poverty alleviation programmes.

6.11. Socio-Economic and Demographic Indicators:

6.11.1. Ludhiana had an urban population of 1398467 comprising 268700 households. The slum population was 314904 comprising 61822 households, which is 22.52 percent of the total urban population. Average size of the household in slums was 5.09 as compared to 5.23 in non-slum areas. There is preponderance of male population in the slum areas. The data suggests sex selective migration of males to the slum areas of the town. The sex ratio of population in slums is 759 females per 1000 males, which is lower than that of the non-slum urban area (764), with overall sex ratio of 763. Child population in slums is 41000, which is 13.02 percent of total slum population. This ratio is considerably higher in slum areas when compared to non-slum areas (11.84 percent) and urban areas (12.10 percent). Interestingly the child sex ratio in slum areas is better at 826 than non-slum areas (816). The proportion of Scheduled Castes population is quite high in the slums as compared to non-slums. Interestingly the slum areas of Ludhiana do not have very high percentage of Scheduled Castes (15.22 percent) as in slums of Ludhiana (39.1 per cent). The sex ratio of the SC population in slums is 818 as compared to 836 in non-slum areas (Detail shown in Table 1)

6.11.2. Ludhiana slums have recorded the highest Work Participation Rate (WPR) for total (35.61 percent) as well as male workers (57.08 percent).

6.12. Evolution of planning and urban development policy:

6.12.1 The history of evolution of master plans and urban development policies and practices of the city shows grim picture.. It has been observed that more than 48% of city was built without any planning. Even 18% of the area covered by regulatory town planning schemes could not bear results to any acceptable planning and development standards and remained largely deficient in requisite services and facilities with encroachment and sale of land earmarked for public parks and open spaces dominating the development scenario. A very limited effort was made by development agencies operating in the city to acquire and develop land due to lack of resources with the result

a demand for developed land outpaced the supply in the city. Since the developed land made available by parastatal agencies for various purposes was far lower than the demand, the process of haphazard and fast growth of Ludhiana brought under development large number of low lying areas otherwise unfit for development for residential purposes by low income groups resulting in emergence of slums, facing the serious problem of flooding, drainage and sewerage even during light rains.

According to the CDP prepared by the MCL 'As the economic base of the city is relatively sound and the hinterland is well developed the population below poverty line is low at 10%. Out of 209 slum pockets identified in the city, 57 have already been provided with the basic amenities including – water supply through house taps, sewerage, individual toilets, roads, street lights. There are 68 partially upgraded slum pockets in the city where, water supply, roads and street lights have been provided. Rest of the 84 slum pockets are to be considered for provision of services. A total amount of Rs. 222 Crores (5.6% of total investment proposed) has been proposed exclusively for urban poor housing and services.

6.13. Conclusion

Ludhiana is most urbanized city of the state and slums and poverty are two major challenges to the policy makers and planners. Large numbers of slums have concentration of urban poor, who do have adequate livelihood options. The migration is continuing and encroachment of public and private land by the urban poor/ slum dwellers is affecting social and environmental fabric of the city. Master plan and its proper implementation is needed to guide the future growth of urban area in Ludhiana. Municipal Corporation must speed up the slum development and poverty alleviation activities. A strong institutional mechanism is required for improving planning and local governance in the city. This will also help in protecting the interest of underprivileged sections.

CHAPTER-VII

Traffic & Transportation

7.1 If urban centers have been recognized as engines of economic growth, traffic and transportation has rightly been termed as wheels of such engines. Urban transport has also been considered an integral part of urban planning and traffic & transportation has been considered as a function of land use planning. Roads and streets in a city have been equated with arteries in the human being and any obstruction in the system can create numerous complications. In this context traffic and transportation has emerged as the most critical issue in the effective operation and efficient functioning of any urban centre. More so in the case of metropolitan centers where distances to be traveled get extended with the physical growth development of the city and number of people to be transported grows geometrically. In fact efficiency and productivity of an urban centre clearly hinges on its efficiency of traffic and transportation. Accordingly, rationalization of traffic and transportation system assumes importance. For rationalization, it is important that a detailed study and analysis of the existing transportation network is made, pattern of traffic clearly identified, capacity of the network is quantified and user behavior is clearly brought out for understanding the existing problems and bottlenecks in the system which create road blocks in the efficient transportation of men and material. Accordingly, this section focuses on establishing the current status of transportation system and traffic management in Ludhiana which form the basis of evolving a realistic policy for its efficient planning, development, operation and management.

7.1.1 Ludhiana, the financial capital of the state is the hub of Indian hosiery Industry and major centre for cottage and small scale industries. With history spanning over 5 centuries, the city has grown from a small village on the bank of Sutlej River to the most vibrant urban centre and the first metropolitan Centre of the state of Punjab. The city growth has largely been haphazard and unplanned. The road network accordingly does

not follow any well defined hierarchy. With only 8% area of the city available under the transportation, the road network is incapable of catering to the traffic demand of the city. With Ludhiana recording high growth in industry, trade and commerce, higher education, Medicare and population, vehicle ownership and travel demand in the city are increasing at a rapid pace. Further due to absence/inadequacy of reliable / efficient public transportation system, the growth of IPT (Cycles & Auto rickshaws). The existing transportation network has not kept pace with ever rising travel demand within and outside the city, accordingly roads have lost their functional character and are carrying traffic beyond their service capacity. The traffic and transportation in Ludhiana remains chaotic for major portion of the day and road users suffer enormously in the process.

7.2 Existing Network –Road

The existing road network in the city follows a radial pattern and is dominated by both rail and road network. The entire network converges in the centre with G.T. Road (NH-1) and railways forming the major spines. In fact the entire network gravitates along this axis. Considering the centrality of Ludhiana in the state, it has high degree of connectivity with other parts of the state and the country. It has 3 national high ways and number of important roads passing through it, which include :-

- i) Amritsar-Kolkata(NH-1)
- ii) Ludhiana-Ferozepur (N H)
- iii) Chandigarh-Ludhiana(NH-)
- iv) Ludhiana-Rahon Rod
- v) Ludhiana-Malerkotla
- vi) Ludhiana-Sidhwan Bet
- vii) Ludhiana-Pakhowal
- viii) Ludhiana-Machhiwara

7.2.1 Besides this, there is bypass connecting G.T. Road at both ends as well as Chandigarh Road. The inner city road network with irregular alignment, inadequate widths and frequent intersections has serious capacity constraints. There is a link road, which is circular in nature and its used for both intercity as well as intercity vehicular movement. Six regional roads meet link at different points. The present road network is spread over 12.72 sq. km of area, which accounts for 8% of the total Municipal area. The total road length 1356 km. and the equivalent road length is 3390 km. The city has roads ranging from 6 to 35 m width.

7,2.2 To prepare Master Plan and to meet the future traffic needs and to facilitate movement of vehicles on roads, the following transport studies relating to length of carriages, right of way & carriageway have been carried out.

Table No.1
With w.r.t. carriage way and length of major roads passing through Ludhiana city

Name of road	Length (Km)	Right of way (m)	Carriage way (m)
Narional Highway			
G.T. Road (NH-1)	20.5	25-60	20
NH-95 (Chandigarh and Ferozepur)	22	30-60	20
State Highway			
Gill Road (Sangrur and Mansa)	7.35	65	20
Major Roads			
Chandigarh road (from Samrala Chowk to octroi post)	8.1	20-30	10+10
Mata Rani Chowk to Jalandhar Bye pass	2.0	25-40	10+10
Clock Tower to Jagraon Bridge	1.0	25-40	10+10
Rahon Road from Basti Jodhewal Chowk to Octroi post	3.79	33-40	7+7
Ferozepur road (Jagraon Bridge to octroi post)	7.35	65	10+10
Pakhowal Road (Bhai wala Chowk to Octroi post)	4.5	27-33	7+7
From Sherpur Chowk to Ambala Road Octroi	8.47	40-60	10+10
Gill Road (Gill Chowk to Octroi post)	3.6	30	7+7
Humbhran Road (Session Chowk to Hambhran Road Octroi Post.)	5.1	33	10+10

Source: City Development plan, Ludhiana (2007-2021)

7.2.3 The data given in the above tables gives the description of the length and width (in terms of right of way and carriage way) of the N.H.'s, S.H.'s i.e. and the major roads passing through the city. It shows that the total lengths of the two N.H.'s i.e. G.T. Road (NH-1) and Chandigarh - Ferozepur Road (NH-95) are 20.5 kms and 22 kms.

respectively while 7,35 kms. long State Highway i.e. Gill Road (Sangrur to Mansa) is also passing through it. The length of other major roads is given from their starting points in the city up to their respective octroi posts. The total road length of this network is 121.1 Km.

7.2.4. Despite the adequate width of National and State Highways, their right of the way varies at certain points due to encroachments. Therefore, the usage/efficiency of these sufficiently wide carriageways decreases due to these encroachments.

7.2.5. The carriageways of all these National/State Highways are uniform with a width of 20 mtr. at all points while dual carriageway are provided with the width of 10m+10m for all other major roads except the three roads which have carriageway width of 7m+7m.

Table No.2

Existing ROB's within city limits

Sr. No.	Location	Carriage way (in meters)
1.	Ferozepur Railway Line Near Bus stand	15.00
2.	Dhuri Line- Link road	15.00
3.	Jagraon Bridge	15.00
4.	Ambala Line-Dholewal Chowk	15.00
5.	Ambala Line—Near Sherpur Chowk	20.00
6.	Ambala Line-Near Dhandari Kalan	15.00

Source: City Development Plan, Ludhiana (2007-2021)

7.2.6. However road network has not expanded in tandem with the increase in number of vehicles and other traffic generated in the city. Further due to large scale encroachments made by informal sector & others road capacity has reduce

considerably. Parking of vehicles on the roads adversely inspect to the effective movement of the vehicles.

7.3. Rail Network

7.3.1. Strong network of rail links with other parts of State /country exists in the city like Ludhiana / Ambala railway line, Ludhiana-Amritsar-Pathankot railway line,, Ludhiana-Dhuri railway line and Ludhiana-Ferozepur railway line. A new rail link connecting city with Chandigarh is in the process of advance implementation. In order to serve the public, three railway stations like Main railway station in center of the city, Dhandari Kalan railway station and railway station at Model Gram are provided. The railway goods traffic is taken care of at the main railway station and at Dhandari Kalan only.

7.3.2. These railway lines cut the road network of the city at numerous level crossings which become centre for traffic bottlenecks. To facilitate the people with the smooth traffic flow, six ROB's have been built in the city as described in the above table. The table also depicts that out of these six ROB's one exist on Ferozepur railway line, the next two are on the Malerkotla line while remaining three are constructed on railway line leading to Ambala.

Table No. 3
Existing under passes within city

Sr. No.	Location	Carriage way	Name of Railway Line/ Road
1.	Domoria Bridge	Dual	Ludhiana – Amritsar
2.	Jassian Road	Single	Ludhiana – Amritsar
3.	Near Village Hussainpura	Dual	Ludhiana – Amritsar
4.	Sherpur	Single	Ludhiana – Ambala
5.	Near Gurudwara Dukh Niwaran	Single	Jagraon Bridge
6.	Near New Kundan Puri	Single	Ludhiana - Amritsar

Source : City Development plan, Ludhiana (2007-2021) & Field survey 2007.

7.3.4. Similarly, the table No. 3 reveals the fact that six under passes also exist on various roads at points where the other road or railway line cross them. Among the underpasses mentioned in the above table, those existing on Domoria Bridge and near village Hussainpur have dual carriageway while the other four have single carriageways. Four of these underpasses are constructed on Ludhiana – Amritsar railway lines, one on Ludhiana-Ambala railway line and last on Jagraon Bridge.

7.4. Terminals: -

7.4.1. Bus Terminal :

Terminals are the nodal points of the transportation network. In Ludhiana the central bus terminal is located in the centre of the city, which has area of 14.66 acres. Buses move in all the directions on inter city and intra city roads. The Local Bus stand is also situated near the central bus terminal. The description of the yearly bus traffic route-wise is given in the table bellow : -

Table No. 4
Yearly Bus traffic route-wise

Name of Route	1999	2001	2003	2005	2007
Malerkotla Road	190	189	220	227	250
Ambala G.T. Road	480	484	494	490	506
Jalandhar G.T. Road	830	966	930	985	1035
Ferozepur Road	431	476	530	563	563
Pakhowal Road	31	136	136	141	141
Humbhran Road	32	76	76	76	76
Chandigarh Road	342	376	401	441	459
Mini Buses					
Ambala Road	-	-	11	13	13
Malerkotla Road	-	-	11	11	13

Source : Punjab Roadways, Ludhiana.

7.4.2. Table No. 4 indicates that over the years, bus traffic has recorded an increase with few exceptions. However number of buses have recorded rapid growth on Malerkotla Road, G.T. Road, Chandigarh Road with largest growth occurring on

Pakhowal Road and Humbran Road indicating the direction of current growth of city & traffic. But this table indicates the low level public road transport services. Effective transport is the need of every metropolitan city and for cities that are growing at rapid pace. The concept of public transport is quite old in the city but general could not met with any reasonable success so far. In Ludhiana, the services of city transport started with operation of buses by Punjab Roadways the year 1977 which shifted to M.C. But the services were withdrawn by Municipal Corporation which is largely handled by private operators.

7.4.3. Presently although the system is again being run by the State Transport with limited number of minis buses but is not properly organized. All the routes originate and terminate at main bus stand leading to the congestion in central areas of city. Due to the inefficient services and un-organized system of public transport, predominant modes used for intra city passenger travel are personalized vehicles, cycle rickshaws, auto rickshaws etc., which enhance the problems like congestion, accidents, parking as well as pollution. In the City, there is an urgent need of the provision of efficient and reliable public transport system, which can effectively meet the existing as well as the future transport demand for the next 20-25 years.

7.4.4. However the location of the existing Bus Terminus needs a critical review. Though from the point of view of users, the bus terminal has very convenient location, but it in a major implication for the traffic and transportation. Since most of the traffic originate and terminates at the Bus Terminal and preferred mode of travel is also the Bus, accordingly, areas attract large volume of the traffic in process. In addition Terminal cater to large number of daily commuters who come to work and business places and in process terminal also attracts large number of informal commercial activities. With large number of cycle rickshaws, auto rickshaws, taxis occupying the space around the bus terminals, movement of traffic in the area largely remains chaotic

for major part of the day. Accordingly, it is important that the existing position of the Bus Terminal is critically reviewed and appropriate place is identified for the same in order to minimize traffic congestion in the area. Also on the inter State and local Bus terminals will require segregation for reduction in traffic congestion.

7.5. Rail Terminal:

7.5.1. Due to high degree of rail connectivity with national capital and other metropolitan centers, railway station caters to large volume of passenger traffic on day to day basis. With 5 platforms, it has all basic facilities like waiting hall, reservation centre, parking facilities, ticket booths etc. in the terminal. The railway station is located in the heart of the city on the portion of the G.T. Road passing through the city core. Being the industrial hub of the state and a large centre of industrial production, it also caters to large volume of goods traffic, both in the shape of raw material and finished goods. In the process railway station attracts large volume of men and material traffic and road network serving the area remain stretched particularly during the day time. With large movement of men and material, railway station attracts large number of vehicles and commercial activities, which occupy valuable road space, reducing their usable capacity and creating major bottlenecks in the process. Accordingly, the movement of traffic would required to be regulated.

7.6. Truck Terminal:

7.6.1. Ludhiana also has well planned Truck Terminal located near the Samrala Chowk within the M.C. limits. It is spread over an area of 114 acres. for catering to the goods traffic and booking agencies which were earlier operating within the city. Truck terminal has helped in relieving goods congestion within the city. However terminal needs to be managed more effectively in order to improve its operational efficiency.

7.7. Pattern of Vehicular Population

7.7.1. Registered vehicle population in Ludhiana is closed to 1 million mark as per the figure made available by the District Transport Officer, Ludhiana. The number of registered vehicles has recorded more than 3 fold growth during the 1995-2007 period when it rose from 2,91,384 (1995) to 9,61,988 (2007). The annual growth rate of registered vehicles has raised between 8-13%. Highest growth in number was recorded to the year 2006 when in all 63,725 vehicles were registered in a single year. of 2005-06. The average registration of vehicles per month exceeded five thousands. Out of the total majority of vehicles were two wheelers which accounted for more than 70% of the vehicles registered in the year. Next to two wheelers, four wheelers accounted for 25% of the total account. Thus both these categories accounted for more than 95% of the total vehicles added to the city and region. The vehicles ownership has also been found to be very high as compare to other Metro and compared variably with Delhi metro. With the fast addition of vehicles, the number of vehicles per thousand has doubled from 243 in 1995 to 484 in 2009. However despite large influx of vehicles in the city, the road net work has not kept pace in vehicular growth. leading to numerous problems emerging in the city. With large induction of vehicles in the city parking of such vehicles is becoming a major problem. All night most of the roads are converted into parking lanes to accommodate increased vehicle ownership. With smaller size of plots in the core areas, the entire parking spills over to the road side. With economic conditions recording higher order and attitude changing very fast, city is likely to witness further acceleration of vehicles. Therefore, strategies need to be worked out to minimize personal ownership of vehicles by offering better options of public transport in the city. Table below indicate the pattern of growth of Registered Vehicles and category wise addition to the city on annual basis:-

Table No. 5
Total Registered Vehicles

Year	No. of vehicles
1992	2,19,628
1993	2,38,412
1994	2,58,056
1995	2,91,384
2001	6,80,494
2006	9,41,694
2007 (Till April)	9,61,988

Source: District Transport Office, Ludhiana.

Table No. 6
Registered vehicles category wise

Year	Four wheeler	Three Wheeler	Two Wheeler	others	Total	%age growth rate
2001	7843	1425	29167	8	38443	8
2002	8749	1272	31865	15	41901	9
2003	9835	1487	35142	37	46501	11
2004	11300	1806	39380	48	52534	13
2005	13383	2241	40825	90	56539	8
2006	15096	2386	46096	147	63725	13

Source: District Transport Office , Ludhiana.

7.7.2. Further in order to define the composition of vehicles plying on the road , number of slow moving vehicles also been looked into. Table No. 7 indicates that out of total vehicle added, 54.2% and 45.8% in 2007. However the proportion of slow moving vehicles have been going down indicating the increased trend d of using fast moving vehicles. Looking at the composition of slow moving vehicles has been observed that number of men driven vehicles are much higher as compared animal driven vehicles which constitutes more than 95% of the vehicles under such category.

Table No. 7
Slow Moving Vehicles Category wise

Year	Men driven	Animal driven	Total slow moving	%age of total vehicles
2001	31083	1371	32454	45.8
2002	31169	1473	32642	43.8
2003	30461	1339	31800	40.7
2004	31279	1367	32646	38.0
2005	31339	1464	32803	36.8
2006	31034	1454	32488	33.8

Source : District Transport Office, Ludhiana.

Table No. 8
Traffic Composition in Ludhiana City Year wise

Year	Fast moving		Slow Moving		Grand total
	Total vehicles	%age of Total vehicles	Total Vehicles	%age of total vehicles	
2001	38443	54.2	32454	45.8	70897
2002	41901	56.2	32642	43.8	74543
2003	46501	59.3	31800	40.7	78301
2004	52534	62.0	32646	38.0	85180
2005	56539	63.2	32803	36.8	89342
2006	63725	66.2	32488	33.8	96213

Source: District Transport Office, Ludhiana & M.C. Ludhiana.

7.7.3. The number of man driven and animal driven vehicles show the fact that the change in number of vehicles in these categories is almost stagnant with insignificant increase or decrease every year. Due to presence of large number of slow moving vehicles on the Ludhiana roads, large conflicts, delays, pollution have been observed in the city. Mixing of traffic also reduces the speed of vehicles causing the further delays and congestion in the city. Most of the major roads passing through the city have large number of commercial and industrial abutting these roads and generating considerable amount of slow moving traffic. These areas including Gill Chowk, Partap Chowk, Sherpur Chowk, Giaspura Chowk, Basti Jodhewal Chowk etc. As result there is perpetual conflict between fast moving and slow moving vehicles leading to lowering of road capacity and road safety.

7.8. Capacity utilization of Road Network

7.8.1. Growth of road network has not kept pace with the enormous population growth (which have ranged above 5% per annum for last 4 decades) and the rapid increase in the population of the vehicles which has been above 8% over the last decade. Work participation rate has also been found to be improving with student population also rising sharply. All these factors have added to the larger volume of traffic coming on the city roads. In order to assess the capacity utilization of roads, a detailed analysis of the existing road network has been made in terms of volume & capacity of important roads.

7.8.2. The ratio of volume & capacity (V/C) is one of the most important factors for evaluation of level of services of road network. The peak hours volume of different categories of major road network in Ludhiana has been assessed to calculate volume capacity ratio. While the capacity is measured in PCU's per lane of road width. The V/C ratio is up to 1 is considered as the optimum condition. If ratio exceeds 1, it indicates condition of congestion whereas figure below 1 indicates under utilization of the road capacity. But the table given below reveals that almost all the roads / chowks in Ludhiana city are suffering from the problem of traffic congestion. The V/C ratio ranges from 1 to 2 on 26 roads in different chowks which indicates extreme vulnerable traffic conditions. The situation is still worse at Malerkotla Chowk, Sidhwan Canal-Malerkotla Bridge and Ghumar Mandi Road, Fountain Chowk where it ranges between 2 to 3. But on Rahon Road and Gaushala Road and Jodhewal Basti Chowk as well as Focal point road at Giaspura Chowk, the data shows the unbelievable traffic problems/

highest degree of traffic congestion where the vehicles capacity ratio is more than 3. This it can be observed that majority of road network is already over stressed and has no capacity to cater to the existing level of traffic count- what to talk of further growth of the city traffic. Accordingly, it becomes critical that either the existing capacity of the road is increased or volume of traffic on these roads reduced to the level of available capacity. Infact no single strategy would be useful. A firm strategy which not only enhances the available road capacity but also rationalizes the flow of traffic on these roads to minimize congestion. Infact large volume on these roads is due to the absence of efficient mass transportation system, use of large number of personalized vehicles and mixing of inter-intra city traffic. Accordingly introducing a rapid mass transportation system in the city, construction of southern bye-pass and missing links .would be critical not only the existing chaotic conditions but also to cater to the further traffic count of the city.

Pattern of Volume Capacity of Roads:

Table No. 9
Volume capacity ratio on main approaching roads (year 2007)

Location	Name of the road	Peak hour volume(PCU)	Capacity (PCU)	V/C ratio
Samrala Chowk	Bye Pass Road (Jalandhar Side)	8867	6000	1.4
	Chandigarh Road	6133	6000	1.0
	Bye-Pass Road (Ambala Side)	6720	4800	1.4
	Link Road	6133	4800	1.3
	CMC Hospital Road	6244	4800	1.3
Jodhewal Basti	Bye-Pass Road	6231	6000	1.0
	Rahon Road	5528	1500	3.6
	Bye Pass Road (Ambala Side)	7680	6000	1.3
	Gaushala Road	5074	1500	3.4
Jalandhar Bye pass on GT Road		6692	4800	1.4
Giaspura Chowk	Focal Point	4615	1500	3.0
Gill Chowk	Malerkotla Road	6980	6000	1.1
	Link Road	6981	6000	1.2
Jagraon ROB	Ferozepur Road	9305	6000	1.5
	G.T. Road	10785	6000	1.8
Pakhowal railway crossing	Pakhowal road	2891	1500	1.9
Sidhwan Canal Ferozepur Railway Crossing and Pakhowal Road junction	Pakhowal Road	2768	1500	1.85
Sidhwan Canal-Dhuri Railway Crossing		2875	1500	1.93

Sidhwan Canal Malerkotla Bridge	Malerkotla Road	2952	1500	2.03
Gill Road Near ATI	Malerkotla Road	6654	6000	1.0
Fountain Chowk	Jagraon Road	5918	6000	1.0
	Guru Nanak Road	5814	4800	1.2
	Link road	4155	6000	1.0
	Ghumar Mandi Road	4339	1500	2.8
	Old Court Road	5262	6000	1.0
Bharat Nagar Chowk	Ferozepur Road	9126	6000	1.5
	Link Road	7838	6000	1.3
Mata Rani Chowk	G.T. Road (Ambala Side)	5255	4800	1.0
	Meena Bazar Road	2037	1500	1.4
	Old Court Road	1724	4800	0.4
	G.T. Road (Jalandhara Road)	5303	4800	1.1

Source: PCU's (2007) are projected from RITES field survey 1999

7.9. Road Accidents:

7.9.1. With a view to assess the safety of the road users in Ludhiana Metropolis, it is important to study the road accidents in the city as per the figures made available by the traffic police, number of road accidents recorded in 2003 were 456 whereas in 2006 count was 476. So despite rapid increase in vehicular population, the number of accidents have by and large, remained at the same level. However despite the fact number of accidents remained at the same level but number of fatal accidents increased during the same period when casualties rose from 188 in 2003 to 218 in 2006. The reduction of accidents can be attributed to the large congestion and slowing of the speed over a period of time due to extreme congestion. But increased number of fatalities are a cause of concern. In 2007 not only number of accidents have shown enormous rise but also the proportion of fatal accidents. The tendency needs to be curbed with strict regulations and enforcement mechanism. This clearly presents the case of enhance traffic safety and reduce number of accidents on the road of Ludhiana metropolis

Table No.10
Road Accidents year wise

Year	No. of Accidents	Fatal	Non Fatal
2003	456	188	353
2004	432	219	331
2005	438	259	334
2006	476	242	307
2007 up to October	422	218	268

Source: Traffic Police, Ludhiana City.

7.10. Rail Based Transport:

7.10.1 In addition to the road traffic, railway, also carry large volume of goods and passenger traffic into Ludhiana. In all 63 pairs of passenger trains pass through the city on daily basis which cater to the traffic on Ambala-Amritsar, Ludhiana-Dhri, Ludhiana-Ferozpur and Ludhiana –Lohian routes. Maximum trains are ply on Ambala –Amritsar routes and account for 2/3rd of total trains. The number of passengers catered to by these train are more than 70% of the total passenger traffic. Further, it has been observed that passenger traffic catered to by railways is also on the increase. From 68,47,837 passengers in 2004-05, the number rose to 76,76,987 in 2006-07 . Growth rate recorded 2005-06 was 7.7% whereas it was lower in 2006-07 i.e. 4% . However railways cater to large volume of traffic which basically comprise of daily commuter from /to the city, large number of migrants coming to serve in the agriculture and the industrial sector. Railway being economical and efficient mode of transportation, largely catering to the inter city/ long distance traffic would continue to attract large volume of passenger traffic. Railways accordingly offer large options for both inter and intra city traffic. To improve the efficiency of railways , number of additional local stations would have to be created besides improving the capacity of the railway stations and road net work serving these stations , so as to reduce passenger on the city road network.

7.10.2. In addition to 63 pairs of passenger trains, large number of goods trains also pass through the city for bring in and taken out raw material and finished good. Railways offer enormous option of bulk movement of goods at the most competition freight accordingly, it has emerged as the preferred mode for the goods transport with railways focusing on improving the speed of freight movement, more goods traffic will be diversified to it from the road net work. Accordingly better connectivity of railway net work with the centers of production, consumption, bulk market etc. would be critical for minimizing the road based good traffic within the city. Construction of dry port at Dhandhari Kalan has been welcome step in the direction but its efficiency and capacity needs to be improved for optimizing services offered by railways.

7.10.3. Table indicating the detailing number of passenger goods trains and passenger traffic handled by Ludhiana Railway station are given below:-

Table No.11
No. of passenger trains passing through Ludhiana City

Ludhiana-Jalandhar		Ludhiana-Ambala		Ludhiana - Dhuri		Ludhiana-Ferozepur		Ludhiana-Lohian	
Incoming	Outgoing	Incoming	Outgoing	Incoming	Outgoing	Incoming	Outgoing	Incoming	Outgoing
41	41	41	41	9	9	7	7	5	6

Source: Office of Station Supdt. Northern Railway Region, Ludhiana.

Table No. 12
No of goods trains passing through Ludhiana City

From-To	2002	2004	2006
Ludhiana-Ambala	1480	1491	1383
Ambala-Ludhiana	1145	1506	1392
Ludhiana-Jalandhar	2598	2622	2205
Jalandhar –Ludhiana	2320	2347	2150
Ludhiana-Ferozepur	1490	1523	1653
Ferozepur-Ludhiana	1284	1247	1434
Ludhiana-Lohian	37	45	43
Lohian-Ludhiana	215	197	162
Ludhiana-Dhuri	483	379	305
Dhuri-Ludhiana	271	241	227

Source: Office of the Station Supdt. Northern Railway Region, Ludhiana.

7.11. Travel Characteristics:

7.11.1. In the survey conducted by RITES, it was observed that in all 13.92 lakh trips were conducted for various purposes on a normal working day. Out of which 12.8 lakh trips (92%) were home based while remaining 1.15 lakh trips (8%) were non home based. Further 49% of home based trips were for work 26% for education and remaining 25% for other purposes. Purpose wise distribution of passenger trips in Ludhiana is defined below:-

Table No. 13
Purpose wise distribution of intra and inter zonal trips (one way)

Purpose	Vehicular trips		Walk trips		Total		Grand total
	Intra	Inter	Intra	Inter	Intra	Inter	
Work	72851	447387	75403	34702	148254	482089	630343
	38%	58%	34%	36%	36%	56%	49%
Education	64066	154180	80915	323616	144981	186496	331477
	34%	20%	37%	33%	35%	22%	26%
Others	52651	168292	63773	29961	116424	198253	314676
	28%	22%	29%	31%	28%	23%	25%
Total	189569	769858	220091	96979	409660	866837	1276497
	100%	100%	100%	100%	100%	100%	100%
Total Home based	189569	769858	220091	96979	409660	866837	1276497
	68%	98%	98%	96%	82%	97%	92%
Non Home based	87633	18970	4702	4234	92335	23204	115539
	32%	2%	2%	4%	18%	3%	10%
Total	277202	788828	224793	101213	501995	890041	1392036
	100%	100%	100%	100%	100%	100%	100%

Source: Field Survey 1999

7.11.2. In case of model split for total house hold trips in Ludhiana metropolis , it was deserved that only 5% of the trips are preformed by bus, 49 % by private fast modes (Car & Scooters), 10% by bicycles and rest 36% by the Para transit modes (cycle, rickshaw and three wheelers). For home based trips share of public transport is 5% while share of private mode and Para transit modes is 58%and 37% of vehicular trips. Walk constitutes 31% of total home based trips. Model split of household trips in Ludhiana presented in table 2 50 and 2.51. High walk trips indicate low trip lengths and high silt on permanent levels. Large share by personalized motor vehicles indicate high vehicle ownership , as the public transport share is low where as the desirable share should be in the range of 50.60%. Further the travel trend taken to perform trips varies between 20-30 minutes. Majority of trips are performed by scooter, cycles and auto rickshaws . For longer trips length of 30 minutes 20% Of such trips are performed by buses and 16% by cars. The number of trips performed by cycle rickshaw have high trip length because of inadequate of public transport system. The trip cost has been seen to be on lower side in majority of cases which is less than Rs. 5. In case of two wheelers, three wheelers and cycle rickshaws more than 70% of trips cost less than rupees s10/- per trip.

7.12 Speed and Delay:

7.12.1 As per speed and delay survey conducted by RITES during peak and off peak hours on a normal working day along primary and secondary road network in Ludhiana, it was revealed that along the roads within the core area comprising of Chauara Bazar, C.M.C. Hospital road, Old Hospital, Gaushala, , Gurh Mandi, Mata Rani Chowk, Clock Tower , Jail road and Habbowal Road the average speed recorded was below 50 Kms. per hour. The major factor governing in the lower speed were the predominance of slow moving vehicles, large scale encroachment of road space, on street parking and large volume of pedestrians / Further it was observed that on 35% road net work, during the peak hours, the journey speed 10-20 Kmph. Speed lower than 10 Kmph was observed in the thick core area of the city. Further speed ranging between 20-30 Kmph was observed in 42% of road length. However overall speed in the city ranged between 15-20 Kmph.

Table No. 14
Road length by peak hour's journey speed

Sr. No.	Speed (KMPH)	Road length KM					
		Primary		Secondary		Total	
		KM	%age	KM	%age	KM	%age
1.	<10	3	6	6	10	10	8
2.	10-20	15	26	28	45	43	36
3.	20-30	19	33	21	33	40	33
4.	30-40	12	21	2	3	14	12
5.	>40	9	15	0	0	9	7
6.	NA	0	0	6	10	6	5
Total		58	100	64	100	121	100

Source: Field survey , 1999

Table No 15
Road length by peak hours running speed

Sr. No.	Speed (KMPH)	Road length KM					
		Primary		Secondary		Total	
		KM	%age	KM	%age	KM	%age
1.	<10	0	0	0	0	0	0
2.	10-20	8	14	27	43	35	29
3.	20-30	26	45	25	40	52	43
4.	30-40	16	29	4	6	20	17
5.	>40	7	13	1	1	8	7
6.	NA	0	0	6	10	6	5
Total		58	100	64	100	121	100

Source: Field survey, 1999

7.12.2. However in addition to slower speed on the road network , considerable delays have been found mainly during peak hours at intersection on G.T. road, bye-pass road, Samrala chowk, Habbnowal road, Gaushala road, C.M.C. Hospital road, Rahon road etc. The major reasons which contribute to these delays are in appropriate traffic signals, timing , mixed traffic on street parking, lack of traffic awareness and lower order pf traffic control/ regulation. Delays of more than 3 minutes per Km were observed on link road, whereas it was found to be two minutes per km on G.T. road and 1.5 km per on Chandigarh road. Major reason for delays on Pakhowal road is due to mixed traffic conditions, road side parking, encroachments and railway crossing. Similarly cause of delay on focal point delay is mainly Railway crossings and slow moving vehicles. However poor road geometry and poor road conditions also contribute to the delays due to time taken by slow moving traffic to clear the intersections use of road space for commercial purposes by the informal sector contributes to the delay in the moment of traffic on major arteries resulting in congestion on these roads.

7.13. Intermediate Public Transport:

7.13.1 Absence of an effective and efficient public transport system in Ludhiana compared with nature of city road network has lead to the enormous growth of intermediate public transport in the shape of cycle, rickshaws and auto rickshaws. Preferred mode of transport in the city has been witnessed as use of auto rickshaws which have been found to be highly convenient by the users because of affordable fare and convenience of getting on and getting down at any place in the city. Since Ludhiana is the capital of small scale industry the concept of shared auto has been followed. Availability of auto rickshaws is very large as compared to buses. It has been estimated that more than 3000 auto rickshaws and 5000 cycle rickshaws are plying on the city rods. A Skelton intra city bus service is operated in the private sector. The share of the bus service is just 1.5% of the total transport trip generated within the city. Looking at the existing pattern of transportation it has been observed that for the smaller distance and intra city travel, auto rickshaws & cycle rickshaw are the preferred mode of travel whereas for inter city and longer travel bus travel remains the popular mode of travel . The rapid increase number of auto rickshaw can be attributed to lower operating cost and higher profit margins due to lower dead mileage , on an average, it was observed that average vehicle utilization was 71 Km /day. However these auto rickshaws use adulterated fuel mixed with the Kerosene which leads to

emission of lot of noise and fumes. In the process , then cause lot of pollution particularly in the congested area because of their smaller size and greater mobility these auto rickshaw try to occupy important spaces at the road to source passengers leading to creation of road congestion . In the absence of defined parking space , defined stops and effective regulation these vehicles remain parked on the road side outside the major traffic generator like bus, rail terminus and major shopping streets. Despite the fact that ITP serve useful purpose but for rationalization the traffic within the city regulation of auto/ cycle rickshaws would be critical.

7.14. Parking:

7.14.1. Parking remains another critical area for the Ludhiana metropolis . With increasing number of vehicle population , narrow road network , small old houses in the core areas , absence of parking space within majority of built space , parking blues are on the rise in the city. Absence of public transport higher use of personalized vehicles, rapid growth of intermediate public transport has led to the more and more vehicles using road for the parking. With no control being exercised on the volume of construction large and large space is being added to the city leading to creation of more vehicle traffic on the city roads. Policy adopted by the local Govt. to prevent conversion of residential building into commercial use without provision of parking has led to attracting larger number of vehicles on the smaller roads. Poor norms of parking provided in the commercial institutional buildings have been has led to shift of vehicles from these building to the roads. Commercial spaces , even when planned have inadequate parking space because the parking requirement are based on the ground coverage rather than on the total volume of built space. Feroz Gandhi market is a classical case of creating parking problem where higher FAR was permitted without corresponding increase in parking space. In the absence of clearly demarked space for parking vehicles remain haphazardly parked on the road berms . So far municipal corporation has constructed only one six storied parking space near Chaaura Bazar to cater to the parking needs of 600 cars and 600 two wheelers However more such public spaces need to be created alleviate parking problems in the city. In fact considering the acute shortage of parking space , vehicle ownership should only be allowed if owner has a parking space available with him. Private sector should be encouraged to create multi storeyed parking in the congested areas of the city. Further parking norms should be made more realistic and enforced strictly in the newly constructed building. No basement should be allowed to be used for commercial or other use and should be

exclusively earmarked for parking . Where the land use is permitted to be changed , it should be subject to creation of appropriate level of parking as prescribed by the Govt. Parking would remain a critical issue and would require a focused attention in order to overcome major operation problems of traffic and transportation within the city.

7.15 Management of Urban Transport:

7.15.1. Existing scenario of urban transport management is marked by existence of multiplicity of agencies with overlapping areas of operation. In some cases even a single component is managed by different agencies. For example in Ludhiana roads and the associated infrastructure are developed and maintained by several agencies namely Greater Ludhiana Urban Planning & Development Authority, Municipal Corporation , State P.W.D, National Highway Authorities of India, The Central Ministry of Surface Transport. Various agencies in the city feel free to dig these roads and leave un repaired or only badly repaired as often they like. Licensing of motorized vehicles is by District Transport Agencies and non motorized vehicles in by Municipal Corporation. Bus transport services are provided by dedicated State Road Transport undertaking. Rail services are under the control of Ministry of Railways whereas traffic rules are enforced by the State Traffic Police and so on.

7.15.2. All these agencies plan their activities and operate independently without any coordination. The funds for development /management of transport are sourced independently and are spent by them, not necessarily, in a most optimum manner.

7.15.3. The worst part of the existing scenario is that urban transport is considered as secondary responsibility by these agencies. For example it is the primary responsibility of Municipal Corporation, Ludhiana to provide civil services, police to maintain law and order, transport department is to issue licenses Development Authorities to plan for the growth of city, Railways to take care of rail traffic etc. But in the given context urban transport remains secondary on the agenda of these agencies. In certain cases, traffic engineering and Management is left to the traffic police, an area in which they have no expertise. Ludhiana does not have any Urban Transport Planner and Traffic Engineer on its role to guide and manage the urban transport.

7.15.4. The existing state of affairs has led to total neglect of urban transport leading it to a state of disrepair. It has failed to respond to the demand for improved quality and shift passengers from personalized transport to public transport. Further cost of providing services have been rising .

7.15.5. Looking at the existing mechanism, it would be better to put in place an umbrella organization to look into the entire mechanism of planning, development, operation and management of urban transport in Ludhiana. The dedicated authority should also be made responsible for planning, urban transport for the city as a whole including providing an integrated multi-moded public transport. The authority should be vested with power and authority to coordinate the effort of all agencies in order to develop state of art, safe, economic and convenient transport system in the Ludhiana Metropolis

7.15.6. There must be clearly defined allocation of responsibilities with each of agency operating in the domain of urban transport. Adequate man power and resources are a must for the effective management of urban transport. It is rightly said that travel and traffic are the worst gifts of urbanization, In order to minimize traffic and reduce travel within the city, it would be critical that urban transport is looked in an integrated manner and catered for in a totally dedicated and professional manner.

7.16. Key issues:

7.16.1. Based on the study and analysis of existing scenario, key issues identified regarding planning and management of traffic and transportation in Ludhiana are:-

- Absence of functional hierarchy of road network.
- Intermixing of local and regional traffic.
- Location of Bus and Rail terminals within the core areas and limited capacity of the network serving these terminals.
- Narrow roads in central core areas of the city with limited capacity resulting in large scale congestion
- Location of major traffic generators including wholesale markets within the central core.
- Large scale mixing of slow and fast moving traffic.
- Inadequate grade separation leading to travel delays and lack of road safety.
- Large scale encroachments of the road space leading to further congestion.

- Lack of parking space leading to vehicle parked on the roadside again creating congestion and delays.
- Absence of Ring Road or Bypass on the Southern side of the city leading to large amount of intercity traffic coming within the city.
- Inadequate safety and visibility encroachment parameters like signage, marking, channel islands, street name indicators/roads and other street furniture.
- Limited provision of footpaths on the roads with most of the footpaths encroached by informal activities.
- Lack of adequate public transport system and high growth rate of personalized vehicles.
- Poor level of traffic awareness and civic sense among road users and poor travel behavior
- Multiplicity and lack of coordination among agencies involved in planning and regulation of traffic and transportation.
- Irrational landuse pattern.
- .Large number of railway lines crisscrossing the city leading to creation of numerous bottlenecks.
- Operation of large number of slow and medium speed intermediate public transport(IPT) roads includes cycle, rickshaws and auto rickshaws etc.

CHAPTER-VIII

INDUSTRIES

8.1 Industries have been found to be the prime movers of the physical and economic growth of the urban areas. Rapid growth & development of Ludhiana Metropolis in the post-independence period can also be attributed to the momentum generated by the various Industrial segments in the city. The post- independence period has witnessed enormous growth in small and medium scale industries. With more than 80,000 small, medium and large industrial units (including household industries) mushrooming, city has emerged as the industrial hub of the State and capital for small scale industry. Labeled as the 'Manchester of India', city pioneers in the area of Hosiery & knitwear, garments, cycle, hand tools, sewing machines, auto components etc. which constitutes most vibrant industrial sectors in the city. City is also known for high volume of industrial exports. Despite the fact that Department of Industries of the State has developed focal points in an area of 1700 acres and industrial area A & B, a large number of industries are still spread over the Ludhiana city. With a view to facilitate the export from the city, Punjab Warehousing Corporation has set up Container Freight Station in Industrial Phase-II Dhandari Kalan . In order to meet the rapidly growing demand from Exporters, Punjab Small Industrial and Export Corporation has allotted addition land to Punjab Warehousing Corporation to expand its operation. Container Corporation of India has also set up its container yard at Dhandari Kalan.

8.2 Industrial Growth

8.2.1 There are sizeable number of large, medium and small scale industries in Ludhiana. The growth of Industries during the initial period of post-independence period has been very rapid. However, the growth has slowed down in the last decade as indicated by the data in table No 6.1. Table shows that the growth has been of higher order in the small scale sector as compared to large scale industries. Large scale industrial units constitute only 0.35% of the total industrial units existing in the city whereas share of small scale industries have been found to be of the order of 99.65%. The growth of large scale industrial units has been found to be stagnant, with total no. of units staying at 131 in the year 1997 and also in 2006. The yearly growth rate varied from -6.9 to 12.8% during the decade. During the year 1997-98, 1999-2000,

2000-2001 and 2004-05, the trend has been found to be positive with small addition of industrial units except in year 1999-2000 when the growth in numbers was substantial.

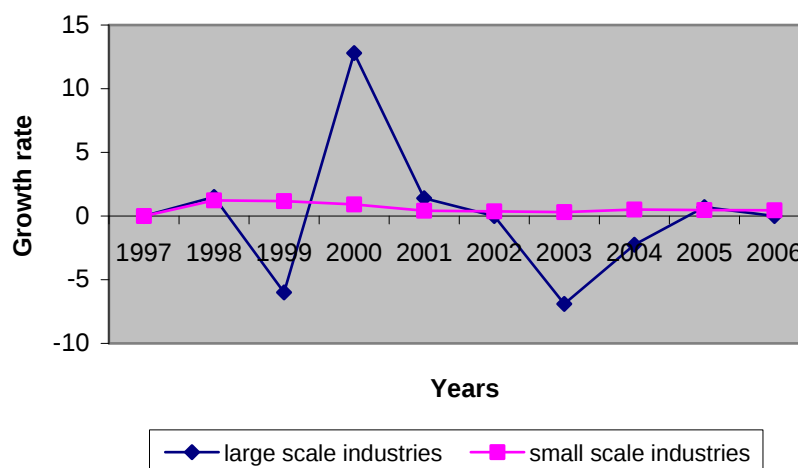
8.2.2 As compared to the large scale industries, the growth of small scale industrial units have better placed higher during the last decade. In absolute terms, the number of small scale units have grown from 34,730 to 36,823. During the period unlike large scale industries, no negative growth in the number of small scale industrial units have been recorded. Accordingly Ludhiana continues to be known as capital of the small scale industries. The growth of industrial units have been found to be varying between 0.31% to 1.23% on the annual basis with highest growth recorded during the period 1997-1998(1.23%) & lowest during the year 2002-03(0.31%). Trends of growth of small & large scale industrial units have been indicated below :-

Table No.1

Growth of Large & Small Scale Industrial Units in Ludhiana during 1997-2006.

Year	Large scale industries		Small scale industries	
	Number of units	%age growth	Number of units	%age growth
1997	131	-	34730	-
1998	133	1.5	35160	1.23
1999	125	-6	35573	1.17
2000	141	12.8	35897	0.91
2001	143	1.4	36049	0.42
2002	143	0	36184	0.37
2003	133	-6.9	36298	0.31
2004	130	-2.25	36484	0.51
2005	131	0.7	36657	0.47
2006	131	0	36823	0.45

Source: District Industrial Center, Ludhiana



8.3 Employment

8.3.1 Keeping in view the trends prevailing in the Industrial Units, small scale industrial units have been found to be not only largest in number but also generator of major proportion of employment in the city. Out of the total employment generated in the year 1997 by the Industries, the share of small scale industry was found to be 78.23% as compared to 21.77% in the year 1997. Thus the small scale industries share was found to be 3.5 times as that of large scale industries. During the last decade, small scale industries units have continued to be major employment provider with 75.89% share in the year 2006 as against 24.11% for the large scale industries. During the last decade despite the fact the share of employment in the large scale industries have grown from 21.77% to 24.11% but during the year 2005-06, it has recorded a negative growth rate of 3.05. As against this, the small scale sector have always contributed positively to the generation of employment during the decade with numbers increasing from 1,82,509 to 2,04,797. During this period large scale industries provided employment to 50,793 (1997) to 65,057 (2006). The details of employment generated alongwith the growth rate and %age of total employment generated are given in Table 2 below:

Table No. 2
Employment in Small & Large Industrial Sector during 1997-2006

Year	Small Scale Industries			Large Scale Industries			Total Employment
	Employment	%age Growth	%age of total employment	Employment	%age Growth	%age of total employment	
1997	182509	-	78.23	50793	-	21.77	233302
1998	185703	1.75	78.36	51277	0.95	21.64	236980
1999	190026	2.33	78.43	52263	1.92	21.57	242289
2000	192818	1.47	76.92	57834	10.6	23.08	250652
2001	194174	0.70	76.71	58960	1.9	23.29	253134
2002	195338	0.60	76.27	60778	3.08	23.73	256116
2003	197415	1.06	75.55	63907	5.1	24.45	261322
2004	199467	1.04	75.41	65024	1.74	24.59	264491
2005	202797	1.67	75.13	67108	3.2	24.87	269905
2006	204797	0.99	75.89	65057	-3.05	24.11	269854

Source: District Industrial Centre, Ludhiana

8.4 Investment & production

8.4.1 Keeping in view the positive contribution made by the Small Scale Industrial Units in the Employment generation, these units have also substantially contributed in terms of industrial production. These units have also attracted considerable investment. Despite the fact that the growth of small scale industrial units during the decade 1997-2006 has been moderate but looking at the investment and the production generated by these units, it can be observed that contribution of these units to the economy of the city and the State has been considerable. Looking at the investment, it has been observed that during the year 1997 the total investment made in this sector was found to be Rs.65,616.06 lac which has been steadily growing on annual basis. The total investment recorded during the year 2006 was of the order of Rs. 126518. lac. In absolute terms, additional investment recorded in the industry was to the tune of Rs 60902.11 lac and in %age terms it was found to be 192.8 % indicating that the investment has doubled during the period. During the same period, the production also increased substantially from Rs.349928.90 lacs(1997) to Rs.128632.12 lacs(2006). As against an investment getting doubled during the period, the production has grown more than 3.5 times indicating larger contribution of industries to the economy of Ludhiana Metropolis . Table No. 6.3 indicates the trends of investment & production in the small scale industrial sector during the decade 1997-2006.

Table No. 3
Small scale industrial investment and production (1997-2006)

Year	Investments (Rs. In Lacs)	Production (Rs. In lacs)
1997	65616.06	349928.90
1998	72994.28	422312.39
1999	86828.16	471258.33
2000	95663.78	556094.17
2001	100814.43	612175.94
2002	105525.41	706001.40
2003	112113.42	822570.78
2004	118577.41	971638.90
2005	122569.00	1150298.65
2006	126518.17	1286324.12

Source: District Industrial Centre, Ludhiana

Table No.4
Small scale industrial Units, investment and production (category wise)

Name of industry	No. of units				Investment (Rs. Lacs)				Production (lacs)			
	1997	2000	2003	2006	1997	2000	2003	2006	1997	2000	2003	2006
Textile	186	203	7085	7128	1307	1814	24871	26342	1599	3153	186394	29455
Hosy. &gar ms	7838	8200	9102	9545	7669	21274.5	32356	35001	91686	131263	152450	175642
Metal prod.	3351	3495	4827	4959	5131.58	6627	13251	20931	16848	24030	155573	240564
Mach. & parts	3099	3224	3690	3739	7989	9011	9537	10926	28446	41006	69639	110630
Transport eqp & parts	4394	4642	4758	4898	12307	15940	17429	21103	117724	184293	244381	421906
Servicing & rep.	5403	5435	4803	4829	1575	2715	1354	1946	1882	3164	3056	4885

Source: District Industrial Center, Ludhiana

The data in the Table No. 3 reveals the fact that almost in each category of industry running in Ludhiana City, no. of units, investments as well a production has increased during the past decade with a few exceptions. In textile industry no. of units, investment and production, all have been increased manifolds during the decade, with a sudden influx in all those three aspects in 2003-06 period. In the second category i.e. Hosiery and Garments, the gradual growth has been seen in terms of no. of unit investment and production in general, but during period 1997-2000 the increase in investment is shown almost triple. In the industries related to metal production also, growth trend in terms of all the three aspects shows the gradual increase with a surprising fact that during the period 2000-03 although there is although double the increase in investment, the production has shown a declining figure. In Ludhiana City, the categories of industry related with machinery and parts and transport equipments shows the positive growth during the decade, almost proportionately in all the three aspects i.e. no. of units, investment and production. While the trend in servicing and repair industries are mixed. The data of this type of industries show that there is sudden negative growth in time of all aspects during period 2000-03, with the positive growth of this industry during all other years.

8.5 Industrial Focal Points:

8.5.1 Ludhiana is known for its Industry in the Small, Medium & Large Scale particularly in the Hosiery, Engineering, Garments, Cycles, Metal segments.. City has

not only graduated in the area of industrial production but has also made a mark in the export of goods both locally and globally. In order to meet the growing demand of export, Punjab State Warehousing Corporation has set up Container Freight Station in Industrial Phase-V Dhandari Kalan . With increased level of exports, additional land to the tune of 11 Acre have been allocated to the Corporation for providing additional facilities to the Exporters. In addition, Container Corporation of India has also set up Container Yard at Dhandari Kalan in order to facilitate the quick movement of goods meant for export to the different Ports / Airports of the Country.

8.5.2 With a view to facilitate the industrial growth and to locate the industries in appropriate locations, State Government launched a policy of developing industrial Focal Points in different cities having potential for industrialization. The Focal Points were to be developed based on a well defined strategy, laying for proper siting, state of the art planning, supported by basic & essential infrastructure and services in order to provide appropriate environment for industrial growth & development besides increasing their productivity. Accordingly, Industrial Focal Points were set up in the Ludhiana Metropolis by the Department of Industries way back in sixties. Industrial Phase-I, II & III were planned in the Dhandari Kalan with an area of 440 Acre prior to 1973,. Keeping in view larger demand for industrial plots, subsequently Phase-IV, IVA, V, VI(A&B),VII & VIII were also taken up for development encompassing an area of 1699 Acre. So far 2139 Acre have been developed for providing Industrial Plots in the Ludhiana Metropolis. Prior to the development of industrial focal point at Dhandari Kalan, the Industries Department had developed industrial area A & B. The detail of areas and plots carved out in industrial focal points are given below.

Sr.No.	Industrial Phase	Area in acres	No. of Industrial units.
1	I		
2	II	440	123
3	III		
4	IV	73	187
5	IVA	57	153
6.	V	430	285
7.	VI(A&B	227	310
8.	VII	166	379
9	VIII	746	717
	Total	2139	2154

8.5.3 The major industrial planned growth on the Dhandari Kalan is located between two Highways i.e. National Highway No.1 from Ambala to Amritsar and Chandigarh - Ludhiana National Highway . In addition, the trunk railway line between Delhi to Amritsar also forms one of the boundaries of the Industrial Focal Point at Dhandari Kalan. Due to inadequate approaches from the National Highways coupled with the large volume of inter/intra-city traffic carried by the Highways, smooth inflow/out-flow of traffic from Industrial Focal points has emerged as the major problems. Bottlenecks created by the level crossings at the Railway Lines has further led to the deterioration of the smooth flow of traffic. With the large number of encroachments made by the industrial units and dumping of goods on the road berms have reduced the capacity of the roads to carry the required traffic. Mixed and animal driven traffic has also contributed its share in restricting the smooth flow of traffic. The adoption of lower specifications for the internal roads have also hampered the movement of vehicles.

8.5.4 The industrial focal points do not have the adequate provision of storm water drainage resulting in accumulation of water in the area particularly during the rainy season. In the process, considerable damage is caused to the road surface. Every year considerable expenditure is incurred on the repair of the roads after the rainy season. The area needs to be provided with an effective and efficient system of storm water drainage in order to minimize the problem and ensure proper flow of traffic particularly during the rainy season.

8.5.5 During the development of various industrial focal points, no provision of laying out-fall sewer was made and the sewage used to be pumped out in the adjoining fields. The existing disposal work could not carry the effluents of these sectors. Later on the sewage system of the focal point was connected with the sewerage system of MC Ludhiana. However, the system could not take the load of industrial focal point and now the Focal Point Sewerage has been connected with Jamalpur Disposal Works for disposal in Budha Nallah. The system and disposal of sewage from the focal point is inadequate and needs augmentation and improvement.

8.5.6 So far 2154 plots have been made available for the setting up of industries. But the number of plots made available are grossly inadequate to meet the demand for housing even the existing industrial units. As already detailed in Table No. 6.1, there are approximately 37,000 industrial units operating in Ludhiana. Thus large number of such units are operating from areas earmarked for purposes other than industrial. Mushrooming of the small scale industrial units have been found to exist and operate as

integral part of residential development. Industrial units are located within the houses itself. At present polluting industries like electroplating, dyeing and finishing have been set up in a haphazard manner in the residential areas where there exists no facility for effluent treatment plant. All the effluent generated by these polluting industries is discharged in the residential sewers/open drains. This has led to creation of major environmental problems for the residential areas in the city. In addition, it has also led to the contamination of the ground water in the area making the water unfit for human consumption. In fact Ludhiana faces the major environmental crisis from the existence and operation of large number of small scale industrial units from polluting the thick residential areas.

8.5.7 In order to minimize the problem caused by the location of polluting industrial units within the residential areas and to improve the environment within the city, it becomes important that all the polluting industrial units are shifted out of the residential areas and located in the defined industrial zones. The shifting of the small scale industry would require a well defined strategy based on providing incentives/disincentives. In addition, large scale industrial development would be required to be taken up around Ludhiana in order to shift the polluting industrial units from the residential areas. Such a development should be based on creating built up space where number of small scale industrial units could be housed in a single building rather than providing a plotted development

8.6 Key issues:

8.6.1 With a view to rationalize the growth and development of industries in Ludhiana and to provide a supportive and enabling environment which would attract higher investment, generate more employment and improve productivity of the industrial units, following key issues have been identified:-

- i) Large scale planned industrial development needs to be taken up to provide for existing shortfall and future land requirement of the industrial units.
- ii) The infrastructure and services within the existing focal points needs to be upgraded in order to improve the environment and productivity of the existing units.
- iii) Open spaces provided within the industrial focal point should be developed/landscaped. Large scale plantation of trees should be taken up along the road berms and the open spaces.

- iv) Approach to the existing focal points needs to be appropriately upgraded to facilitate the movement of traffic within and outside these units.
- v) All level crossings on the trunk railway line needs to be replaced by underpasses/over -bridges for eliminating delays and traffic jams.
- vi) All polluting industries operating from the residential areas needs to be shifted on priority to the defined zones.
- vii) All polluting industries should be provided with Effluent Treatment Plants in order to treat the toxic industrial waste. The treated industrial waste should be recycled to be used by the industrial units in order to minimize pollution of the ground water or surface water sources.
- viii) All polluting industrial units operating along the Budha Nallah should be shifted on priority to the designated industrial zones for minimizing pollution of Budha Nallah based on appropriate incentives.
- ix) All polluting industries should be located and segregated from the residential areas by creating appropriate green buffer.
- x) Multiplicity of agencies operating within the domain of industrial development should be eliminated and a nodal agency for growth and development of industrial focal points in Ludhiana should be designated..

CHAPTER-IX

ENVIRONMENT

9.1 With Ludhiana Metropolis becoming home to large number of industrial units and centre for trade & commerce, city has been rated as one of the most industrialized and commercial capital state of Punjab. Industry has not only been found to be the major growth driver of the city but also major polluter of the city environments. Accordingly, Ludhiana has emerged as the 2nd most polluted city in the Northern India. Impact of pollution has been witnessed in the city in the form of quality of air, quality of water both surface and underground, noise pollution, degradation of the natural resources, low vegetation cover etc. These environmental problems have already reached a critical stage, calling for an immediate action. The intensity of the pollution in terms of air, water and noise have been evaluated in order to clearly understand the level and causes of pollution existing within the city so that appropriate strategies are put in place to tackle the problem of pollution.

9.2 Air Pollution :

9.2.1 Existence of large number of units including the polluting industries, has adversely impacted the quality of air in the Ludhiana metropolis. Emission generated by fuel burnt by industries have also contributed to the lowering of quality of the air. With a view to clearly assess and monitor the status & quality of ambient air in Ludhiana, data with regard to quantity of suspended particles, SO₂ and NO₂ present in the air is being collected and analyzed by the Punjab Pollution Control Board. The data is collected for the entire year and is categorized into three distinct periods involving January to April, May to August & September to December. For this purpose, the Board has set up four monitoring stations in different parts of the city. These stations have been placed at the most vulnerable parts of the city which include Milk Plant (residential) , Bharat Nagar Chowk (commercial), Industrial Area and Sherpur Chowk(industrial). These areas not only carry large volume of traffic but houses large number of industrial/residential/commercial units. The data collected for the year 2001, 2002, 2003 and 2004 has been indicate below in Table No.1,2,3& 4:

Table No.1 : Ambient air quality in Ludhiana (2001)

Sr. No	Location	Jan-Feb-Mar-Apr			May-Jun-Jul-Aug			Sep-Oct-Nov-Dec		
		SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NOx $\mu\text{g}/\text{m}^3$	SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NOx $\mu\text{g}/\text{m}^3$	SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NOx $\mu\text{g}/\text{m}^3$
1.	Milk Plant	131	11.3	30.6	120	11.8	30.9	165	10.8	16.8
2.	Bharat Nagar Chowk	154	13.1	30.7	138	11.9	31.2	169	9.2	29.6
3.	Industrial Area	210	11.6	31.3	235	11.6	31.3	242	11.5	31.7
4.	Sherpur Chowk	241	11.8	30.9	194	12.0	31.6	275	13.1	30.7

Source: CDP (2007-2021), Ludhiana

Table No.2 : Ambient air quality in Ludhiana (2002)

Sr. No	Location	Jan-Feb-Mar-Apr			May-Jun-Jul-Aug			Sep-Oct-Nov-Dec		
		SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NOx $\mu\text{g}/\text{m}^3$	SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NOx $\mu\text{g}/\text{m}^3$	SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NOx $\mu\text{g}/\text{m}^3$
1.	Milk Plant	138	10.2	29.6	123	10.7	29.4	169	9.6	29.9
2.	Bharat Nagar Chowk	158	9.1	28.8	142	9.8	27.9	170	11.7	27.2
3.	Industrial Area	215	12.2	29.9	239	12.0	30.5	246	13.7	31.1
4.	Sherpur Chowk	245	9.8	27.9	200	10.0	27.0	278	10.1	30.5

Source: CDP (2007-2021), Ludhiana

Table No.3 : Ambient air quality in Ludhiana (2003)

Sr. No.		Jan-Feb-Mar-Apr			May-Jun-Jul-Aug			Sep-Oct-Nov-Dec		
		SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NO _x $\mu\text{g}/\text{m}^3$	SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NO _x $\mu\text{g}/\text{m}^3$	SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NO _x $\mu\text{g}/\text{m}^3$
1.	Milk Plant	140	9.7	30.2	121	10.7	31.7	163	8.6	31.8
2.	Bharat Nagar Chowk	159	8.9	30.1	144	9.2	31.9	172	11.9	30.4
3.	Industrial Area	219	12.5	29.0	242	12.2	29.5	248	14.4	32.8
4.	Sherpur Chowk	247	10.5	30.5	202	11.0	31.0	280	10.7	31.7

Source: CDP (2007-2021), Ludhiana

Table No.4 : Ambient air quality in Ludhiana (2004)

Sr. No.		Jan-Feb-Mar-Apr			May-Jun-Jul-Aug			Sep-Oct-Nov-Dec		
		SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NO _x $\mu\text{g}/\text{m}^3$	SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NO _x $\mu\text{g}/\text{m}^3$	SPM $\mu\text{g}/\text{m}^3$	SO ₂ $\mu\text{g}/\text{m}^3$	NO _x $\mu\text{g}/\text{m}^3$
1.	Milk Plant	136	9.1	29.8	118	8.7	29.0	160	9.1	29.2
2.	Bharat Nagar Chowk	160	10.2	29.9	146	9.8	29.1	175	11.7	29.2
3.	Industrial Area	228	13.5	32.0	249	13.7	32.4	257	13.9	34.7
4.	Sherpur Chowk	250	10.0	27.3	206	9.9	29.9	284	9.7	27.2

Source: CDP (2007-2021), Ludhiana

Permissible Levels :

Residential and commercial area: SPM = 120 $\mu\text{g}/\text{m}^3$, SO₂ = 80 $\mu\text{g}/\text{m}^3$, NO_x = 80 $\mu\text{g}/\text{m}^3$

Industrial area: SPM = 200 $\mu\text{g}/\text{m}^3$, SO₂ = 120 $\mu\text{g}/\text{m}^3$, NO_x = 120 $\mu\text{g}/\text{m}^3$

9.2.2 Looking at the data given in the above tables, it has been seen that air contains large volume of suspended particles and the higher presence of such particles has been recorded at all stations against the permissible limit of 120 $\mu\text{g}/\text{m}^3$ at all the four

stations indicating lower quality of air in Ludhiana. The higher level of SPMs has been found to exist throughout the year with lowest recorded during the period May to August and highest during September to December. The presence of higher level of SPMs can be attributed to mixing of dust from open land, pollutants from Industrial Area and smoke from vehicular traffic. Out of the four stations, the best quality of air has been found to exist in the area surrounding Milk Plant due to presence of well planned/developed residential colonies and Punjab Agriculture University. Next in the order of quality of air has been found to be area around Bharat Nagar Chowk whereas the worst placed areas are the Sherpur Chowk and the industrial Area which houses large number of industrial units and large volume of traffic. With regard to level of SO₂, it has been found to be within limits. Also the level of NO₂ has been found to be within the permissible limits and well below the prescribed standards at all the stations during the years 2001 to 2004. However, the data in all the above tables indicates the higher presence of the SPMs, SO₂ and NO₂ over the years indicating the deteriorating quality of ambient air in Ludhiana.

9.2.3 Major contributors to the air pollution have been found to be :-

- i) Vehicular exhaust due to the presence of large number of vehicles and higher use of personalized private vehicle
- ii) Absence of effective & efficient system of mass transportation.
- iii) Narrow road width (with average varying between 4.5 to 7 mts.), low capacity of the roads and high intensity of traffic.
- iv) Smoke emitted by the large scale use of kerosene/diesel based power generators
- v) Presence of large number of intermediate public transport vehicles and use of kerosene as the fuel.
- vi) Smoke emitted by Industries.
- vii) Use of rice husk by the industry.

9.3 WATER POLLUTION

9.3.1 Rapidly increasing urbanization and industrialization of Ludhiana has not only adversely impacted the quality of ambient air in the city but also has affected the city's water resources. Budha Nallah, an unlined canal, is the major surface water resource of the city. Being the recipient of city's untreated domestic and toxic industrial waste, dumping of solid waste, dumping of ash from burnt rice husk, the quality of water has degraded considerably. As a result of perennial flow of sewage into Budha Nallah, it

has been converted into an open sewer. The pollution of Budha Nallah has adversely affected the quality of surface water as well as ground water of the major part of the city and its environs.

9.3.2 Budha Nallah which once used to be a fresh water stream now carries the industrial and domestic waste water of Ludhiana city. Studies have revealed that Budha Nallah which was once the bed of river Satluj and a fresh water perennial stream used to have 56 types of fish species prior to 1965. The number fell to 18 in 1970 when Municipal Corporation started throwing domestic water into the Nallah. By the year 1984 number came down to merely 4 species due to increased level of pollution. As of now Budha Nallah has neither fish nor plankton left indicating highest level of water pollution. The loss of all its wealth can be attributed to existence of high toxicity of water involving heavy metals like Chromium, Nickel and Zinc, Dyes and Cyanide.

9.3.3 For assessing the status and level of contamination of surface water pollution in Budha Nallah, a detailed analysis in respect of Bacteria, odour, mosquitoes, aesthetics has been carried out. Details of the data collected based on field survey is given below. From the data, it is revealed that more than $1/4^{\text{th}}$ of the population of the city and $1/7^{\text{th}}$ area of the city is considerably affected by the water pollution caused in the Budha Nallah. A strip of 1000 mts. on either side of Budha Nallah has been affected by the water pollution. For assessing the impact of pollution the entire area under the impact of pollution has been divided into 3 distinct zones. High bacterial contamination has been found to exist within the first 150 mts. strip whereas moderate contamination has been observed in the middle zone (151 to 500 mts) whereas low contamination has been found to exist in the last 500 mts. In this area more than 55% population is affected by incidence of high & moderate bacterial contamination. Similar position has been found to exist in respect of the aesthetic aspect.

Table No. 5 : Budha Nallah water contamination analysis (Bacteria aspect)

Zones (distance from the source)	% of area affected	% of population affected
High contamination (upto 150 meters)	2.45	4.6
Moderate contamination (151 to 500 meters)	5.70	10.15
Low contamination (501 to 1000 meters)	8.15	13.4
TOTAL	15.30	28.15

Note: percentage of area and population is based on the total area and population of city.

Source: Field surveys.

9.3.4 The water pollution in the Budha Nallah has also adversely affected the quality of ground water. Accordingly, it is revealed that the 28.15% of the population living in 15.30% influence area is forced to consume the contaminated water. Thus study has further shown that population living in this area has been subjected to water borne diseases like gastroenteritis, dysentery, jaundice etc. The table shows that 29% of the total population living in 16.3% of the city area suffers from the above health hazards caused by the contaminated water of Budha Nallah

Table No. 6 : Budha Nallah health affected zone

Zones (distance from the source)	% of area affected	% of population affected
High effected zone upto 1000 meters	16.3	29.0

Note : percentage of area of population is based on the total area and population of the city.

Source: Field surveys

9.3.5. In addition to the surface & ground water pollution, air & environmental pollution has been also witnessed in the area due to pollution in the Budha Nallah. Discharge of untreated sullage, solid water and organic material within the Budha Nallah leads to constant emission of foul smell/stench, which most of the time is unbearable. It has been found a belt of 500 mts. on either side of the Budha Nallah has been suffering from the nuisance of bad odour. The highest affected area falls within 75 mt. belt of the Budha Nallah which houses around 2.9% of the population. 6.09% population living in 76 to 250 mts. depth is moderately affected whereas population living in last 250 mts. is the least impacted. Around 1/8th population of the city have

been found to suffer due to the bad odour emitted from polluted water of Budha Nallah. This shows the level of impact Budha Nallah has on the quality of life in the city.

Table No.7 : Budha Nallah Odour zone

Zones (distance from the source)	% of area affected	% of population affected
High odour (upto 75 meters)	1.22	2.9
Moderate odour (76 – 250meters)	2.85	6.09
Low odour (251-500 meters)	4.36	8.27
Total	8.43	16.26

Source : Field survey

9.3.6 The polluted and stagnant water, growth of wild grass and heaps of garbage within & outside the Nallah has led to breeding mosquitoes and flies on massive scale particularly during the rainy season.. As a result, occurrence of malaria especially during rainy season, has been found to be rampant within a belt of 600 mts. of the Nallah. The details of area and population affected due to mosquitoes is given in Table 8. It has been found that approximately 10% of the area of the city and 1/5th of the population is prone to the diseases caused by mosquitoes and flies. The worst sufferers have been found to live in 100 mt. belt which account for 1.63% of the city area and 3.87% of the population. Next 200mt. belt is moderately affected and houses 3.2% of the area and 6.96% of the population. Least affected area and the population falls in the last 300mt. belt. Every 10th person of the Ludhiana city has suffered due to the water pollution of the Budha Nallah. If the city has to get rid of large incidence of Malaria and other water borne diseases, checking water pollution in the Budh Nallah should be taken up on priority.

Table No.8 : Budha Nallah mosquito zones

Zones (distance from the source)	% of area affected	% of population affected
High affected (upto 100 meters)	1.63	3.87
Moderate affected (101-300 meters)	3.26	6.96
Low affected (301-600 meters)	4.88	9.8
Total	9.77	20.63

Note : Percentage figures are based on total area and population the city.

Source : Field survey

The water sample analysis report given in Table 9, reveals the presence of considerable level of pollutants including solids, suspended/dissolved solids, metals etc. The level of pollutants have been found to be at variance at different places where the water sample of Budha Nallah was taken. In order to reduce the level of pollutants caused by the discharge of sewerage water in Budha Nallah, three sewerage treatment plants viz at Vill. Balloke, Vill. Jamalpur and Vill. Bhattian have been installed. Despite the installation of these STPs, water pollution caused by sullage disposal has not been totally reduced due to lower capacity of these treatment plants to treat the entire city's industrial and residential waste. Accordingly, part of the untreated sullage still finds its way into Budha Nallah causing pollution of both ground and surface water of the city. Table No.9 also shows the comparative values of different parameters before and after the treatment at STP Bhattian. It has been observed that considerable reduction of pollutants has been made possible due to the treatment of sullage water. Not only change in color of water has been observed but also considerable reduction in the quantity of different metals present in the water has also been observed. Despite the fact that the sullage water has been treated but still presence of pollutants have been found to exist in the treated water indicating that more intensive treatment of sullage water needs to be undertaken. The hand pumps and shallow tube wells drawing water in the influence zone of Budha Nallah have been found to be highly susceptible to ground water pollution as well as the toxic pollutants.

Table No. 9 : Water Sample Analysis Report (31.10.2007)

S.No.	Parameters	Inlet to STP			Outlet of STP at Bhattian
		Balloke	Jamalpur	Bhattian	
1.	Ph	6.9	6.8	7.5	7.0
2.	Colour Visual	Greyish	Blackish	Greyish	Pale with light blackish tinge
3.	COD (mg/l)	728	408	725	136
4.	BOD (mg/l) (3 days at 27 °C	238	118	215	28
5.	Total suspended solids (mg/l)	174	94	196	24
6.	Total Dissolved solids (mg/l)	652	608	764	608
7.	Total solids (mg/l)	1123	1462	1309	933
8.	Volatile Solids (mg/l)	636	468	504	258

9.	Fixed Solids (mg/l)	486	994	805	675
10.	Total Chrome (mg/l)	0.62	0.75	0.42	0.17
11.	Hexa Chrome (mg/l)	N.D.	N.D.	N.D.	N.D.
12.	Nickel (mg/l)	0.35	0.67	0.80	0.10
13.	Iron (mg/l)	24.8	27.6	12.3	1.50
14.	Lead (mg/l)	1.0	1.7	1.30	1.00
15.	Zinc (mg/l)	1.7	2.9	1.00	0.20
16.	Cadmium (mg/l)	N.D.	N.D.	N.D.	N.D.
17.	Bioassay in 100% effluent	--	--	--	0% Survival of FOL after 96

Source : Punjab Pollution Control Board, Ludhiana.

Ground water pollution

The degradation of the quality of ground water caused due to pollution of Budha Nallah has also taken the toll of the ground water. The seepage of polluted water from the Nallah and the industrial waste has led to the pollution of the ground water sources. Accordingly, the ground water quality in the city is also not good. Ground water in most of the industrial estate and in few residential areas have become unfit for drinking. In comparison to deep water aquifer, shallow water is seriously affected. The city accordingly faces a severe water pollution problem. In the process, majority of the residents of Ludhiana city and that of 40 adjoining villages are forced to consume contaminated vegetables and drink unsafe water, thus exposing themselves to the risk of water-borne diseases. Major issues emerging from the ground water pollution have been listed below:-

- i) Excessive pumping has lead to contamination of ground water. Persons residing in Abadies in close proximity to Budha Nallah passing through Ludhiana and 40 adjoining villages have been found to be exposed to water borne diseases due to polluted ground water.
- ii) Considerable level of ground water pollution have been found to exist upto depth of 100 ft. along the 1km. belt on either side of Budha Nallah. The quality of water has been found to be unsuitable for supporting aquatic life.
- iii) Hand pumps and shallow tube wells drawing water from first aquifer are found susceptible to ground water pollution in areas close to industrial units and Budha Nallah.
- iv) Presence of Cyanide and lead contents have also been reported from the second aquifer

- v) Not only the industrial areas but also the areas having mixed land use are being adversely affected due to the presence of toxic pollutants like cyanide and hexavalent chromium in excessive proportion in the ground water..
- vi) Ground water available along the G.T.Road has also been found to contain large volume of polluting contents like Chrome etc. Effluents containing toxic metals from large number of electroplating units is seeping into ground water due to discharge of untreated/partially treated effluents into the ground.
- vii) The pollution of the soil & ground water has also been caused by the dumping of the industrial wastes (effluents and solid waste) into the open ground leading to stagnation and the generation of the leachate,.
- viii) The use of polluted ground water for agricultural purposes has also led to the degradation of the soil and presence of heavy metals into soil and vegetable crops grown in the area

9.4 Noise pollution

9.4.1 Due to over crowding, large volume of slow moving mix traffic comprising pedestrians, market goers, concentration of two wheelers, three wheelers, cars, buses, trucks etc. the city is facing the problem of noise pollution. The noise has already reached a level, high enough to cause annoyance capable of creating temporary to permanent hearing impairment, particularly to those people who remain exposed to such noise level for longer time during the day. Street vendors, shopkeepers doing business along both sides of road have been found to be most vulnerable to this hazard. The noise pollution is not limited to the traffic only but use of loud speakers by the religious institutions and during the marriage/festivals has also added to the quantum of pollution. The use of generators by the residential, commercial and industrial establishments have also added to the pollution level in the city.

9.4.2 A detailed noise level monitoring was carried out by the Punjab Pollution Control Board, Ludhiana recently during the Dewali days in different parts of the city covering commercial, residential and sensitive locations including hospitals, educational institutions etc. The monitoring was done for three consecutive days i.e. from Nov.8th to Nov.10th 2007 both during the day and the night. In all cases it was observed that the level of noise were higher than the permissible limits in all the areas. Noise level was found to be higher during the night as compared to the day. Noise level was found to be

higher in case of commercial locations as compared to residential and sensitive locations. The worst area suffering from the noise pollution has been found to be the sensitive locations including hospitals and University where during the night time the noise level was found to be more than double the permissible limit of 40 dBs. Details of noise level recorded during the Dewali days at various locations of the city has been given in Table No.10 which may be read with Annexure-III.

9.8.3 Thus it can be observed that city does suffer from the menace of noise pollution. It is, therefore, considered prudent and worth while to conduct noise level monitoring at several sites including different areas at different times during day and night so as to assess realistically the problem of noise pollution and plan for appropriate intervention to overcome the problem

NOISE POLLUTION

TABLE 10 : NOISE LEVEL MONITORING DURING DIWALI DAYS (2007-08)

S.No.	Date	NOISE LEVEL											
		Commercial				Residential				Sensitive			
		Day (Permissible limit 65) (B)		Night (Permissible limit 55) (B)		Day (Permissible limit 55) (B)		Night (Permissible le limit 45) (B)		Day (Permissible limit 50) (B)		Night (Permissible limit 40) (B)	
		dB (A) Leq	dB (C) Leq	dB (A) Leq	dB (C) Leq	dB (A) Leq	dB (C) Leq	dB (A) Leq	dB (C) Leq	dB (A) Leq	dB (C) Leq	dB (A) Leq	dB (C) Leq
1.	8.11.2007	75.2	84.5	80.2	101.7	73.8	90.5	72.8	96.9	72.5	81.5	74.5	87.5
	8.11.2007	77.5	93.4	92.9	100.1	69.2	84.9	80.7	97.5	62.5	98.4	75.8	92.9
	8.11.2007	77.5	85.7	87.8	100.9	70.3	91.8	67.8	98.7	68.9	80.5	70.2	90.4
	8.11.2007	75.5	99.5	82.5	102.9	75.8	92.5	80.2	92.8	59.2	75.2	67.8	87.2
	8.11.2007	74.5	85.7	80.2	103.2	68.2	79.5	76.8	94.4	62.5	82.2	68.9	89.9
2.	9.11.2007	78.8	97.0	89.5	102.8	82.8	91.8	80.2	97.8	73.7	94.9	79.2	88.7
	9.11.2007	79.5	96.8	88.2	102.2	77.0	96.8	81.8	98.4	72.8	74.8	74.8	98.2
	9.11.2007	82.2	101.7	91.8	102.6	74.6	99.0	78.9	98.9	68.9	69.5	69.5	92.9
	9.11.2007	80.9	104.2	96.6	104.7	76.3	102.2	75.8	96.2	72.2	76.7	76.7	92.9
	9.11.2007	81.7	102.9	97.9	106.9	74.7	95.5	77.5	99.9	75.8	71.6	71.6	94.2
3.	10.11.2007	69.5	83.5	72.7	99.5	75.3	79.8	85.5	85.5	68.5	78.9	78.9	95.2
	10.11.2007	76.5	85.6	80.2	101.2	75.5	80.6	96.7	96.7	58.0	63.2	63.2	89.9
	10.11.2007	80.5	89.7	85.2	99.8	65.9	76.9	80.3	80.3	59.5	69.2	69.2	85.3
	10.11.2007	70.9	70.9	76.8	95.7	69.8	81.2	82.2	82.2	62.4	60.2	60.2	82.5
	10.11.2007	75.2	75.2	82.7	100.2	76.8	84.5	95.3	95.3	66.2	70.5	70.5	87.2
		Locations (Commercial)				Locations (Residential)				Locations (Sensitive)			
		1. Ghumar Mandi 2. Jagraon Bridge 3. Chaura Bazar 4. Vishwakarma Chowk 5. Gill Road				1. Urban Estate, Phase-I, Dugri 2. Model Town 3. Sarabha Nagar 4. Bhai Randhir Singh Nagar 5. Civil Lines				1. Guru Teg Bahadur Hospital 2. Punjab Agricultural University 3. Dayanand Medical College & Hospital 4. Civil Hospital 5. Christian Medical College & Hospital			

Source : Punjab Pollution Control Board, Ludhiana

Chapter -X

WATER SUPPLY NETWORK

10.1 Ludhiana has the distinction of having one of the oldest system of water supply in the State of Punjab. It is now a century old . The system was made operational in October, 1908. The system is completely based on ground water s the source of drink water. Initially 24 wells were created in the area presently known as the Rose Garden. The water was pumpd through a system of tube-wells and then lifted to two number of MS steel tanks each with a capacity of 50 thousand gallons. The water was then supplied through a system of gravitation. The two steel water tanks are located in the old city i.e one Daresi Ground and other in Mochpura Ground. With the city getting power supply in 1938, the shallow tube wells were replaced by deep tube-wells and system of pumping/extracting the water was made through new electrical motors. Keeping in view the growth of population in the city, 38 tube-wells were installed between 1945 to 1970 in order to meet the growing demand of water in the city..

10.2 Source of water supply

10.2.1 At present there are three main sources of surface water available to the city which includes Sutlej river, Budha Nallah and Sidhwan Kanal. Due to limitations in respect of quality and quantity, these sources cannot be used for water supply to the city. The availability of water and the quality of water for the purpose of water supply to the city has been detailed below:-

10.2.2 Sutlej River is situated on the northern side approximately at a distance of 8 km from the city. However, the river remains dry during major part of the year , due to construction of Bhakra dam on the upstream side. It is only during monsoon season that the river has sufficient amount of water flowing into it. Hence the river not being perennial, cannot be used as the source for water supply to the city.

10.2.3 Budha nallah which runs parallel to Sutlej river, on its south for fairly large section of its course in the district Ludhiana and ultimately joins Sutlej at Gorsian Kadar Baksh in the north western corner of the district. Budha Nallah for a considerable length passes through the city limits. It gets flooded during the rainy season but in the dry season it does not carry enough amount of water. Presently, the nallah is extremely polluted due to dumping of industrial effluents and discharge of city's untreated sullage. Considering the quality , water from Budha Nallah can not be used as a source for water supply to the city.

10.2.4 Sidhwan Canal, a distributory of Sirhind canal, originates from Ropar head works in Sutlej River flows through the southern part of the city. The canal has a sizeable discharge of 1600 cusecs of water. But due to irregular flow, water cannot be sourced for supply to the city on the regular basis.

Thus, there is no surface water available for domestic or industrial purpose. The city totally relies on ground water for its water needs.

10.3. System of water supply and area coverage :

10.3.1 Supply, operation and maintenance of water is one of the prime and basic service, provided by Municipal Corporation of Ludhiana. However, the role of Municipal Corporation is limited to funding the entire cost of the project, making the system operational, maintain it besides collecting the revenue from the end users. The entire process of planning, designing, construction and laying the major net-work and construction of tube-wells & OHRs is handled by the State level agency i.e. Punjab Water Supply and Sewerage Board (PWSSB). Board undertakes this work for and on behalf of the Municipal Corporation and after completing the system it is handed over to Municipal Corporation.

10.3.2 For water supply, the Corporation has divided the entire city area (159.37 sq.kms.) into two distinct parts i.e. 'Declared areas' and 'Un-declared areas'. Declared area comprises of 85% of the city area (135.46 sq.kms.) and houses 85% of the population(14.15 lac), the un-declared constitutes (15%) of the total area of the city (23.91 sq.kms) and houses an equal proportion of population . As it stands today, supply of water by the Municipal Corporation is limited only to declared areas falling within the city limits whereas un-declared area is not served by the system. The coverage of the declared area is to the extent of 100% by the water supply system. However, the undeclared area which houses 2.5 lac population remains outside the ambit of water supply by the Municipal Corporation. This area is totally dependant upon their own sources of water supply. Declared and Undeclared areas are detailed in Table & Map No. **10.3.2**.

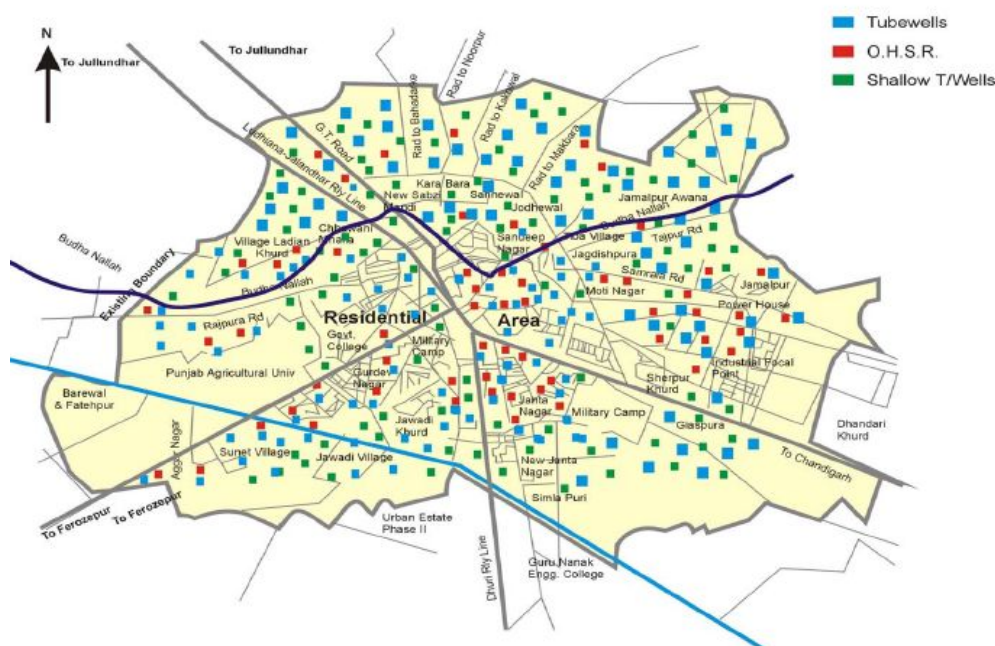
supplying water through gravity and for achieving required head. It can also be used as storage for meeting the requirements of fire safety by the Fire Brigade Department.

10.3.4 Right from the day of supplying water, the system is completely dependent on ground water as source of water supply (domestic as well as industrial) and the system of pumping the water was based on the Tube-wells. At present a net-work of 490 tube-wells spread over the city area are used by the Ludhiana Municipal Corporation to supply water. Both shallow (100 Nos) and deep tube-wells(390 Nos) are used for pumping the ground water. Deep tube-wells extract water from a depth of 400ft. and above whereas shallow tube-wells extract water from depth of approximately 180ft. Total amount of water extracted by these tube-wells is to the tune of 415 mld. All the tube-wells are equipped with chlorinators wherein 0.2 ppm of bleaching powder is added for treatment for providing 100% chlorinated water. The detail of tube-wells and their location is given below:-

Table No: 10.3.4
No. of Tube-wells and amount of water extracted

Item	Quantity Nos.	Remarks
Total no of tube-walls	490	Depth varying between 180 to 460
Deep Tube wells	390	Depth 400 ft and above
Shallow Tube wells	100	Depth 180ft and above
Total amount of extracted ground water	415 MLD	

Source: City Development Plan, Ludhiana (2007-2021)



Location Map – Deep Tube-wells, Shallow Tube-wells and OHSR

10.3.5 Out of 490 tube-wells, 429 tube-wells are used to direct supply of water in the system without any intermediate storage. 61 tube-wells are connected with the dual system involving supply of water with or without intermediate stage. The amount of water supplied through the direct system is 360 mld whereas the quantum of water supplied through the dual system is 61 mld. There are 61 OHSR (each with a capacity of 0.9 ml) which have a storage capacity of 55ml. In case of failure of electricity and resultant non-operation of the motors for pumping , the city faces hardship in terms of supply of water. The details of tube-wells under the different system and the amount of water pumped is detailed below in the Table 10.3.5

Table No. 10.3.5
Type of network system

Network system	No. of tube-wells	No. of water tanks (overhead)	Capacity (MLD)
System 1-Direct supply i.e. without intermediate storage)	429	---	360
System 2-Dual supply system (with or without intermediates storage)	61	61	55
Total	490	61	415

Source: City Development Plan, Ludhiana (2007-2021)

10.4 Connections

10.4.1 The city at present has 1.6 lakh registered water connections. There were only 16 connections in the year when the water supply was made operational in Ludhiana in the year 1909. The increase in number of connections in the pre-independence period was low and till 1950, Ludhiana had 2602 registered water connections. However, the post independence period witnessed a rapid growth of the population, industrialization, higher economic growth, number of households and accordingly number of water connections. Since 1976, when Ludhiana Municipality was up-graded to the level Corporation, number of water connections have been increasing at a rapid pace. During the last 5- years (2002-06), the number of connections have grown more than 30% from 1,27,905 to 1,64,473. The number of connections are likely grow very fast once un-declared area is also brought under the system of organized water supply by the Municipal Corporation under the JNURM.. The slum areas are supplied water through a system of water stand posts. At

present, there are 500 Water Stand Posts operating in the slum areas. Graph showing the growth of water connections is given below:-

Table no.10.3.6.

Year wise -profile of increasing water connections

Year	No. of connections
1909	16
1910	164
1920	1433
1930	1626
1940	2295
1950	2602
1960	4609
1970	14526
1980	35746
1990	82628
2000	115225
2002	127905
2003	137071
2004	154447
2005	159275
2006	164473

Source: City Development Plan, Ludhiana (2007-2021)

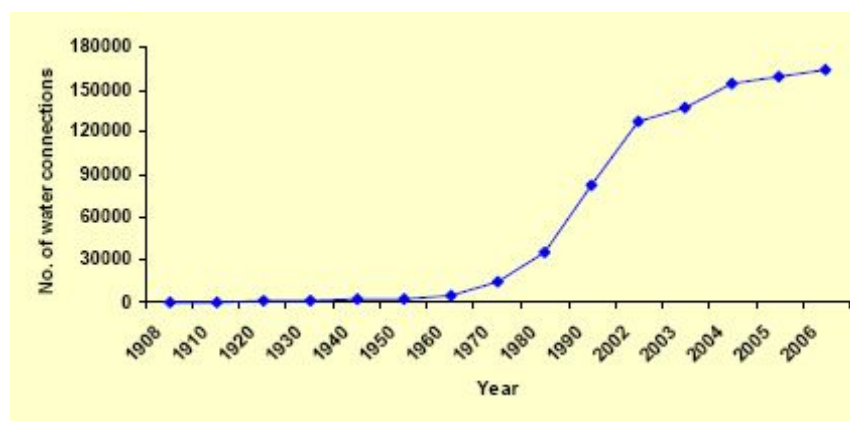


Figure: Year-wise Increasing Profile of Water Connections

10.4.2 A detailed analysis has been made with regard to number of connections registered in the domestic and commercial segments of the city. It has been observed that larger proportion of the connections fall under the category of domestic use. Whereas commercial water connections constitute only 8% of the total water connections. Number of connections have been growing very fast. The increased population, increased number of dwelling units and commercial establishments has resulted into more water demand in Ludhiana city. Moreover, the affordability level of people has led to increase in the number of connections during the last five years. Growth of water connections has been higher in

case of domestic category as compared to commercial use. The details of the water connections in both these categories is given in Table 10.4.2

Table No 10.4.2
Increasing profile of water supply connections during last five years

Years	Water Supply		
	Domestic	Commercial	Total
2002	117415	10490	127905
2003	126766	11305	137071
2004	128784	25663	154447
2005	1455943	13332	159275
2006	151912	12561	164473

Source: City Development Plan, Ludhiana (2007-2021)

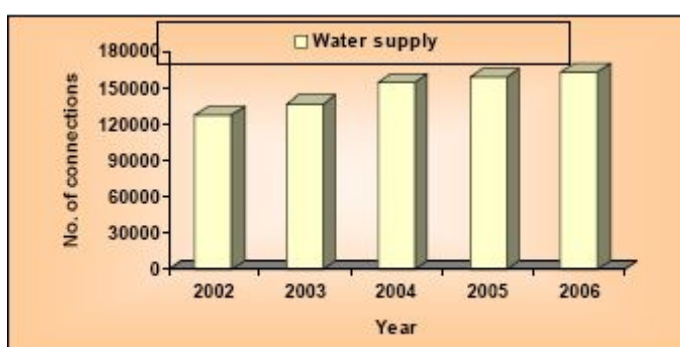


Figure: Increasing profile of water supply connections during last four years

10.5 Water supply and duration

10.5.1 The table indicates the area coverage and population receiving the water supply, amount of water supplied, number of connections and per-capita supply of water within Municipal limits. The total water supply in Ludhiana city in the year 2006 on daily basis was of the order of 415 MLD. Based on the population of the city in Ludhiana, the amount of water supplied on per capita basis works out to be more than 220 lpcd. As per the norms prescribed, the amount of water to be supplied is 135 lpcd. Accordingly, the amount of water supplied is higher than the prescribed norms. The duration of water supply is 3-times a day and the total duration works out to be 12hrs. on daily basis.

Table No. 10.5.1 Water demand and supply

Category	Area(in Sq.Kms .)	Amount of Water supplied	Regd. connections	Population	Water supply (lpcd)
Municipal area	159.37	415	164473	16,65,000	>220
Declared area	135.46	415	164473	9,81,618(Avg. household size 6	>220

Source: City Development Plan, Ludhiana (2007-2021)

10.6 Key issues:

10.6.1 Water contamination

Water supply system was first laid in the year 1908 and the sewerage facility was started in late 1960s. The streets of the old city are narrow and as such the water supply lines are running very near to the sewerage lines. With the passage of time the old city water supply lines especially the GI pipes have been corroded and have developed snags/cracks which attracts/sucks sewerage water leading to contamination. The reason of leaking of sewer is the eating away of the cement joints of the SW pipes used for provision of sullage sewer lines. In certain cases it has been seen that the water supply connections are passing through the sewerage manholes which are detected only after the reporting of the contamination complaints.

10.6.2 Multiplicity of Agencies.

Because of multiplicity of development agencies including PUDA, Improvement Trust, PSIEC, Deptt. of Industries, Marketing Board etc. operating in Ludhiana Corporation area, there has been found to be lack of coordination and integrated planning in the provision of services and amenities. All these agencies have focused on their areas taken up for development without bothering about the city level infrastructure. In this scenario, there have been found to be considerable variation in the level of services provided in the city. It has also been observed that in the initial stages, the newly developed area seem to be much better placed so far as the provision of services are concerned. But over a period of time with these areas getting developed, there have been found to be degradation of these services due to lack of maintenance and upkeep. Due to lack of integration and coordination in planning, development of the service network, the delivery of services

continues to be badly affected. Accordingly, for ensuring appropriate quantity and quality of water supply in Ludhiana Corporation area, a Nodal Agency needs to be designated.

10.6.3 UN-DECLARED AREAS - WATER SUPPLY SYSTEM

Despite the fact, the city has sufficient supply of water but still approximately 15% of the area remains unserved by the water supply network. The so called un-declared area does not have any provision of water supply and the requirement of the residents is met by the water supplied by the bore-wells dug out by the individuals. The quality of water through this source is highly un-reliable due to contamination of first layer of ground water. Thus more than 2.5 lac population of Ludhiana continue to suffer due to the absence of water supply network and absence of coverage by the water supply system.

10.6.4 Taping additional sources: The entire water supply system of the Ludhiana Municipal Corporation is based on the ground water resource. With rapid growth of population and expansion of the city, the amount of water being consumed have increased substantially. This has lead to rapid depletion of the ground water table. Initially considerable proportion of the demand for water supply was being met by the hand pumps which were in operation practically in all houses. With the lowering of the water table most of these water pumps have become non-operational. Further due to contamination of the ground water due to industrial waste, water made available through hand-pumps has not been found to be fit for human consumption.

10.6.5 Considering the rapid growth of Ludhiana Metropolis, it has become important that alternative sources of water supply should also be explored so as to reduce dependence on the ground water and to minimize the fast depletion of the water table. Appropriate mechanism of reducing the consumption of water needs to be explored including recycling of the waste water by the industry. Mechanism of rain water harvesting should also be encouraged at the household/institutional level to reduce dependence on the ground water.

10.6.6 The other major issues in the present water supply are :-

- Inequality in water distribution
- Quality of water
- Absence of record regarding the old network(location, depth, size, quality)
- Low overhead storage capacity
- High mortality rate of shallow tube-wells
- Large number of illegal connections.

- Poor maintenance of service network
- High degree of water loss due to leakages
- Wastage of water in slum areas due to stand posts.
- Un-metered water supply.
- Irrational water charges.
- Old service network requiring replacement.

CHAPTER-XI

SOLID WASTE MANAGEMENT

11.1 Introduction :

11.1.1 Waste is unwanted material left over from the manufacturing process and refuse from places of animal and human habitation. Solid waste is a combination of unwanted and discarded materials from households, commercial and industrial operations besides street sweeping. Increase in urban population coupled with change in life style and economic prosperity has lead to generation of considerable solid waste. Solid waste has emerged as the major problem in urban areas with regard to its affective managements. Solid waste arising from human activity has emerged as one of the major environmental issue leading to extensive pollution and threat to human health. The problems of Solid Waste Management, both domestic and industrial have assumed alarming proportions , more so in the larger cities and Metropolises. Limited disposal facilities coupled with dumping of the solid waste in a haphazard manner in various parts of city has lead to not only creating environmental problems but also serious health hazards. The national Conservation Strategy and Policy Statement on Environment and Development has laid stress on adopting stringent measures for prevention and control of pollution due to indiscriminate disposal of solid waste on land and into water resources. Hence, immediate steps are required for proper management of urban solid waste.

11.1.2 Solid Waste Management is the prime responsibility of Ludhiana Municipal Corporation within the Corporation area Corporation discharges this duty through the infrastructure created for collection, storage, segregation, transportation, processing and disposal. The public Health department of the Corporation is vested with the responsibility of day to day solid waste collection and disposal. The Corporation organizes the collection and transportation through of its own conservancy workers and a fleet of vehicles and dumpers-placers. Municipal Corporation collects solid waste from all the residential area within its municipal limits. collection facility is provided in 100% area occupied by people

11.2 Type & Quantity of waste generated :

11.2.1 There has been no formal study estimating the amount of solid waste generated in the Ludhiana Municipal Corporation. However, it is estimated that per capita waste generated per day is of the order of 535gms. In all city generates garbage to the tune of 850mts. on daily basis. The amount of garbage generated on per capita basis is quiet on the higher side considering the pattern of garbage generation in other cities of the country which ranges between 300 to 450gms. as against 530gms generated in Ludhiana Higher

garbage generation can be attributed to the living style and the economic/industrial character of the city

11.2.2 With regard to the type of solid waste generated in the city, it has been found that there are three broad groups into which the waste generated by the city can be categorized. These include :

- i) Municipal Solid Waste (MSW)
- ii) Hospital Solid Waste (HSW)
- iii) Industrial Solid Waste (ISW)

This categorization is based on the major activity pattern of the city. In addition to housing large population, city is also hub of small scale industries. It is also the nerve centre of providing health care in the State and accordingly houses large number of hospitals and health care institutions.

11.2.3 Looking at the classifications of waste generation, it has been found more than half of the total waste generated has its origin in the residential and open areas. Commercial areas account for 1/4th of the total waste generated whereas industries account for 1/5th of total solid waste. Accordingly, waste generated is heterogeneous in nature and has both toxic and non-toxic components. The details of source, type of facilities /activities generating the waste and the type of waste generated in the city is detailed below in Table No. 11.2.3 :-

Table No. 11.2.3 Sources And Type of MSW

Sr. No .	Sources	Typical facilities, activities & location	Type of MSW
1.	Residential and Open areas (56.31%)	Single & multi family dwelling, streets, parks, bus stand.	Food waste, rubbish ashes, street waste.
2.	Commercial (23.95%) including street sweeping.	Offices, Institution, markets Hotels, restaurants, stores auto repair shop, medical facilities, streets etc.	Food waste, rubbish ashes, street waste occasionally hazardous waste.
3.	Industrial (19.74%)	Small/medium scale industry, Offices, canteen	Office waste, food waste packaging material.

Source : Report by EPA

11.2.4. There has been no study undertaken for estimating the waste generated in the Ludhiana Metropolis. However, on the basis of data made available, Ludhiana has been found to generate waste which is higher than the norms followed in other cities of the country. On an average the per capita waste generated is of the order of 535gms on daily basis as compared to 300 to 450 gms generated in the other parts of the country. Based on the average waste generated, total waste generated in Ludhiana is of the order of 85mtons. per day. Out of this 56.31% is the contribution of the residential sector whereas the commercial area contributes 23.95% of the waste generated whereas the industrial waste has been found to be 19.74%. the quality of waste generated have been found to be heterogeneous comprising of both toxic and non-toxic waste. Ludhiana Municipal Corporation covers 100% area of the Municipal Corporation so far as garbage collection is concerned.

11.3. Current practices of solid waste management:

11.3.1 Management of the solid waste within the Ludhiana Municipal Corporation area is the prime responsibility of the M.Corporation. In the Corporation Department of Health is responsible for collection and disposal of solid waste. The Health department is headed by Health Officers and supported by the field staff which assist in collection and disposal of the waste. The process of solid waste management can be broadly classified into following stages:-

- i) Waste storage & segregation.
- ii) Primary and secondary collection
 - a. Waste transportation
 - b. Disposal of waste.

The solid waste is first collected from the points where it is generated and taken to the collection centres defined by the Municipal Corporation. This process is taken up both at the individual level or by the Municipal Corporation. After the garbage is dumped at the defined places it is transported by the Municipal Corporation to the dumping sites for final disposal. The detail of primary collection of solid waste in respect of household, commercial, institutional, road network, industrial and bio-medical waste is detailed below:

11.4. Solid Waste collection-Household waste.

11.4.1. Presently, a two level system of waste collection is made applicable in the Ludhiana city. Waste is first collected from the point of generation known as primary collection which is then taken to 2nd level of collection created at the community level. Considering the large population, the largest proportion of solid waste is also generated at the household level. Considering the growing number of population, change in the life style and higher economic status attained, the quantum of waste generated has been growing very fast at the household level. This sector alone contributes 56.31% of the total waste generated in the city. The waste generated is largely non-toxic in nature with large component of organic and inorganic waste. There is no segregation of waste at the generation level with the result both the organic and inorganic waste get mixed up which poses considerable problem in effective disposal of the waste. In addition, it also causes enormous loss in terms of transportation and final disposal

11.4.2. The waste generated at individual premises is removed initially by the owner or the Municipal employees. This collected solid waste is then dumped at various collection points identified by the corporation, and other unauthorized open places by the use of Wheel barrows and cycle rickshaws. This collection points consists of various community bins (containers), designated open sites and portable bins. However the waste in many cases is not dumped directly into the community bins. It is dumped either outside the bin, into any open areas or just dumped on the road side. This shows the awareness level in terms of importance of solid waste management is very low.

11.4.3. Road side waste

11.4.3.1 The waste lying on the road sides is collected by the staff employed by the Corporation. The waste dumped outside the community bin (containers) and portable bins are also dumped inside the bin by the Safai sewaks. The safai sewak has been given wheel barrows to lift the waste and transport it to the identified dump site

11.4.4 Road sweeping

11.4.1 Corporation has employed various safai sevaks to sweep the roads daily and collect the solid waste. Each safai sevak is given approximately 2km of road length for sweeping of municipal roads. They are also given cycle rickshaws to dump their collected waste to the designated site.

11.4.5 BIO MEDICAL SOLID WASTE

11.4.5.1 Ludhiana has been considered to be nerve centre of the Health care of the State of Punjab. It houses large number of hospitals nursing homes and health care institutions

offering state of the art health care. In the process large wastes generated by these institutions. The waste generated by the hospitals mostly falls into the category of hazardous /infectious waste which poses danger to human life. The bio-medical waste requires specialized mechanism for its collection, transportation and disposal. Considering the gravity and the threat to the human life, a project based on BOO has been made operational in joint collaboration with a Hyderabad based firm. The firm has been entrusted with the job of collection, transportation and final disposal of the medical waste not only from Ludhiana but also from other parts of the State. The bio-medical waste is collected and segregated at the source in three separate bins of different colors namely; yellow, blue and white depending upon the toxicity of the waste. The waste is then transported for disposal in the plant located at village Jamalpur.

11.4.6 Industrial solid waste

11.4.6.1 Ludhiana being the hub and capital of small scale industries, it generates large volume of industrial waste. The industrial waste generated have been found to constitute 19.74% of the total waste generated in the city. The industrial waste generated is due to industrial and manufacturing processes adopted by the industrial units. As per the survey conducted by the State Pollution Control Board, 1095 industrial units have been found to generate industrial waste. More than half of the industrial units fall in the category of foundry. Electroplating units which constitutes the most toxic waste account for 1/4th of the number of units contributing to the solid waste of the city. In addition, tyre & tube, heat treatment, induction furnace, rolling mills, paper and board mills are the other units contributing to the industrial waste.

11.4.6.2 Industrial solid waste is not stored within the premises but is generally disposed off outside the premises, sometimes along the roads/open spaces. However, heaps of industrial waste are noticed at a distance away from the industrial premises along the roads/open areas. The industrial waste contains large number of chemicals, some of which are toxic. Most of the industries follow manual handling of the waste as a normal practice. There are indeed very few mechanical aids available for proper collection and transportation of industrial Solid Waste. The disposal of industrial waste in unscientific manner in the landfill poses a grave threat to water pollution due to leachates by adding injurious

constituents into soil. The details of the waste generating industrial units identified by Punjab Pollution Control Board is given in Table No. 11.4.6.2 given below:-

Table No. 11.4.6.2: Details of Categories of Industries generating waste

Sr. No.	Type of Industry	Nos.
1.	Foundry	507
2.	Electroplating	281
3.	Dying	130
4.	Tyre & Tube	59
5.	Heat Treatment	41
6.	Induction Furnace	25
7.	Rolling Mills	22
8.	Paper & Board Mill	14
9.	Flour Mill	5
10.	Arc furnace	4
11.	Vanaspati	4
12.	Soft drink	2
13.	Breweries	1
	Total	1095

11.4.7 Waste collection at the secondary level :

11.4.7.1 This level comprises of bins and dumping sites to which the waste generated at the primary level is transported and dumped before transportation for final disposal. The secondary level collection points serve as an intermediate transfer point from household, roadside waste, commercial and institutional waste to disposal in the landfill sites. In order to effectively cover the entire city, 269 sites of community bins have been provided by the Municipal Corporation.

11.4.7.2 For the purposes of effective solid waste management at the secondary level, the entire city has been divided into four distinct zones. These zones share 269 sites created at the community level which belong to the category of portable bins and designated open dumping sites. Out of 269 sites, 9 belong to the category of designated open dumping sites whereas remaining 260 are the contained sites. The solid waste from the primary source is dumped either into the open sites or to the container sites which have moveable containers which can be lifted for final transportation to the dumping sites. Zone-D has the largest number of sites (93) whereas zone-C has the lowest number of community bins (39). In all 260 containers have been provided at the secondary level for collection of the solid waste. Details of collection points in different zones have been given in Table No. 11.4.7.2

Table No. 11.4.7.2 :Details of collection points in different zones-2006

Zones	Total sites	Paved (pucca)	Containerized sites	No. of containers placed
Zone A	65	4	61	61
Zone B	72	1	71	71
Zone C	39	2	37	37
Zone D	93	2	91	91
Total	269	9	260	260

Source :C.D.P. Ludhiana.

11.5 Transportation of waste:

11.5.1 The solid waste from 269 designated collection sites created at the secondary level is then transported to the dumping sites for final disposal by municipal corporation staff on regular basis. The waste collected at the open sites is then lifted with the help of JCB into tipper trucks or tractor trolleys for transportation to the disposal sites. The containers used for collection are directly lifted for transportation to the disposal site. Solid waste so collected in the community bins and at other places is presently being transported to the dumping site by using different type of vehicles which includes JCB machines, Truck Tippers, Dumpers, Tractor Trolley In all 68 vehicles are being used for transportation of solid waste. These vehicles work in shifts. In all these vehicles carry a total of 849 mt. of solid waste which is sufficient to cater to the daily waste generated in the city which is of the order of 850 mt. About 65% .of the total waste transported by the truck tippers whereas around 25% is carried out by the dumpers. In addition, Municipal Corporation also has a Collector/Compactor machine transportation of solid waste from primary source to the dumping sites. Details of fleet deployed for waste collection including the vehicles and trips undertaken by them is given in table No. 11.5.1

Table No. 11.5.1 Detail of fleet deployed for waste collection (2006)

Type of Vehicles	Scheduled Vehicles	Available Vehicles	No.of Shifts	Total trips	Waste collected in MT
JCB Machines	4	4	1	-	-
Truck Tippers	27	27	1	4	540
7.0 Co. Dumper Placers	25	25	1	6	225
Tractor trolley & Hauler tuggers	12	12	1	28	8
Refuse Collector/Compactors Machine	1	-	-	-	-
Total	69	68	4	38	849

11.6 Disposal of solid waste

11.6.1 The method adopted by the Ludhiana Municipal Corporation for disposal of the solid waste is through the mechanism of landfills. At present Ludhiana corporation uses three sites for dumping of the solid waste. The sites are located at village Jamalpur, Jainpur and Noorpur Bet. The area under these sites is 25 acres, 10 Acres and 21 Acres respectively. However, the site at Jainpur is completely filled up and is no more used for dumping the solid waste. Thus the Corporation is left with only two sites i.e. Jamalpur and Noorpur Bet which are located at a distance of 11 & 14 Kms. from the city. The average depth available at these sites vary from 10 to 15ft. for dumping of the solid waste. It has been estimated that these sites will be sufficient to take care of the solid waste for the next 25-years. However, the figure seems to be on the higher side considering the rapid growth of population and large generation of the solid waste.

11.6.1 The solid waste collected at 269 sites created at the community level is transported to Jamalpur and Noorpur Bet. None of the landfill sites is lined and properly defined. Moreover landfilling is being done in an unscientific manner. The waste is directly dumped, without any segregation where a JCB is employed to spread the waste over the site. There is no compaction of the waste undertaken to compress it since no road rollers are available with the Health Deptt. for this purpose. In the absence of scientific disposal of the waste lot of valuable waste is lost due to absence of recycling. . Municipal Corporation Ludhiana does not involve rag pickers in recovering the valuable recyclable waste. This results in loss of opportunity of creating employment for low income groups of the city besides reducing the quantum of solid waste dumped at the site besides loss of valuable waste.

11.6.2 Further, in the absence of defined boundaries, animals like pigs etc. vegetate on the waste. In addition, due to unscientific disposal of the waste, lot of foul smell is generated due to the presence of organic waste polluting the environment in the process. No treatment of the solid waste is undertaken during the dumping process as required in the system of sanitary landfills.

11.6.3 Jainpur Landfill site:

Landfill site at Jainpur is completely filled up and needs closure. Even though the Corporation has closed this site and ordered not to dump additional solid waste, the dumping of solid waste is still continuing due to its close proximity. Hence there is an urgent need to scientifically close this landfill site and then develop it for public purpose like park or green area.

11.6..4 Jamalpur and Noorpur Bet Landfill sites:

Both the landfill sites are operational and solid waste is being dumped into it. However the landfill sites are not lined and also scientific disposal of waste does not take place. The Jamalpur site is located near to a village 'Jamalpur' and hence site is creating nuisance in the surrounding residential areas. Also the site does not have any kind of fencing or compound wall surrounding to it. This poses a danger for children or cattle in that region. Noorpur Bet landfill site has been exclusively purchased by the Corporation with a specific intention to use it for installing solid waste treatment plant. Thus the urgent requirement of the Corporation is to properly and scientifically develop both the landfill sites. This will help to avoid any nuisance in the surrounding areas; reduce the environmental risks like ground water contamination, air pollution, soil contamination and possible health risks to the residents of surrounding areas. Details of the dumping sites including the area, distance from the site etc. is given in Table No. 11.6.4

Table No. 11.6.4 Details of Waste Dumping Sites

Sr. No.	Site	Land area (acres)	Average depth (in ft.)	Future life (years)	Distance from city centre
1.	Jamalpur	25	8 to10	25	11km
2.	Jainpur	10	Completely filled	Nil	10km
3.	NoorpurBet	21	12 to15	25	14km

Source : C.D.P. Ludhiana.

11.6.5 Bio-medical waste is disposed of by a treatment plant created by the Project installed on BOO basis through a Hyderabad based firm known as M/s.Medicare Incin Pvt. Ltd. on a plot area of 2000 Sq. Mtrs. Situated in Jamalpur in the year 2003. The firm has changed its name to M/s. Ramky Enviro Engineers Limited. The capacity of the plant is 5tons per day which is 200kg per hour. The process used for disposal of bio-medical waste include incineration, autoclaving, shredding and dumping Project capacity is sufficient to cover all the Hospitals of Punjab. Main clients are Punjab Heath System Corporation, Medical Colleges and Hospitals, Health and Medical Education, and other hospitals in Punjab. Charges for disposal of Bio-Medical waste are @ Rs. 2.70 paise per bed with additional charge of Rs. 0.50 paise against carriage upto a distance of 100Kms and it is Rs. 1/- per Bed beyond distance of 100 Km. Segregation is made at source in three separate bins of different colours Yellow, Blue and White depending upon the toxicity of the waste as already stated in para. 11.4.5.1.

11.7 Manpower deployed:

11.7.1 The responsibility for the solid waste management within the urban limits of Ludhiana Municipal Corporation has been vested with the Health Deptt. of the Corporation. The Department. is headed by two Health Officers who are assisted by a work force of 3662 persons which includes Chief Sanitary Officers, Sanitary Inspectors, Supervisors, and Safai Sewaks besides Drivers etc. In all 3161 Safai Sewaks have been deployed which include full time, part time workers besides daily wagers and contract based employees.

11.7.2 The work of management of solid waste is assigned to Health Officers who are not professionally trained to manage the work. Moreover, the supporting staff is not much aware of the current technological developments in the field which creates road blocks on scientific planning and disposal of the solid waste. There is absence of formal system of communication between the Supervisors and the subordinates. Most of the communication is through informal channel that is conveying verbally which leads to mismanagement of the system. Further there is no rational system of deployment of manpower which is usually done on an adhoc manner without any relationship of quantum of waste generated or population served. This reduces the efficiency of the manpower deployed in the system. Further there is no system of recording the public complaints regarding the solid waste. In the absence of the system, redressal of complaints have a low priority. Large scale absence of workers from their duty have also been observed. The details of manpower deployed in the solid waste management is detailed in Table No. 11.7.4

Table No. 11.7.4 :MSW-Existing man power deployment

Sr. No.	Name of the Official	Number
1.	Health Officers	2
2.	Chief Sanitary Officers	7
3.	Sanitary Inspectors	17
4.	Sewadars	1
5.	Sanitary Supervisors	51
6.	Safai Sewaks (Full time)	2001
7.	Safai Sewaks (Part time)	123
8.	Safai Sewaks (Contract)*	337
9.	Safai Sewaks (Daily wages)*	700
10.	Drivers	88
11.	Drivers (contract)*	37
	Total	3664

11.8 Key issues:

- Despite large number of manpower deployed for management of solid waste, heaps of stinking waste can be seen at number of places in the city. Removal of garbage is done arbitrarily by the staff without following any well laid down system. Cleaning of roads also has not been found to be satisfactory and the dumping of waste by the public has been found to be highly unsatisfactory. In the process, solid waste management has emerged as the major issue in the management of the city. The key issues involved in the solid waste management have been found to be :
- Absence of scientific management of solid waste
- Absence of public participation and lack of public awareness.
- Untrained and unqualified manpower deployed.
- Inefficiency in the management of vehicles used for transportation.
- Irrational deployment of manpower.
- Lack of data on the generation of the solid waste.
- Poor management of dumping sites
- Absence of segregation of waste at the primary level
- Absence of recovery of valuable recyclable waste.
- Absence of involvement of large institutional network creating large volume of solid waste including Marketing Board, Department of Industries, etc.
- Mixing of industrial and toxic waste with the domestic waste.
- Absence of scientific system of sanitary landfills
- Absence of door to door collection of the solid waste.
- Absence of appropriate mechanism for converting waste into wealth and for generating energy and fertilizers.
- Absence of appropriate mechanism for reducing health hazards and environmental degradation.

CHAPTER-XII

SEWERAGE NETWORK

12.1 Introduction

12.1.1 On the analogy of providing safe drinking water, provision and disposal of domestic as well as industrial, commercial and institutional sewerage facility in the city is one of the mandatory functions of the Municipal Corporation.. Provision of sewage disposal is also mandated because of its impact on the quality of life and the quality of environment in the city. Efficient disposal of sullage also assumes importance in the context of saving the precious ground water resources from pollution and also to avoid spread of epidemics caused due to unscientific disposal of the waste. Considering the role and importance of proper sewage disposal, creating appropriate level of effective and efficient system of sewerage assumes importance.

12.2. Area Coverage

12.2.1 Ludhiana Municipal Corporation provides the facility regarding disposal of sewage from the area under the Corporation. This includes waste generated both from domestic, industrial, commercial and institutional units operating in the city. Despite the fact that sullage disposal is one of the critical activity of the Corporation but still in the existing scenario the total city area is yet to be covered under this facility. Out of the total city area of 159.37 sq.kms. the coverage under the sewerage system is to the extent of only 57% . Accordingly, remaining 43% of the area under Municipal Corporation is still to be provided with the sewerage network to take care of the sullage generated therein.

12.2.2 With regard to availability of sewage system at the micro level, it has been found that declared area is better placed as compared to undeclared area. Out of 135.46 sq.kms. of declared area, the extent of area covered under the sewerage system is 90.8 sq.kms. which works out to be 67% of the declared area. In the declared area 44.7 sq.km. area still remains to be provided with the sewerage system. Therefore, the declared area which has total coverage under water supply still has 1/3rd area uncovered under the sewerage network With regard to undeclared area which comprises of 23.91 sq.km., there exists no provision of sewerage system and the population living therein are using septic tanks, soak pits and open drains as the mechanism for disposal of sullage.

12.2.3 In certain areas of the old city which is highly congested and where the network has been laid, the quality of sullage disposal is not at all satisfactory due to the sewer lines getting choked frequently. Due to inadequate capacity of the network and the outfall

sewer, the system remains overloaded and accordingly poses numerous problems in these area. The city sewerage network also remains choked due to the heavy discharge of the waste from dyeing and other industrial units into the sewerage system. Further due to improper design and absence of appropriate gradients, the self-cleaning velocity is not attained by the waste which leads to slow disposal and choking of the system. In the absence of storm water drainage facility available within the city, during the rainy season, the storm water also gets discharged into the sewer system thus overloading the network leading to backflow of sullage in the households etc. Further discharge of storm water into the network leads to heavy silting of the pipes reducing its overall capacity and discharge. Due to lack of periodic cleaning of the network, the efficiency of the system further goes down. The satisfaction level with regard to disposal of sullage even where the network exists has been found to be quite low among the end users.

12.2.3 The sewerage network covers an area of 57% of the total urban area and 67% of the declared area of the Corporation. The sewerage network laid within the declared area (90.8 sq.km.) comprises of main sewer and distribution network. In all 1341 Km. length of the network has been laid so far. Out of which main sewer comprises of 141 Kms. whereas length of distribution network has been recorded as 1200 kms. It has been seen that the length of the main sewer has increased rapidly during the last 5 years i.e. 2001 to 2006. During this period the length of the main sewer has increased by 50%, from 94 km. to 141 kms.

Map showing the area based coverage of the city with sewerage network.



Uncovered area
Area covered with sewerage network

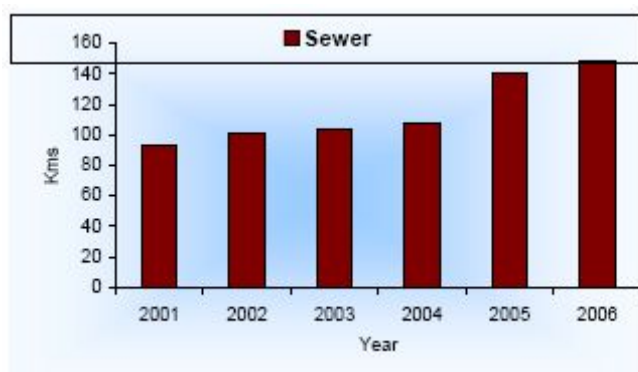
12.2.4 It is estimated that the remaining area of Municipal Corporation (68.61 Sq.Kms.) would require an additional network. The length of the network has been estimated at 1010km. out of which 110 kms. shall be the main sewer whereas the 900 kms. shall be the distribution network to cover the entire existing population and the area falling within the Municipal Corporation, Ludhiana.. The detail showing the area coverage and the extent of network laid besides the additional network requirement to cover the entire city is given in Table No. 12.2.4

Table No. 12.2.4 Detail of Existing & additional Sewerage Network required

Sewerage network	Year -2006	
	Current Coverage	Additional requirement
Area (Sq.Km)	90.84	68.53
<i>Sewerage Line</i>	13,41 Km	1010
Pipe length –Main sewer (Km)	141	110
Pipe length –Sub Main (Km)	1200	900

Source: City Development Plan Ludhiana (2007-2021)

Growth of main sewer network (in Kms.) during the period 2001-06.



12.3 Population Coverage:

12.3.1 With regard to the population coverage, 57% of the total population of 16.65 lac persons(2006) has the facility of sewerage system whereas 43% population does not have any access to the system with the result that they continue to suffer on account of polluted ground water and poor environment in and around their habitat. In the declared area which houses 14.15 lac population, only 9.48 lac persons have the facility of sullage disposal. The population served at present is only to the extent of 67% whereas 33% population of the declared area still do not have the facility of sullage disposal. Thus every third person in the declared area uses system other than sewerage disposal provided by the Municipal

Corporation. With regard to undeclared area which houses 2.5 lac people, the system of sewerage is conspicuous by absence. Thus in the existing scenario, about half of the city area and half of the city population is deprived of the basic facility of sullage disposal which has contributed to a large extent to the degradation of environment and quality of life in the city. The detail of municipal area, declared area and the population covered under the sewerage network is given in Table 12.3.1

Table No.12.3.1: Extent of area and population covered under the sewerage system

Item	Area(in sq.km)	Area under coverage(%)	Population(in lacs)	Population coverage(%)
Total M.C. Area	159.37	57	16.65	57
Declared area	135.46	85	14.15	67
Area under coverage	90.8	67	9.48	100%
Area not under coverage	44.7	33	7.17	Nil
Undeclared area	23.91	Nil	2.50	Nil

12.4 Quantity of waste generated :

12.4.1 The existing level of water supply in the city is of the order of 415mld. Considering that the waste generated is of the order of 80% of the water supplied , the sewerage generated in the city works out to be 332mld. Thus at the existing level, the city generates a waste to the extent of 332ml. on daily basis.

12.5 Number of connections:

12.5.1 The number of sewer connections as per record made available the corporation has been placed at 1,40,610 out of which majority comprises of the residential connections. The number of residential connections existing area 1,25,187 whereas number of commercial connections is placed at 15,423 . The details of connections in these categories is detailed below in Table No. 12.5.1

Table No.12.5.1 : Number of sewer connections

Item	Quantity Nos.
No. of connections	140,610
Residential	125,187
Commercial	15,423

Source: City Development Plan Ludhiana (2007-2021)

12.5.2 Considering the growth of population and the increase in the network laid by the Municipal Corporation, coupled with increased awareness about the health and hygiene, improved economic status and the initiative taken up by various parastatal agencies for scientific disposal of the sullage waste, the number of sewer connections have also been recording rapid growth . The increase in the number of sewerage connections recorded during last three decades has been found to be more than 8000%. As against 1728 connections existing in 1974, the number of connections recorded in 2006 were 1,40,610. The growth of connections have been very rapid after the constitution of Municipal corporation in the year 1976. Since then the number of connections have been growing very fast with 1, 28,468 connections released by the Corporation during the period 1980 to 2006. The growth in number of sewer connections during the period 1974-2006 is given below:-

Table No 12.5.2 : Number of sewer connection (year- wise)

Year	1974	1980	1990	2000	2002	2003	2004	2005	2006
No. of connection	1728	12142	56121	81213	116973	121344	136194	138831	140610

Source: City Development Plan Ludhiana (2007-2021)

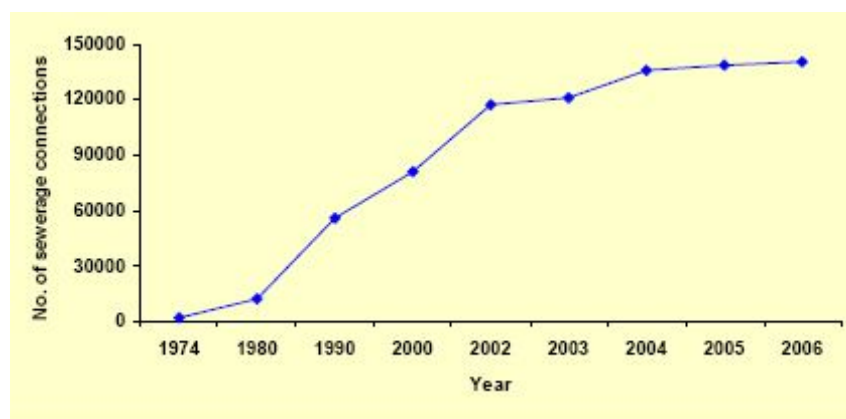


Figure: Year wise -profile of increasing sewerage connections

12.6 Waste Disposal :

12.6.1 In order to dispose off the sullage waste of the city, three sewerage treatment plans have been proposed. These plants are to be located at village Jamalpur, Bhatian & Baloke. The capacity of these plants have been placed at 48mld. , 111mld. and 152mld respectively. Thus in all city will have a capacity of 311mld. of sullage waste treatment when all three plants will become operational. The STP at Baloke has the largest capacity of 152mld. whereas that of Jamalpur has the lowest capacity of 48mld. Out of these three plants, only

STP at Bhatian has been made operational so far with a capacity of 111 mld. The remaining two STPs at Jamalpur and Baloke are still under the process of completion

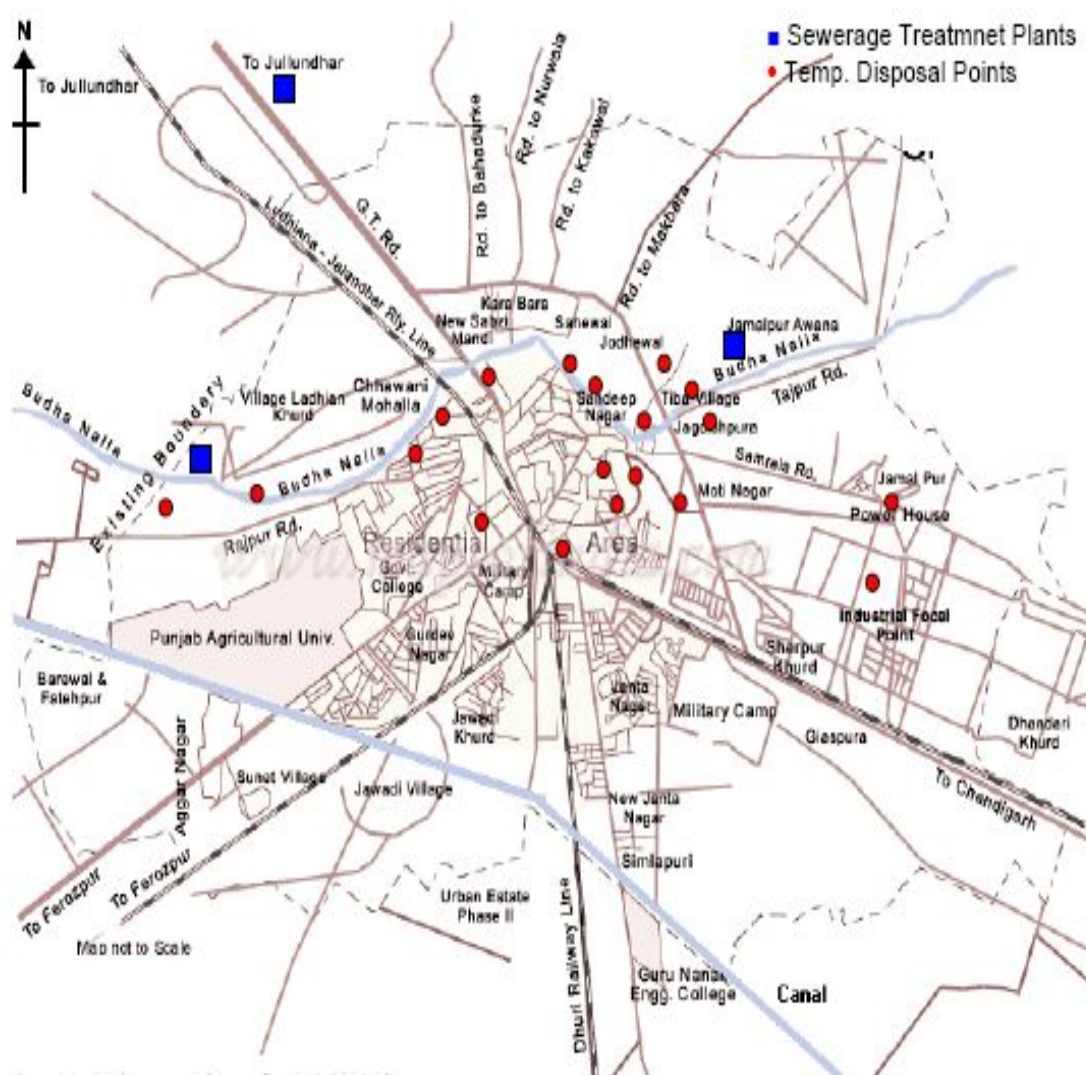
12.6.2 The city at present generates a sullage which is of the order of 332 mld.. The sewerage treatment capacity available with the city is only 111mld. Thus only 1/3rd of the sullage generated in the city is being treated at present whereas 2/3rd of the sullage is being disposed off untreated.. Even with the installation of remaining two plants, there will be shortfall of 21mld capacity to treat the sullage waste. This is the scenario when only 57% of the city area and the population is served by the sewerage network. The short fall will increase rapidly when the entire corporation area will be brought under the sewerage network. At present the untreated sullage which is of the order of 221 mld. is disposed off through a network of pumping stations into the Budha Nallah This has resulted in degrading the quality of water in the Budha Nallah besides polluting the sub-soil water and environment in the city. The water from the Budha Nallah is ultimately discharged into the river Sutlej on the down stream side. Accordingly, the untreated sullage water from Ludhiana also pollutes the water of Sutlej river making it unfit for human consumption. The city requires completion of remaining two sewerage treatment plants on priority and to close the temporary pumping stations created along the Budha Nallah for pumping the untreated sullage in order to save it from the curse of sullage pollution. In addition, city also requires the installation of additional capacity of STPs in order to cover the sullage to be generated by the remaining area along with the network laid in the area so that no untreated sullage is discharged . In addition, it will be appropriate to recycle the sullage water for irrigation and domestic sewerage so as to minimize the use of potable water. In addition it will be important that water efficient sanitary fittings are installed by the households and the industrial/commercial units in order to lower down the consumption of water and generation of waste. This could be achieved through a system of providing incentives/disincentives and making it an integral part of the Municipal Bye-laws. The details of the existing and proposed sewerage treatment plants along with their capacity, location and area is given in Table No. 12.6.2

Table 12.6.2 The details of the Sewage Treatment Plant (STP) being constructed under Sutlej Action Plan

Zone	Name of S.T.P	Capacity	Land
A	Jamalpur	48 MLD	40 acres
B	Bhattian	111 MLD	90 acres
C	Baloke	152 MLD	130 acres
Total		311 MLD	260 acres

Source: City Development Plan Ludhiana (2007-2021)

Map showing the location of Sewerage Treatment Plants & Pumping Stations



12.7.1 Key Issues:

- Less than half of the city area and population still uncovered by the sewerage network.
- Low efficiency of the existing network particularly in the congested areas of the old city.
- Poor maintenance and upkeep of the existing network.
- Use of Budha Nallah for disposal of untreated waste
- Large volume of untreated waste due to operation of only one STP
- Capacity gap to treat the sullage even after all three STPs become operational.
- Poor awareness about the scientific disposal of sullage waste.
- Large scale usage of soak pits, septic tanks and open drains for sullage disposal
- Disposal of rainwater into the sewerage network.
- Inadequate capacity of the existing net work.
- Disposal of untreated industrial waste from dyeing and electroplating units.
- Existence of illegal connections.

CHAPTER-XIII

STORM WATER DRAINAGE

13.1 Existing status:

13.1.1 Following the analogy of sewerage network, the city has high degree of deficiency in the storm water network also. Considering the existing status, it has been found that creating an effective and efficient system of storm water drainage network has never been on the agenda of the Municipal Corporation. Despite the fact that rain water is very valuable source of water, city has been facing problem of flooding in certain parts of the city during the rainy season in the absence of an effective system of storm water disposal.

13.1.2 At present only 11% of the city area is covered under the storm water network. That means about 90% of the city area remains outside the purview of the network and the rain water accordingly causes havoc in the city. In the absence of storm water system, the rain water is largely discharged into the sewer network. This results in heavy loading of the sewerage network, ultimately leading to choking of the pipes, overflow of the sullage and backflow of the sewerage water. This calls for the urgency of having a separate storm water network to be put in place in the uncovered areas to dispose off the rain water.

13.2 Area and Population coverage:

13.2.1 As already stated, city has a deficient network of storm water drainage which covers only 1/9th (11%) of the area falling under the domain of Municipal Corporation. Thus out of the total city area of 159.37 sq.kms., approximately 17.5 sq.km. area has the storm water network whereas remaining 141.87 sq.km. area of the city is still to be provided with this facility.

13.2.2 Looking at the micro level the declared area has a higher proportion of storm water network as compared to undeclared area. Out of the 135.46 sq.km. of undeclared area, the coverage is to the extent of 13% of the area available under this category. The undeclared area which comprises of 23.91 sq.km. seems to be totally neglected by the Corporation for providing storm water network. In this area, no network exists and the water remains stagnant in the area for a larger period of time causing numerous problems and hardships to the people living therein.

13.3 Population

13.3.1 Looking in terms of the population, the storm water network provides a coverage to 15% of the total population of the city (16.65 lac). Remaining 85% of the population has no facility to take care of the disposal of the rain water in their areas. The population served by the network is 2.5 lac whereas 14.15 lac of the city is deprived of this facility.

13.3.2 Looking again at the micro level declared area is again better placed in terms of population coverage. If the area coverage was 13%, the population coverage in the declared area has been found to be 18% . As against this undeclared area does not have any facility of storm water drainage and accordingly 2.5 lac population in this zone remains un-served due to absence of the network. Thus it has been found that there exists great disparity between declared and undeclared area so far as provision of basic services including the storm water drainage network is concerned. The detail of the area and the population covered under the storm water network is given in Table No. 13.3.2

Table No. 13.3.2 Area and the population covered under storm water drainage.

Item	Area(inSq.Km.)	Area under coverage(%)	Population(in lacs)	Population under coverage(%)
Total Municipal area	159.37	11	6.65	15
Declared area	135.46	13	14.15	18
Un-declared area	23.91	Nil	2.50	Nil

13.4 Quantity of water generated:

13.4.1 Considering the annual average rainfall in the city which has been estimated to be of the order of 650mm and the Municipal Corporation area which is spread over 159.37 sq. km., the gross volume of rainfall received in the city has been found to be 103,59 million cubic meter.

13.5 Network :

13.5.1 The present network of the storm water drainage which covers 11% of the city area has a length of merely 17kms. Looking at the growth of the network, it has been observed that till the year 2001, the network had only a length of 8kms. Addition of 9 Kms. of storm water drainage was made in the year 2001-02 when the total network of 17kms. was created. Since 2002 no addition to the storm water network has been made and the total network remains as 17kms. As compared to water supply and sewerage net work, the area coverage under the storm water net work has been on a lower side. As compared to 85% of the city area covered under the water supply 57% area coverage under the sewerage system, the storm water coverage has remain stagnant at 11%. In the absence of adequate coverage, under storm water drainage, rain water finds its way through the sewer network resulting in overflow of the sewer network etc. In addition where the sewerage network is absent, particularly in the undeclared area, storm water creates havoc to the life of the individual and the existing network particularly the road system . In addition, where the

storm water gets into the sewerage network, it creates silting of the pipes due to inflow of dirt and soil particles. Accordingly it is important that the city should be covered under a proper, effective and efficient system of storm water network.

13.5.2 Further it has been estimated that in order to cover the entire Corporation area of 159.37sq,kms. a total network of 237km. will be required to be laid. Thus in additional length of 220kms. will have to be provided to cover remaining 89% of the city area. The details showing the gap analysis of storm water drainage is given below in Table 13.5.2

Table No. 13.5.2 : Gap analysis- storm water network.

Year	Population	Storm sewer		GAP(Storm sewer)
		(Kms)	%	
2001	1395053	17	11	179
2002	1478000	17	11	179
2003	1517000	17	11	179
2004	1550759	17	11	179
2005	1601469	17	11	179
2006	1657520	17	11	74
2011	2060000	207	100	190
2021	3296000	237	100	220

13.6 Storm water disposal :

13.6.1 At present storm water generated in the city is disposed off into the Budha Nallah. This also creates enormous pollution and environmental degradation of Budha Nallah and the surrounding areas. Initially Ludhiana had a well laid down system of storm water drainage but over a period of time these natural drains and the low lying areas have been brought under urbanization. With the closing of these natural channels, storm water disposal in the city has emerged as a major problem. Budha Nallah can be considered as one of the most potential source for disposal of the storm water provided the Nallah is properly aligned, lined with capacity to hold water increased. Accordingly, Budha Nallah would require cleaning permanent lining to make it appropriate for the storm water disposal.

13.6.2 In addition to using Budha Nallah, the mechanism of rainwater harvesting will have to be appropriately explored. Large area available with the institutions like Punjab Agriculture University, Government College, and the open spaces available within the city could be used for rainwater harvesting. In addition, it will be essential to effectively implement the building bye-laws by the Municipal Corporation, GLADA and the Improvement Trust in order to ensure that appropriate mechanism of rain water harvesting are installed at the individual household, institutional level so that the amount of rain water

generated is reduced considerably and majority of rainwater is harvested for not only recharging the ground water and also meeting the requirement of the city in terms of part of the water supply. Percolation wells for rainwater harvesting has not been found to be suitable in the region considering the quality of soil available. Option of open trenches appears to be better for harvesting the rain water. In addition, existing natural drainage network should be preserved as an integral part of the developmental process and they should be declared as the protected areas so far as the development is concerned. In order to ensure that natural system of storm water drainage is not disturbed,

CHAPTER-XIV

HOUSING

14.1 Housing is one of the basic human needs and ranks after food and clothing in terms of priority. Housing constitute one of the most important part of the social environment where an individual is nurtured, grows and matures as a human being, part of the society and as a citizen. Housing, in addition to making contribution to the quality of living also plays a significant role in improving the national economy and generation of employment. Housing have multiplier effect on the economy and industry of the country. It does not provide merely a shelter but gives an identity to the human being besides making him a better human beings. Poor quality of housing or absence of appropriate shelter has considerable impact on the economy and productivity of human beings besides health and hygiene. Housing has been considered to have critical role in maintaining the social health and stability and in ensuring the people a decent quality of life. Accordingly, housing has been placed high on the agenda of any national government committed to the cause of promoting human welfare. Considering the role and importance of housing in the national economy, productivity, industrial growth, employment and quality of life number of policies dedicated to creating affordable housing has been framed at the national level. The agenda of these policies have been focusing on the ultimate goal of providing affordable shelter to all by 2021.

14.1.1. As per a Central Statistical Organization (CSO) estimate, the Housing Sector contributed 4.5% to India's Gross Domestic Product (GDP) in 2003-04 at current prices. The contribution of housing *in urban areas* to the GDP in 2003-04 was 3.13%. Further, the spotlight is focused on the fact that 16% of the Indian work force is engaged in Construction and Transport Sectors. It is estimated that overall employment generation in the economy on account of additional investment in the Construction/Housing Sectors is eight times the direct employment (IIM Ahmedabad : 2005). In view of the substantial use of cement, steel, marble/ceramic tiles, electrical wiring, PVC pipes and various types of fittings; construction activity has a multiplier effect on industrial demand for these items

14.1.2. The latest housing policy framed by the Govt. of India – National Urban Housing and Habitat Policy-2007. The preamble of the National Policy states :

" Shelter is a basic human need next only to food and clothing. At the end of the 10th Five Year Plan, the housing shortage is estimated to be 24.7 million. However, urban areas in our country are also characterized by severe shortage of basic services like potable water, well laid out drainage system, sewerage network, sanitation facilities, electricity, roads and appropriate solid waste disposal. It is these shortages that constitute the rationale for policy focus on housing and basic services in urban areas. This policy intends to promote sustainable development of habitat in the country with a view to ensuring equitable supply of land, shelter and services at affordable prices to all sections of society. Given the magnitude of the housing shortage and budgetary constraints of both the Central and State Governments, it is amply clear that Public Sector efforts will not suffice in fulfilling the housing demand. In view of this scenario, the National Urban Housing and Habitat Policy, 2007 focuses the spotlight on multiple stake-holders namely, the Private Sector, the Cooperative Sector, the Industrial Sector for labour housing and the Services/Institutional Sector for employee housing. In this manner, the Policy will seek to promote various types of public-private partnerships for realizing the goal of Affordable Housing For All " .

14.1.3. Housing is not merely confined to the four- walls which make a house but also all supporting infrastructure which are required to sustain the human beings in terms of physical & social infrastructure. Accordingly, National Urban Housing Policy lay emphasis not only on providing affordable shelter but also creation of appropriate quantity and quality of essential services etc.

14.2 Growth of housing in Ludhiana

14.2.1 Housing is an activity which is mainly driven by individuals to provide itself with an appropriate shelter. With the rapid increase in population, number of houses have also recorded an increase. Besides individuals, parastatal agencies have also contributed to the household stock of the Ludhiana Metropolis. In order to facilitate the construction of housing, large number of schemes have been framed by the Department of Housing & Urban Development, PUDA, Improvement Trust, Housefed and Municipal Corporation, Ludhiana. These agencies have not only created built up houses but also have provided

developed plots by framing Housing Schemes in and around Ludhiana. Improvement Trust, Ludhiana has so far promoted 23 Development schemes besides built up houses in the city. Municipal Corporation has contributed by framing 87 Town Planning Schemes offering residential plots to the people. In addition, Department of Housing & Urban Development has developed 12 Residential Estates in Ludhiana and has offered 11,134 developed plots of various sizes for building houses. The erstwhile Punjab Housing and Development Board also added to the housing stock of the city by constructing houses for various categories of society. In addition, private developers have also taken up large number of colonies licensed under the Punjab Apartment & Property Regulation Act, 1995. In addition private builders are offering various options of built up houses in Ludhiana city.

14.2.2. The growth of residential houses and households have been found to be keeping pace with the growth of population in the Ludhiana Metropolis. As per the Census 2011, the number of houses has more than doubled during last two decades i.e. 1981 -2001 when its number rose from 108726 to 2,33,982. The largest growth has been recorded during the decade 1981-1991 which has been placed at 72.3%. The high growth rate of housing in Ludhiana can be attributed to large migration from the rural to urban area during the period. However, the growth was found to be lower during the last decade when it was of the order of 24.8%.

14.2.3. Following the pattern of growth in residential houses, number of households have also increased at a rapid pace. During the last two decades, the number of household have increased by more than 250% with largest growth recorded during the decade 1981-1991. During this period the growth rate recorded was 77.8% as against the 72.3% recorded for the residential houses. Similarly the growth during the last decade was found to be 37.6% which is also higher than the growth of residential houses. During this period it has been found that the household size has also recorded a decline as against a household size of 5.5 in the year 1981, it came down to 5.3 in 1991 and 5.2 in the year 2001. This shows that with the growth of economic status, awareness among the people better housing and trend towards nuclear families has lead to the lowering of the household size in the city. Table No. 14.2.3 indicates the growth pattern of houses and households during the last two decades.

Table No. 14.2.3 No. of households

Year	Occupied residential houses	%age growth rate of residential houses	No. of households	%age growth rate of households	Household size
1981	108726	-	109015	-	5.5
1991	187408	72.3	193862	77.8	5.3
2001	233982	24.8	266810	37.6	5.2

Source: Census of India 1981, 1991, 2001

14.3. Pattern of using housing stock :

14.3.1. Looking at the pattern of use of the existing housing stock, it has been observed that majority of households are being used as residential houses which comprise of nearly 2/3rd of the total housing stock.(63.8%). Mixed use of houses has also been observed in large number of cases . Every 7th house in the city is being used both for residential and commercial/office purposes. In addition, every 20th house has been found to have additional use besides serving for residential purposes. Despite the fact that the occupation density in the housing is very high, every 11th house in the city remains a vacant or unoccupied.. Thus it has been observed that the available housing stock is also not being put to optimal use. The large number of vacant houses can be attributed to the legal framework including the Rent Control Act which leads to unwillingness on the part of the owners to rent out the houses. Accordingly, favorable environment needs to be created in order to minimize the number of vacant houses so as to ensure the optimum use of the housing stock.. Details of use pattern of housing stock available in the city is given below:-

Table no. 14.3.1. : Pattern of use of Census houses - Category wise (year 2001)

S. no.	Category	No. of houses	%age of total houses
1.	Residential	233982	63.8
2.	Residential cum other use	18690	5.0
3.	Residential cum shop cum office	54095	14.7
4.	School/college	952	0.2
5.	Hotel/Lodge/Guest House	512	0.1
6.	Hospital/dispensary	988	0.2
7.	Factory/Workshop/Work shed	12753	3.4
8.	Place of Worship	1172	0.3
9.	Other Non Residential uses	12497	3.4
10.	Vacant houses	30859	8.9
	Total census houses	366500	100

Source: Census of India 2001

14.4. Predominant use of materials in the Housing Stock:

14.4.1. Besides looking at the housing stock in term of various uses, the use of material for the roof of the residential houses has also been looked into in order to qualitatively ascertain the housing stock. It has been observed that the majority of the housing stock has a permanent roof which constitutes around 93.4% of the of the total housing stock. As against this only 6.6% of the housing stock has temporary roofing which includes materials like grass, thatch , bamboo, wood, mud, plastic, polethene, slates, GI material and stones etc. . This indicate that the economic conditions prevailing in the city are much better. Most of the housing stock having temporary roofing have been found to be located in the 209 existing slums of the city

14. 4.2. It has also been observed that among the predominant material used for roof approximately 3/4th of the housing stock has cement concrete roofing whereas every 9th house uses brick as the predominant material fo roofing. Every 10th residential house has used tiles as the material for making the roof. Despite the fact that majority of housing stock is fairly placed so far as quality of roofing is concerned but still there are more than 15000 houses which require up-gradation of their roofs in order to improve the quality of housing. Table no. 15.5.5.2 indicates the distribution of residential houses by predominant material of roof in Ludhiana (year 2001).

Table no. 14. 4.2. :Distribution of residential houses by predominant material of roof in Ludhiana (year 2001)

Material	Concrete	Brick	Tiles	Other material	Total
No. of houses	166876	27586	24428	15092	233982
%age of total	71.3	11.7	10.4	6.6	100

Source: Census of India 2001

14.5. Houseless population:

14.5.1. According to 2001 census, despite the fact that 30,859 houses were vacant in the city, 4590 people were found to be without roof on their head. In *all* 1179 households were observed to constitute the houseless population. Most of these people have been found to squat on the public places and occupy available open spaces/public places for their shelter.. The average size of household in this category have been found to be 3.9 persons . However, the size of the household has been found to vary from as low as one to as high as seven. Majority of these houseless people are either single or having large family size.

High land prices, high rentals and lack of resources have been found to be the prime reason for number of houseless in the city.

14.5.2. City has large population living in 209 slums identified in the city. The number of households in the slum areas have been found to be 63046 which constitutes around 25% of the total households of the city. The size of the household have also been found to be very high in the slum areas which is placed at 7 as compared to 5.2 for the entire city. The slums are largely inhabited by the immigrants from the States of Bihar, UP Madhya Pradesh & Rajasthan. Most of these inhabitants are casual workers employed in the industrial sector. Table No. 15.5.6.2 indicates the number of houses, households and size of households.

Table No. 14.5.2. Population of slums, households and dwelling units

Identified slum pockets	Total slum population	No. of households	House hold size	No. of dwelling units
209	2,33,400	63046	7	33,343

Source: City Development Plan (2007-2021) (survey carried out under SJSRY)

Quality of housing in the slums have been found to be of lower order. Absence of basic infrastructure has also been observed in these housing. Lack of proper ventilation and sun-light has been found to be largely absent leading to poor quality of living environment. Up-gradation of these housing stock existing in the slum areas poses greatest challenge to the parastatal agencies,

In addition, large housing stock existing in the walled city is also becoming old and would require replacement/up-gradation. Considering the growth of population, large housing stock in the slum areas, housing stock becoming obsolete within the old city, massive efforts would be required on the part of parastatal agencies, individuals and private sectors to create more housing stock in order to meet the housing requirement of the city. Further, it is observed that majority of housing stock now being added largely belongs to category of middle and higher income groups whereas the lower income and economically weaker section have been found to be lowest in the priority. Accordingly, such a trend would lead to more distortion in the pattern of housing and quality of living in the city. Creation of housing stock in the LIG & EWS categories should be considered on priority as a matter of policy by the state Government on the pattern defined in the National Urban Housing & Habitat Policy-2007.

CHAPTER-XV

HERITAGE & CONSERVATION

15.1. The basic objectives of urban and regional planning are very clearly related to those of conservation of historic towns, area and monuments. Landuse plans, Master Plan, Zoning Regulations and building bye-laws etc. help in achieving these objectives.

15.1.1. Town planning for existing old areas in cities needs care of the architectural fabric in urban areas. Therefore conservation needs to be an integral part of the town planning process, i.e. of landuse plans, building regulations and development policies. The perspective plan of a city must be reviewed to assess its effect on the conservation needs of the city. It must reflect and respect the form of all areas and buildings and precincts must recognize the social needs of community in old days.

15.2 Acts/laws

15.2.1. A few of the Central Government Acts which mentions conservation of build heritage monuments and natural and environmental protection are enumerated as under:-

- i) Ancient Monuments Preservation Act, 1904, provide for preservation of ancient monuments and objects of archeological, historical or Artistic interest.
- ii) The concept of a monument of national importance was introduced in the Ancient and Historical Monuments and Archaeological sites and remains (Declaration of National Impotence) Act, 1951.
- iii) Subsequently Ancient Monuments and Archaeological sites and remains Act, 1958 replaced the earlier Acts.

15.3. Haritage & conservation in Ludhiana:

Ludhiana does not have too many scenic sports but it is the hub of cultural activities in the state which include the rural Olympics held in Killa Raipur village situated within Local Planning Area of Ludhiana and Rural Museum at the Punjab Agricultural University. The other places of historical importance and interest falling in Local Planning Area are as under:-

Maharaja Ranjit Singh War Museum The foundation of this museum was laid in 1990. The museum was planned to create general awareness about the defence services, not only for its role in defending the country but also in strengthening the bonds of national integration and unity. The museum has regular shows in a light and sound hall. This

presentation showcases the stories of bravery of Indian especially Punjabi soldiers in upholding the price of the motherland.

The Fort:

The Fort lies to the northwest of the city of Ludhiana. The main attraction of the fort is the shrine of Pir-i-Dashtgir, also known as Abdul Kadir Galani. It draws both Hindu and Muslim pilgrims.

Medical and Educational Institutes:

The Christian Medical College & Hospital, Ludhiana is an educational and medical institution of an all India character established and run by the minority Christian Community. Its primary aim is to educate and train Christian men and women as health professionals. However, like many other Christian educational institutions this college also offers educational facilities to other young men and women irrespective of religion, caste and community. Through education in this college, the Christian Church seeks to make a significant emphasis on healthcare in the rural areas. Besides, the building design of the College also carries architectural importance of its own.

Dayanand Medical College & Hospital

Dayanand Medical College & Hospital is a 200 bedded hospital. It is one of the best medical institutes in North India established to provide world-class standard health care facilities to patients through a dedicated team of doctors.

Punjab Agricultural University:

On the outskirts of the city is the world famous Punjab Agricultural University, which is modeled on the land Grant of America. The University has a Rural Museum, which houses local arts and crafts and objects belonging to the ancient times. The University also organizes a Kisan Mela every year.

Killa Raipur

Killa Raipur, Twenty kilometers in the south west of Ludhiana is very famous for the Rural Olympics held every year there. People from different corners of Punjab come to observe the village youth demonstrate their sporting skills. The event is held in mid-February. The competitions are essentially of three types in the rural meets. Purely rural games are Kabaddi, Wrestling, and Weight lifting.

Religious places:

Gurudwara Manji Sahib Alamgir:

Gurudwara Manji Sahib is one of the renowned historical Gurudwaras in Punjab in the memory of 10th Guru of the Sikhs Guru Gobind Singh. There is a nice story behind this

Gurudwara . When Guru Gobind Singh was pursued by the Mughal army to took shelter and later on this gurudwara Manji Sahib and thereby the place was consecrated by his holly presence.

Melas:

Social, Cultural and some other melas are of recent origin in Ludhiana. These started with annual mela(congregations) dedicated to renowned Punjabi Poet Prof. Mohan Singh . The idea has caught the imagination of the people and they flock to this annual two-day mela. Folk sangeet, flk dance, folk games and fold means of entertainment such as ropedance, snake-charming and cockfight are the highlights of this mela.

Every week, more or less, one cultural event or another takes place in Punjabi Bhavan, Guru Nanak Bhavan, Nehru Sidhant Kendra Auditorium etc.

Prof. Mohan Singh Mela, Ludhiana

Prof. Mohan Singh had been a great writer and to honor that talented author who created numerous heart-throbbing poems, every year a grand fiesta is held in Punjab which is known as the Prof. Mohan Singh Mela, Ludhiana. It is more a cultural festival rather than an ordinary social gathering. It is visited by many accomplished and gifted people from across the globe.

Kisan Mela :

Punjab Agricultural University organizes a Kisan Mela in Ludhiana every year, where new techniques of farming are shown to the farmers. New hybrid quality seed of food grains are displayed and sold.

Besides these there are a few and small protected monuments which include Sunet, Kos Minar Ludhiana. Kos Minar Sahnewal and Kos Minar Sherpur Kalan. In addition other environmental resources which are supposed to be protected and preserved in the Local Planning area of Ludhiana include Budha Nallah, Wetlands and floodplains, existing vegetation, slopes, soild conditions and water quality etc.

CHAPTER – XVI

SOCIAL INFRASTRUCTURE

16.1 Availability and accessibility to quality social infrastructure are the key determinants of quality of life in any urban centre. Accordingly provision of social infrastructure of appropriate level assumes importance in the context of natural growth and development of individuals and community in the urban areas. Social infrastructures can be considered in term of facilities available in the urban areas at various levels. These includes facilities pertaining to education, health, recreation parks and open spaces, post offices etc. Availability of these infrastructures at different levels of the city has to be ensured as an integral part of the city development plan. In order to assess the adequacy of the social infrastructure, it becomes critical to assess, both qualitatively and quantitatively, the existing social infrastructure based on the population norms defined.

In addition, it needs to be ascertained that spatial distribution of the social infrastructure is such that it is available to the entire population and is within their easy reach. Often it is found that social infrastructure are concentrated in few pockets of the city whereas certain areas have been found to be deficient. This adversely impact the community living in deficient areas which are required to travel considerable distance to avail them. In the process, city faces problems due to unnecessary travel necessitated by irrational distribution of these services. According for proper and efficient functioning of the urban centres it is not only critical, that urban infrastructure in appropriate quality and quantity are provided but also it will be important that they are spatially distributed in a manner. So as to cover the entire city and its population. This would not only minimize travel with in the city but would also improve the operational efficiency of the city and its community. Based on this premise the available social infrastructure in the Ludhiana metropolis have been studied and evaluated.

16.2 Educational Facilities:

16.2.1 Educational Facilities certainly impact the quality of manpower available in the urban areas. In addition, these facilities have been found to leverage the economic growth development and employment. Ludhiana, in this context, has been found to have large number of educational institutes. These institutes cater to the educational

requirement of not only the Ludhiana Metropolis but also of the region and the state. Accordingly, Ludhiana has emerged as the educational hub of the state of Punjab. It houses large number of institutions both at the lower and higher level of education besides institutions catering to the need of higher education in the field of medicine, engineering, agriculture, law education etc. Out of 5 universities Ludhiana has the distinction have Punjab Agriculture University which has played pioneering role in ushering a green revolution in the state and the country. Large number of varieties of foodgrains have been evolved by the university. Besides promoting research and development in the field of foodgrains, Panjab Agriculture University also provides technical education in the field of agriculture, mechanical etc. So as to produce required skilled manpower to look after the agricultural sector. It has also contributed immensely to educate the farmers in the use of new techniques and varieties of foodgrains to improve productivity and economy to the state and farmers.

16.2.2 In addition to Punjab Agriculture University, Ludhiana is also the hub of medical education in the state. It houses 2 out of 5 medical colleges existing in the state. The location of these colleges in the city has made Ludhiana as the nodal centre of healthcare in the region. Large number of people visit Ludhiana for specialized medical care due to the availabilities of experts in the field of medicine and surgery. In addition, Ludhiana has also 2 Homeopathic Colleges and 2 Dental Colleges which provide education in the field of homeopathic and dental care. Besides excelling in the area of medical education, Ludhiana also houses one of the oldest engineering institution i.e. Guru Nanak Engineering College which has served with distinction to provide technical education in the field of various branches of engineering. In all, technical institutions have been found to be operational in the city which has contributed immensely to the growth and development of the industrial sector. There are 4 B.Ed. Colleges in the city imparting lessons in the field of education besides a law college. In the field of higher education, Ludhiana has the privilege to have one of the oldest college in the state i.e. Government College, Ludhiana which has played a pioneering role in providing education in the area and has produced largest number of professionals, educationists and bureaucrats. Today Ludhiana have 18 degree colleges.

16.2.3 Besides the availabilities of number of institutions in the field of higher education, Ludhiana also has large number of institutions imparting education at the school

level. At present, it has 394 primary and elementary schools and 191 high / higher/ senior secondary level schools in the city. Considering the existing population and the norms defined for educational institutions, quantitatively the number of institutions are adequate to cater to the needs of the education of the city. However, taking into account large number of students visiting the city for the education, the available number of these institutions appears to be on the lower side, as compared to the prescribed norms. Further, it has been observed that, despite the fact that quantitatively number of institutions are adequate, but qualitatively most of the institutions have been found to be deficient in the basic amenities and facilities. The buildings having these institutions in number of cases have poor air, light and ventilation. Class rooms are inadequate to provide appropriate space to the students and accordingly remain crowded. Number of class rooms are also on the lower side. Number of schools do not have adequate open space play grounds for the students and students are forced to use available public open spaces in the vicinity of such institutions. Space occupied by the institutions is also on the lower side when compared with the norms prescribed by various agencies. The situation remains critical particularly in case of educational institutions located within the walled city, unplanned and congested areas. Further number of institutions and academies have been found to be operating from the residential houses and commercial buildings, indicating the shortage of space for educational institutions.

- 16.2.4 Worst sufferers in the field of education have been found to be large population inhabiting the slum areas. Out of 209 slums identified in the cities, 97 slums have been found to have number educational facility. This around 50 per cent of slums are deprived of the any educational institutions. Since large proportion of city population inhabits the slums, majority of children of poor people have been found to be hit by the absence of the educational facilities. In the absence of the educational institutions the children from 97 slum are forced to travel large distance to access the education. This act as the major deterrent for the parents to send their children to the educational institutions. This leads to lower level of literacy prevailing in slum areas due to large number of dropouts. Absence of education in slums, leads to lower skills and lower productivity of slum dwellers which keeps them in a vicious circle of poverty. This would call for providing appropriate level of educational institutions in these areas so that slum dwellers could benefit and

become educated more productive over a period of time. This strategy would help in improving quality of life, health, hygiene and productivity of slum dwellers so Ludhiana metropolis.

16.2.5 In view of this it will be important that educational institutions operating in residential and commercial areas are shifted to appropriate sites earmarked for educational purposes. In addition educational institutions having less areas or absence of play areas etc. are provided with more land in order to meet the basic needs of the students. This would require that appropriate sites for these institutions are earmarked in the various development schemes and sites already available in the sanctioned urban estates and approved colonies, which are not developed so far should be allocated to such institutions for construction and making available basic infrastructure to the students. The new areas to be developed should have appropriate number of institutions imparting education at various levels so that the position of Ludhiana as the educational hub of the state is not marginalized. Table showing the availability of educational institution at various level both in the area of technical and non-technical have been detailed below in table 16.2.5.

Table No-16.2.5
Educational Facilities

Sr. No.	Name of Facility	Existing in Numbers
1	Primary and Elementary Schools	394
2	High / Secondary Schools and Senior Secondary Schools	191
3	Colleges (Degree)	16
4	Technical Institutions	8
5	Medical Colleges (Allopathic)	2
6	Homoeopathic College	2
7	Dental College	2
8	B.Ed. College	4
9	Missionary College	2
10	University PAU and Veterinary University	2
11	Other LLB College	1
	Total	624

Source: DEO, Ludhiana.

16.3 Medical Facilities:

16.3.1 Following the pattern of educational institutions, Ludhiana is also the hub of medical facilities. Due to its strategic location, Ludhiana has large number of healthcare related facilities which not only save the city population but also that of region and in many aspects the state as a whole. Total number of healthcare units existing at various levels have been found to be 251 out of which sub health centre & primary health centres are 104. At higher level, 147 units are operating in the city with various bed capacities. Among the hospitals majority of units have beds capacity of 200 or blow. There are 122 hospitals in such category. However no hospital has been found to be in the category of 20 per cent to 500 beds. 4 hospitals have beds more than 500 in number which include Dayanand Medical College and Hospital, Christian Medical College and Hospital and Apollo Hospital. These hospitals often state of the art healthcare and have numerous experts. In addition, there are number of super speciality institutions imparting healthcare in the field of cardiology, cancer etc. Due to location of 2 medical colleges in the city, Ludhiana is known for its importance in healthcare. In addition to providing best options in the allopathic category, Ludhiana is also known for Ayurvedic system of health treatment. There are 21 healthcare units working in this branch of medicine. However, majority of Ayurvedic units are operating at lower level. There are 20 Ayurvedic dispensaries but their is only one hospital in this category. Considering the large number of health care units existing and operating in the city, Ludhiana has the distinction of having largest number of medical practioners in the state which are also operating at the individual level at the local level. Healthcare is also provided through number of nursing homes which are spread over the entire city.

16.3.2 In addition to providing healthcare to the human beings, Ludhiana also provides an efficient system of healthcare to pets and animals. To cater to this segment there are 42 units operating in the city out of which 23 are veterinary dispensaries and 19 veterinary hospitals. Due to existence of large number of milk dairies in and around the city, their healthcare is being taken up by these units. Punjab Agricultural University is the main hub operating in this area, Besides providing state of art healthcare to the animals it carries also research in this field of medicine. Punjab Agriculture University provides healthcare in the poultry segment also. University

holds number of melas for animal healthcare to create awareness among farmers to make these animals healthy and more productive.

- 16.3.3 Despite the fact, that Ludhiana is the hub of healthcare in the state and has largest number of healthcare units and the doctors in the states but large segment of the city population still remains unserved so far as healthcare is concerned. Poor people, majority of which are living in slums areas donot have access to the basic healthcare facilities. Due to lower number of Government healthcare units, existing in the city, healthcare becomes unaffordable for majority of the poor due to high charges of the private hospitals. Accordingly majority of slum dwellers are dependent upon unqualified medical practioners in care of any emergency. It has been found that 53 per cent slums in the city, has the access to medical facilities where as 47 per cent have no healthcare unit operating in their areas. This leaves large majority of slum population without any option of healthcare are required to travel considerable distance for availing these facilities. Accordingly, it would be important that parastatal agencies or NGO/CBO's are encouraged to provide healthcare facilities in the slums in order to cover the entire population of the city Municipal Corporation Ludhiana should also work out an agenda to provide healthcare in the slum areas where no such facility exists so far.
- 16.3.4 Considering the existence of large number of reputed healthcare institutions in the city Ludhiana can be developed to be the hub for medical tourism in the state. Further with fairly large number of Auyrvedic institutions operating in the city it can attract large number of tourists for providing ayurvedic system of treatment. This aspects needs to be critically looked into and used for leveraging the economy and employment in the city.
- 16.3.5 The World Health Organization (WHO) has defined the norms of 5 beds per thousand population to be provided in order to take care of healthcare needs of the city. At the current level the city required around 6800 beds for catering to the needs of the Ludhiana metropolis. But, considering the fact that city caters to the healthcare needs of the region and the state, the requirement of beds appears to be in the range of 9000-10000. The number of beds available at Ludhiana are inadequate to meet the current level needs and accordingly there is lot of rush in various dispensaries and hospitals, particularly those operated by the state government and by the charitable institutions. More number of such institutions are required to be

created to meet the current level demand as well as further healthcare needs of the city. Even in case of number of existing healthcare institutions, there has been found to be qualitative deficiency existing in the hospital related infrastructures due to which patients seeking treatment continue to suffer. In order to provide appropriate level of healthcare in the city, it will be important that large number of sites are carved out in the new areas which are under land and development. All available healthcare related sites should be put to optimum use by constructing dispensaries/hospitals so as to cater to the needs of the population. Spatial distribution of the healthcare units with a proper hierarchy would be critical to serve the entire population. The existing number of sub health centres, primary level health centres, allopathic and ayurvedic hospitals besides the veterinary dispensaries / hospitals operating in the city along with their bed capacity is given below.

Table No-16.3.5
Medical Facilities

Sr. No.	Name of the Facility	Existing in Numbers
1	Sub Health Centre and Primary Health Centre (Govt.)	104
2	Hospitals i) Upto 200 beds ii) 201 to 500 iii) Above 500	122 Nil 4
3	Ayurvedic Dispensary	20
4	Ayurvedic Hospital	1
5	Veterinary Dispensary	23
6	Veterinary Hospital	19

Source: CMO, Ludhiana.

16.4 Recreational Facilities:

16.4.1 Recreational facilities constitute an important element of physical and social development of an individual and for that reason, their provision and balanced spatial distribution at the local, sub-city and city level assumes importance. Accordingly, it would be important that city is divided into compact and sustainable communities and recreational facilities of appropriate order is made available to these communities to save the population residing therein. Recreational facilities

have been found to exist in the shape of parks and open spaces cinema, multiplexes, stadiums, museums, sports related activities, clubs, library and amusement parks etc. Recreational facilities have also been divided into active and passive recreational facilities, provision of both these facilities has to be made in order to cater to the essential needs of the individuals and communities.

16.4.2 Ludhiana metropolis has number of facilities as enumerated in the table 16.42 which cater to the recreational needs of the people living in the city. Maximum number of recreational facilities have been found to be in shape of parks created at various levels. There are in all 263 parks which include both small and large sized open spaces. Most of these parks form integral part of the planned colonies which have been developed by the Improvement Trust, Department of Housing and Urban Development, Punjab Urban Planning and Development Authority, Municipal Corporation, Housefed etc. Accordingly these parks are concentrated largely in the Bhai Randhir Singh Nagar, Surabha Nagar, Urban estates of Dugri, Dhandari Kalan, Samrala road, Gurdev Nagar, Model Town etc. These areas cover only limited part of the total city and as such we find high degree of concentration of the parks in few areas which have been developed by parastatal agencies. Private colonies which have been developed by colonizers and approved by the state government also have provision related to parks etc. which are comparatively lower in size, number and areas. Since major portion of Ludhiana has been developed without any planning input and planned intervention, therefore most of these city area do not have facilities of open spaces. Walled city has acute shortage of open space due to high degree of congestion and buildings in the areas.

Most of the residents living in walled city do not have much access to the open spaces/parks and are accordingly required to travel longer distance to have access to such areas. There are only 2 open spaces within the core area of the city. Efforts in this direction has been made by the parastatal agencies to create adequate number of open spaces including the Famous Rose Garden in the city. Punjab Agriculture University offers large open spaces which are used by the people. Worst sufferers in this context are the residents of 209 slums existing in the city which do not have any such facility. In the absence of such an area, most of the children use every possible available space including the streets/roads for playing. Even the existing level of parks are inadequate and do not conform to the planning norms specified for

parks and open spaces. Thus there is an urgent need to create adequate number of additional parks and open spaces in the city as per the specified norms besides ensuring their rational distribution in the city in order to ensure their availability to all the residents of the city including poorest of the poor.

Table No-16.4.2
Recreational Facilities

Sr. No.	Name of the Facility	Existing in Numbers
1	Parks	263
2	Cinemas	18
3	Multiplex	2
4	Stadium	3
5	Museum	2
6	Swimming Pool	4
7	Clubs	6
8	Library	2
9	Amusement Park	2

Source: Municipal Corporation, Ludhiana.

16.4.3 In addition to the parks, there are 18 cinemas existing in the city besides 2 multiplex catering to the recreational needs of the city. With the number of multiplexes coming up in the city, number of cinemas are likely to go up considerably. Considering the inter options of entertainment offered by multiplexes large number of existing cinemas are in process of conversion into multiplexes. Most of the now multiplexes are coming up on the outskirts / peri-urban areas. The distribution of cinemas have also been found to be irrational with concentration in few pockets and absence in others. This factor needs to be critically looked into. Most of the cinemas operating within the core areas of the city have emerged as traffic nodes and are creating numerous problems in the area due to absence of adequate parking spaces. The cinemas need to be rationally distributed within the city with adequate parking facilities.

16.4.4 In addition Ludhiana has 6 clubs including the Satluj Club, besides 2 amusement parks, 2 libraries, 4 swimming pools, and 3 sports stadiums. Sports stadiums are

frequently used to host local / state level sports competitions. However, looking at the fast population growth and rapid physical expansion of the city, it is important that adequate level of recreational facilities are created in the city and distributed to cover the entire population of the city. It will be essential to create a well-defined hierarchy of these amenities which should be followed as an integral part of planning and development process. Existing encroachments in the open spaces needs to be removed with areas restricted back for the use of community. Available open spaces need to be rationally planned and developed in order to make there optimum use. Involvement of the maintaining the open spaces and recreational facilities would be critical, more libraries need to be added to the city for promoting the habit of reading among the residents and the children's. Slum areas should be the focus of provision of open spaces and other recreational activities in order to improve the quality of life and to improve the quality of human population living therein. Promoting planned development would be critical to provide adequate sites for development of recreational facilities. Corporate houses, NGO's, CBO's and Voluntary Organizations should be actively involved in the development of recreational facilities in Ludhiana Metropolis City would require a well defined road map to provide these facilities in various segments of the city.

- 16.4.5 In addition to the open spaces, city would require the creation of sports facilities at the neighbourhood level and at the city level with the aim of development of sports and play areas for all age groups at appropriate levels. To achieve this objective, sports facilities at various levels of the city. Including housing clusters, neighbourhood, district and city on defined norms should be created. Sports facilities should be developed based on a well defined layout plan and landscape plan with adequate parking facility. In addition, the existing sports infrastructure should be upgraded and efficiently replanned to improve the level of facilities. New play field areas should be preferably provided / developed in the vicinity of educational institutions and landscaped areas. In order to facilitate the provision of sports related facilities available open spaces within the existing education or other institutions should be considered as the best options in order to optimize the use of scarce open spaces available within the city. The sports facilities should be provided integral part of intuitional development for making their optimum use. Infact looking at the centrality of the Ludhiana in the state and its vast potential city should be developed

as the nodal centre for sports activities by creating national and international level sports stadiums and sports infrastructure. In addition considering the present trends in the area of recreation, development of gyms, spas, bowling alleys etc. at the neighbourhood level should also be taken up on priority. Since these activities are mostly established as commercial ventures, provision of land / space for these could be considered as integral part of commercial development.

16.5 Post and Telegraph:

16.5.1 Into the rapid advancement in the technology and policy of liberalization adopted, communication has emerged as an important medium of communication. Despite rapid progress made in different modes of communications, post and telegraph still remains the most popular option of communication for vast majority of population. The provision and management of post and telegraph facility falls under the domain of the cost of index through the department of post and telegraph. There are in all 153 post offices operational in the city out of which 104 are branch level and 1 head post office. There are also telegraph offices. Number of such offices are reducing due to availability of better option of communication with are not only faster but also cheaper. But still, these facilities serve considerable proportion of population both at the city level and national level. The existing distribution of post offices also needs to be rationalized in order to serve the community in a better manner. Accordingly their provision should be made as per defined norms in order to cater to the needs of vast majority of city population. Details of the post offices available within Ludhiana are provided in the table 16.5.1, given below.

Table No-16.5.1

Post Offices

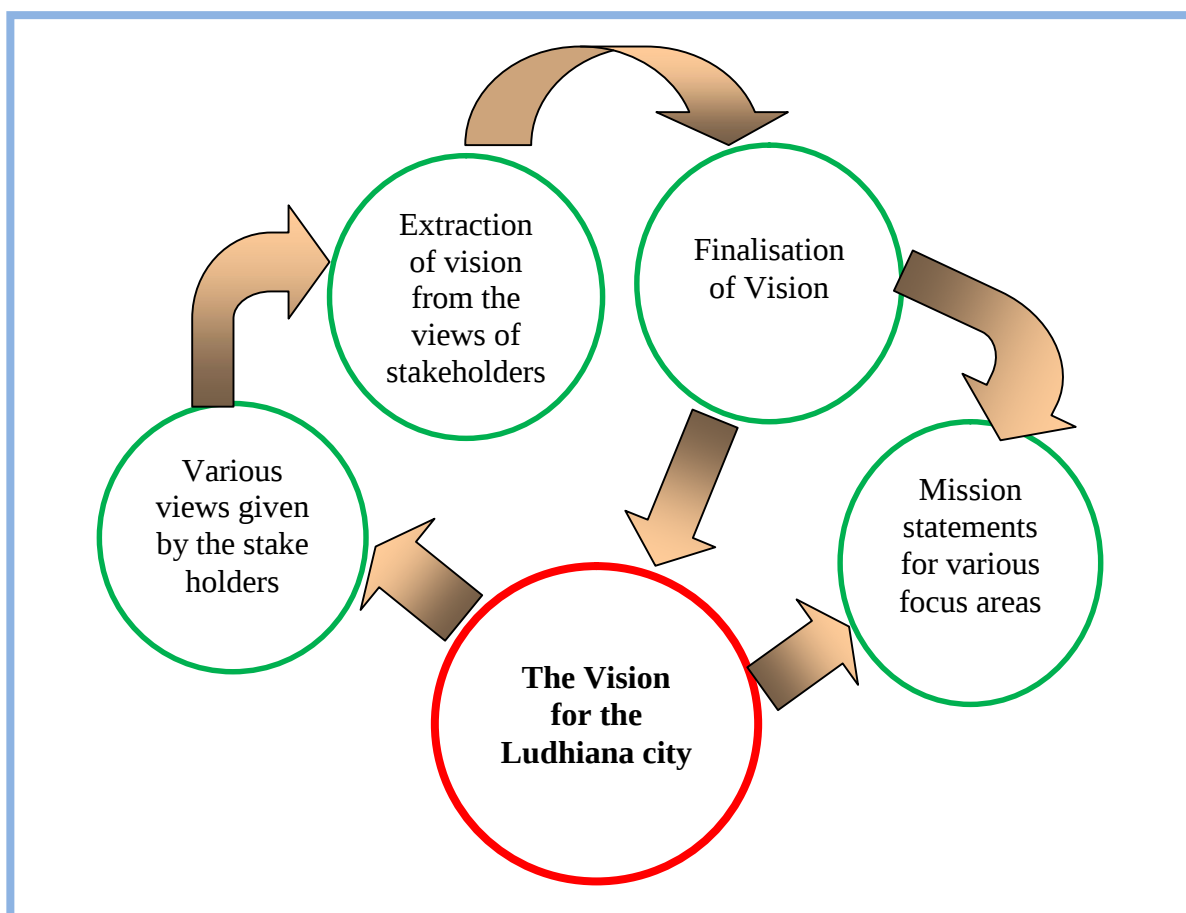
Sr. No.	Name of the Facility	Existing in Numbers
1	Branch Post Office	104
2	Sub Post Office	48
3	Head Post Office	1

Source: CMO, Ludhiana

16.5.2 With the introduction of the privatization in the telecommunication sector, large number of players have emerged in this areas leading to faster growth and cut throat competition. Accordingly demand for providing telephone exchanges have gone up considerably. Since the private players have got major chunk of the segment, so most of the demand for space will be met in the private sector, but considering the existence pattern, parastatal agencies still continue to be major player in the segment of telephones. With the increasing population and availability of enormous network, government sector would be required to expand its operational mechanism to meet the future demands in the urban sector. Accordingly number of telephone exchanges would require to be created within the city besides upgrading the facilities and infrastructure in the existing exchanges to cater the existing needs and the future requirements of population.

CHAPTER -XVII

Vision and Mission



Based on the outcome of discussions held with various stakeholders, intellectuals, non-government organizations, community based organizations, professionals, elected members and officials of the urban local body, professionals from the town and country planning department and detailed study & analysis made of the existing and historical growth and development mechanism, it has been observed that Ludhiana as a Metro city has enormous potential for rapid economic, physical growth and industrial development. Considering basic creativity of Punjabi Entrepreneurship coupled with availability of high order of technical and professional manpower in and around the city, Ludhiana has high degree of potential to emerge as financial capital as well as export hub of the State of Punjab provided required level of support systems, quality infrastructure, user friendly policy options, State of art developmental and institutional mechanisms are put in place. In order to make Ludhiana grow and emerge as one of the most important, humane dynamic,

productive, sustainable, eco-friendly pollution free and vibrant urban centre of the State of Punjab, the future of the city is envisioned as:

Vision:

- Ludhiana to be developed as financial capital, commercially and industrially vibrant eco-friendly city of state of Punjab providing assured employment and quality living to all its existing and future residents, irrespective of the caste, creed, gender, economical and social status including poorest of poor.
- The quality living in the city to be achieved through
 - o Ensured higher order of better urban governance
 - o High degree of operational efficiency
 - o Higher order of economic productivity
 - o Ensured environmental sustainability
 - o Reduced vehicular and industrial pollution
 - o Rationalized land use pattern
 - o Decongested core areas
 - o Assured quality of higher order of infrastructure and services
 - o Improving traffic and transportation
 - o Assured safety of residents and communities
- City to be culturally, socially and economically vibrant where
 - o Every individual has gainful employment
 - o Where each family has access to all basic amenities of life and
 - o Where each community is self-contained and self-sustained
- Ludhiana to be
 - o Export capital of the State
 - o Nerve centre of high tech small scale enterprise
 - o Hi-tech industrial and garment hub
 - o Centre for trade and commerce
 - o Centre of excellence for health care
 - o Centre for providing quality high-tech education
 - o Center for providing quality medical education
 - o A cultural hub
 - o A role model of planned development
 - o A role model of good governance

Mission statement for focused areas:

In order to achieve the objectives and goals enshrined in the vision statement, mission statements for various focused areas has been detailed below:

a) Growth management

- Promoting planned development through effective city planning.
- Rationalizing land use pattern for effective traffic management and provision of basic services and amenities.
- To rationalize the Peri-urban development
- To minimize haphazard, unplanned and sub standard growth
- Making effective plan implementation and enforcement as integral part of city planning and development process.
- Conserving the cultural fabric.
- Making growth management process more participatory.
- Review of development plan on regular basis.
- Improving system of building plan approvals through use of IT and GIS.
- Making urban development self sustaining.
- Leveraging growth management process for resource generation.

b) Urban Environment

- Urban environment to be made integral and essential part of city development process.
- Environment to be made integral part of planning and decision making process.
- Effective treatment of all sewage generated within the city.
- Improving solid waste management.
- Creating / developing new and improving existing gardens, parks and open spaces.
- Promoting better water management.
- Making city free from air, water, land and noise pollution.
- Promoting optimum use of natural resources.
- Minimizing growth of slums / shanty towns and improving existing slums.

c) Urban Services :

i) Water supply

- To ensure safe, equitable, reliable, adequate and quality water supply
- To ensure 100% coverage of the city
- To improve operational efficiency of water supply system by minimizing wastage and leakage.
- Remove illegal water connection and public stand posts (PSP)
- To minimize the ground water consumption by promoting water conservation.
- To promote rain water harvesting and recycling of water.

ii) Sewerage and Drainage

- Total coverage of the city with sewerage and drainage system including slums.
- To promote eco-friendly decentralized treatment system.
- To minimize sewerage generation through water saving appliances
- To promote recycling of sewage
- To promote protection of natural water bodies
- To promote optimum use of storm water as an alternate source of water supply.

iii) Solid waste management

- To improve the solid waste management in the city using best practices.
- To use PPP model for Solid waste management.
- To promote “Recycling” of SWM.
- To make solid waste management people centric
- To integrate solid waste disposal and rag pickers for efficient solid waste management and resource/employment generation for poor.
- To create awareness for minimizing solid waste generation.

iv) Storm water disposal

- Revive the storm water disposal system of the city
- To improve the capacity of the water bodies existing within the city
- To make optimum use of storm water for reducing the demand of fresh water
- To improve the natural water drainage channels by de silting and stopping the sewage water from entering the channels.
- Construction of Storm water disposal channels and integrating each and every house into the system

- Integrating the storm water channels into development using land suitability analysis

v)Traffic and Transportation

- To improve safety, mobility and efficiency of traffic within and out side the city
- To segregate and rationalize the inter and intra city traffic
- To improve road geometry and road capacity of existing network
- To minimize the use of private transport and to promote public transport.
- To use planning as a mechanism for rationalizing and minimizing traffic
- To minimize pollution caused by traffic and transportation and improve environment.
- To create new road network and to improve the existing network to promote operational efficiency of traffic.
- To review the existing activity pattern to rationalize the traffic.
- To provide adequate parking spaces to remove traffic bottlenecks.
- To create an cost – effective and efficient mechanism of mass transportation.

vi) Urban Poor

- Making urban poor integral part of the city planning, growth and development process.
- Improving accessibility to basic services for the urban poor.
- Providing urban poor with better living environment and option.
- Creating enough employment opportunities for improving financial status of poor.
- Providing adequate opportunities for creating affordable shelter duly supported by basic services.
- Empowering poor to be integral part of city development process.
- All poverty alleviation programme to be made more focused and poor centric.

vii) Social Infrastructure

- To provide adequate sites based on norms, for creating / developing various social infrastructures.
- To involve private and corporate sectors for providing / developing and maintenance of social infrastructure.
- To make optimum use of mechanism of planned development for developing adequate and quality infrastructure.

- To promote community participation in maintenance and upkeep of social infrastructure.

viii)Urban Governance

- To make urban local body a role model for good governance.
- To create appropriate and effective mechanism for grievance redressal
- To improve and strengthen the urban local body in terms of structure and quality manpower and resources.
- To create appropriate mechanism for promoting higher interface between ULB and communities and regular basis at ward and ULB levels.
- Making urban governance citizen centric.
- Adopting best practices and systems which improve transparency, grievance redressal and accountability.
- To improve service delivery at minimum cost.
- To promote transparency and objectivity in all public transactions and decision making.
- To effectively involve NGOs and CBOs in the poverty alleviation programmes.

CHAPTER-XVIII

Projections and Proposal for Planning Area Ludhiana-2021

Part-I Projections:

The population is the basic human factor for which planning is done. The future development of the town mostly depends on trade expansion, development of industries, and expansion of civic infrastructure etc. These elements may produce sharp rises of slow growth or stationary or decreasing conditions for the population. Population projection is to analyze the past data for a number of years and to extrapolate the past trends assuming that the conditions will continue to change in the future. The following data show the present and the projected population for the year 2021:

Table No.1

Population falling within Local Planning Area Ludhiana.

Area	1981	1991	Existing population 2001
M.C.Ludhiana	607052	1042740	1398467
Sahnewal Nagar Panchayat	-	-	17293
Doraha M.Council	7606	9589	18986
Mullanpur Nagar Panchayat	8115	10138	13949
Villages of Distt.Ludhiana(281)	296935	368583	445732
Villages of Distt. Jalandhar(20)	19196	24098	28253
Phillaur M.C.	-	18596	22302
Total	938904	1473744	1944982

Source: District census 1981,1991,2001

Table No.2:

Past & Present growth rate of Local Planning Area, Ludhiana

Year	Population (in persons)	Growth Rate (%)
1981	938904	-
1991	1473744	57
2001	1944982	32

Source: District census 1981,1991,2001

Table No.3:

Existing population of Ludhiana city and its Urban Fringe (i.e. 43 villages abutting M.C.Ludhiana)

Year	M.C. Ludhiana	Population of Urban Fringe	Total population (M.C.+ Urban Fringe)	Combined growth rate (%age)
1981	607052	45944	652996	-
1991	1042740	65149	1107889	70
2001	1398467	106495	1504962	36

Source: District census 1981,1991,2001

A) PROJECTED POPULATION OF LOCAL PLANNING AREA UPTO
2021

Table No.4:

Projected population of Local Planning Area

Existing population (2001)	Projected population (2011)	Projected population (2021)
1944982	34 Lac	48 Lac

**B) PROJECTED POPULATION OF LUDHIANA CITY AND ITS URBAN
FRINGE**

Population in 2001 = 1504962 persons

- i) Although as per census 2001, the population of Ludhiana city and Urban Fringe has been calculated 1504962 persons but for calculating the future requirements of housing and infrastructure etc. in the master plan, the floating plus seasonal migratory labour which is estimated about 25 % to 30% of total population has been taken into account, as result of which the total population of Ludhiana city and its Urban Fringe has been estimated about 20lacs persons. Hence for population projection, the figure of 20lacs population is being considered of the census figure of 1504962 persons and the assumed decadal growth rate taken is 40%.

Table No.5:

Projected population of Ludhiana city and its Urban Fringe:

Existing population (2007)	Projected population (2011)	Projected population (2021)
2000000	28 Lac	40 Lac

These population projections are based on the following assumptions:

- i) The strong economic base of Ludhiana city has started attracting MNC's and other famous builders of the country for investment in real estate which is likely to invite more people.
- ii) Up gradation of Sahnewal aerodrome shall encourage economic and physical development of city and more persons are likely to be settled in future in Ludhiana city.
- iii) Economic corridors shall be extended from Mumbai to Ludhiana, which will increase employment opportunities and hence making the economic base of the city stronger.

Besides population projections, a review of past Master Plans has been done in chapter III and existing situations and problems has been discussed in the respective chapters of viz. situation analysis, socio-economic and demographic profile, slums and poverty in Ludhiana. Environment, Housing and storm water drainages etc. In addition, the emerged major/key issues have also been enumerated after analysis of the existing situation with regard to the Traffic and Transport in chapter VII, Industries in chapter VIII, water supply network in chapter X, solid waste management in chapter XI and sewerage network in chapter XII.

Basic considerations in formulating Land Use Plan-2007-2021

Part-II Considerations:

Detailed and indepth analysis of current pattern of development based on the existing land use plan prepared in collaboration of Centre for Computational Engineering (C.C .E) ,Punjab Engineering College, Chandigarh indicates that :

- Major share of the area which have been added during the recent past is sparsely built up . In these areas land has been sub-divided with the prime motive of speculation leading to low built up area
- Development is primarlily and essentially focussed either around existing colonies or along major road net-work.
- . Geographical expansion of the city and actual construction of housing and colonies is largely pronounced along GT Road, National Highway No. 1 , from Delhi to Amritsar and N.H. 95 from Chandigarh-Ludhiana besides in the area between Dugri Road, Ferozepur Road and Humbran Road etc.
- o Residential, industrial growth is largely concentrated along National Highway No. 95 towards Samrala and NH No.1 stowards Khanna and Phillaur besides roads leading to Machhiwarara and Bahadurke
- This pattern of growth has created traffic congestion along National Highways .Even though growth may be encouraged along major routes of communication, it is necessary to enforce access control along the highways.
- Ludhiana being industrial city, the prevalent trend of co-existence of industrial and residential growth needs a special mention. Therefore, a Mixed land use has been introduced with the objectives of a) making

provisions for setting up of shopping centres, hotels, hospitals, institutions and several other activities in a large number of locations, b) to give sense of flexibility to the people , c) to allow polluting and hazardous industries located in the city to use their lands for commercial use if they choose to shift the units away from the city.

Thus trends of physical growth of Ludhiana invite amendments, alternatives, land use decisions and city management strategies of coming years. With a view to evolve a rational framework for the future growth & development of Ludhiana Metropolis, the extent and location of land for different uses is primarily based on the principles of clustering. Clustering involves clubbing of similar compatible blocks for facilitating designing and laying of services and road network to serve the specific nature and requirement of the area. This principle of clustering is based on avoiding sparse pattern of growth, achieving compact development leading to achieving economy in laying basic services and social infrastructure and utilities including roads, water supply, drainage, electrification, sewerage, education & health etc. within the clusters besides promoting socially interactive communities. Needless to mention that not only our system but no system can afford the cost of providing utilities and services (roads w/s, electricity and drainage etc.) for vast plotted development with houses sparsely built and with large tracts of vacant areas left un-built for large number of years. Considering the nature of residential and industrial growth, the pattern of clusters adopted for them would have different connotations in terms of level of services and infrastructures, pattern of road network.

The role of Urban Local Bodies and GLADA would be primarily focused on creating major road network and laying trunk services in the area of development. This would ensure achieving the objectives of the planned development in accordance with proposals of the Master Plan. Funds for creating the major network would be made available through levying and collection of external development charges. No doubt, private developers can successfully implement large land development projects involving, housing colonies and townships, but the accomplishment of the task of developing trunk road net-work and services cannot be left to the whims of individual developer.. Therefore, once the major network is laid by the parastatal agencies , the private sector can be associated as partners in the development and implementation. This needs a

coordinated approach amongst several agencies involved with urban services and development along with a participatory planning process at local level.

Therefore, while preparing master plan for local planning area of Ludhiana ,the present urbanized area has also been taken into consideration to assess the trend and nodes of development. Thus, the break-up of major existing landuses within present urabised area is given below:-

BREAK UP OF MAJOR EXISTING LANDUSES

Local Planning Area Ludhiana-2007

Sr.No.	Existing landuse	Area (in hectares)	%age of total area
1.	Residential	12273	9.65
2.	Commercial	851	0.67
3.	Mixed landuse	1277	1.01
4.	Industrial	3251	2.56
5.	Recretional	300	0.23
6.	Traffic & Transportation	4275	3.36
7.	Utilities	150	0.12
8.	Government	502	0.40
9.	Public & Semi-public	1952	1.53
10.	Agriculture and Water Bodies.	102291	80.47
	Total	127122	100.00

In the local planning area of Ludhiana ,a large area was notified to regulate the development along major corridors and the periphery of the metropolis. In the process other small urban settlements like Doraha, Mullanpur and Phillaur were included whereas Sahnewal has already been merged with Ludhiana urban agglomeration.**It is clarified that individual development plans of these urban settlements outside M.C. limits of Mullanpur,Doraha & phillaur will have to be undertaken separately.**

Master Plan Ludhiana-2021

Part-III Proposals:

Proposed Land Use Plan 2007 -2021

In the light of foregoing details, discussions, analysis, assumptions and projected population of local planning area Ludhiana and the planning requirements proposed land use plan-2021 has been prepared.

The break up of proposed land uses shown on Drawing No:-D.T.P. (L)02/2008 dated 22-02-08 of the Master Plan is given below .

Break-up of major Proposed Land Uses within Local Planning Area, Ludhiana.

Sr.No.	Proposed Landuse-2021	Area (in hectares)	%age of Urbanisable area	%age of total L.P.A.area
1.	Residential	43395	41.51	34.14
2.	Commercial	5294	5.06	4.16
3.	Mixed landuse	1920	1.84	1.51
4.	Industrial	24688	23.62	19.42
5.	Recreational	7416	7.10	5.83
6.	Traffic& Transportation	10249	9.80	8.06
7.	Utilities	2238	2.14	1.76
8.	Government	4116	3.94	3.24
9.	Public & Semi-public	5220	4.99	4.11
	<u>Total Urbanisable area</u>	104536	100.00	-
10.	Agriculture and Water Bodies.	22586	-	17.77
	Total	127122	-	100.00

After examining the various possibilities and taking into account the pattern suggested in Urban Development Plans Formulation & Implementation (UDPFI) guidelines published by Ministry of Urban Affairs& Employment ,Governemnt of India,

New Delhi , the aforesaid landuse categories have been adopted for the Proposed Landuse Plan. The other concerned aspects of these different Landuses have been detailed out in the following sections/sub-heads of this Part-III. The issues, guidelines and controls mentioned in the following sub-heads shall have to be read with Landuse Zoning Regulations specified for different landuses in Part IV i.e. Landuse Zoning Regulations. Therefore, the development in different landuse zones would be regulated and carried out in accordance with the regulations as laid down in Landuse Zoning Regulations in Part-IV and respective sections of Part-III of this chapter.

However, the lands which comes under the optimum utilization of vacant Govt. lands (OUVGL) scheme of the state Govt., the use of such lands/sites shall be determined by the Govt. later on at any appropriate time, irrespective of their existing /proposed landuse and

The sites on which various projects have been approved or whose change of landuse has already been permitted by competent authority/Govt., such sites shall be deemed to be adjusted as sanctioned/permitted.

Zonal Development Plans:

The Local Planning Area Ludhiana will be divided into different zones/sector and separate sector zoning plans will be prepared to further regulate development and also the final alignment of sector roads would be determined after the approval of these zoning plans.

Section-A

LUDHIANA URBAN AREA-2021

In 2001, about 12025 Hectares of area was estimated to have been built up, accommodating about 1398467 lakh population. To accommodate the projected population of 40 lakh by the year 2021 in local planning area Ludhiana, a four-pronged strategy is recommended:

- i) The growth of Ludhiana is to be viewed in the Regional context as a regional node.
- ii) To encourage the population to deflect in the satellite towns like Mullanpur, Doraha, Sahnewal and Phillaur to reduce pressure on the city by developing proper road network that provides arteries for growth.
- iii) To increase the population holding capacity of the area within existing urban limits through redevelopment for accommodating additional population in the city.
- iv) Extension of the present urban limits to the extent necessary to include the peri-urban areas which are fully developed and dependent on Ludhiana.

URBAN EXTENSIONS

Urban extension could be in areas already under developmental pressure for utilization for various urban activities and areas along major transport corridors and fringes of already urbanized areas. It is envisioned that rural areas would be absorbed as urban extension from time to time considering the need of balanced city development. The immediate urban extension could be in the proposed urbanisable zone of Master Plan Ludhiana 2021.

HIERARCHY OF URBAN DEVELOPMENT

A planned city, for an environment of convenience should have a hierarchical cellular structure; with nuclei to contain essential facilities and services at different levels. The pattern of a community module is conceived as residential area containing a 'neighbourhood' with senior secondary school and shopping facilities for day to day needs. The higher level of additional facilities is to be provided at community, district and zonal/sub city levels. Such a structure could be maintained in the process of the preparation of zonal plans.

REDEVELOPMENT OF EXISTING URBAN AREA

The scope for development of urban extensions on a large scale is suggested to be restricted to save the fertile / precious agricultural land in Ludhiana. Therefore, the option of redevelopment through a process of reorganization and utilization of the land already developed will be a major element of overall city development plan.

A redevelopment strategy for accommodating more population in a planned manner is suggested to be taken up on priority in all use zones for efficient and optimum utilization of the existing urban land, both in planned and unplanned areas. This would have to be supported with provision of adequate infrastructure viz. water supply, sewerage, road network, open spaces and the essential social infrastructure.

To encourage the growth impulse for regeneration in the target redevelopment areas, the possible incentives and modalities should include grant of planning permission to reorganize /pool properties for planning purpose, provision of social infrastructure through Transferable Development Rights or Accommodation Reservation(i.e.allowing construction of community facilities without including area in FAR) and reduced space standards for unplanned areas, higher FAR for specified redevelopment areas and application of flexible concept of mix-use zones in inner zone.

REDEVELOPMENT STRATEGY

The target areas for redevelopment will have to be identified on the basis of their need for up gradation and potential for development. Redevelopment schemes will be prepared by the respective local body/land owners/residents. The concerned local body should promote private land owners to take up assembly and redevelopment with minimum area specifications / requirements .

Mixed use areas

These areas are characterized by a mix of different land uses and have similarities in compact built form, narrow circulation space and low-rise high-density developments, mainly accommodating residential, commercial (both retail or wholesale) and industrial uses. Therefore, it is important that the areas, which are already established with identified uses, continue to play an active economic role. The authority may further designate certain other areas as ‘mixed use areas’

The strategy is to provide suitable framework for allowing mix-use activities appropriate to the character of the areas as per the individual schemes having greater flexibility in terms of

permitting variety of uses namely, commercial use (shops, offices, banks etc.) outlets for specialized services etc.

Unplanned areas:

Villages:

The villages in Ludhiana have undergone significant physical and functional transformation based on their specific location. Villages are characterized by a mix of different land uses and have similarities in compact built form, narrow circulation space and low-rise high-density developments. These mainly accommodate residential, commercial and industrial use and function as a mix. It is important that these areas, which are already established with identified uses, continue to play an active economic role.

For provision of social and educational facilities, reduced space standards may be adopted. The facilities like community hall, dispensary etc. may be grouped together depending on the availability of land.

Guidelines for Redevelopment Schemes:

The basic objective of redevelopment is to upgrade the area by implementing specific schemes on the basis of existing physical and socio-economic conditions in the following way:

- i) Areas for redevelopment and renewal should be identified on the basis of physical features such as rail, roads, drains, high tension lines and controlled zones of Monuments/Heritage areas, etc.
- ii) The residents/cooperative societies/private developers should get the layout and services plan prepared in consultation with the concerned authority for approval.
- iii) Amalgamation and reconstitution of the plots for planning purpose will be permitted.
- iv) The standard of housing density, minimum width of roads and community facilities can be relaxed, wherever justified, by planning considerations (e.g. pedestrianisation of the area).
- v) The Public and Semi-public uses and services like hospitals, dispensaries, colleges, schools, police stations, fire stations, post offices, local government offices, parking etc. shall be retained in their present locations as far as possible and if not, relocated as part of the redevelopment scheme. Alternative sites shall

be indicated in the Redevelopment Schemes/Zonal Development Plans. Any change or addition therefore shall be in accordance with the overall policy framework to be prescribed by the authority concerned.

- vi) Reduced space standards may be adopted for community facilities/social infrastructure for such area. The land required for any public purpose may be acquired with the consent of the owner through issue of Development Rights Certificate in lieu of payment towards cost of land as per the prescribed regulations. The concept of Accommodation Reservation i.e. allowing construction of community facilities without counting in FAR may also be utilized.
- vii) The circulation pattern should include segregation of pedestrian and vehicular traffic, entry control, access of emergency vehicles to every block, provision of adequate parking etc.
- viii) Urban Design and Heritage of the area to be conserved as per the guidelines.
- ix) The land use shall be governed by the Master Plan/Zonal Development Plan. The non-residential use will be permitted as per the provisions of the Mixed Use Regulations or any special area regulations.

Section-B

SHELTER

The policy regarding “Shelter” is based on the goal of ensuring affordable ‘Shelter for All’ by harnessing the potential of the public, private/corporate/co-operative and household sectors. It aims at ensuring effective housing and shelter options for all citizens, especially for the vulnerable groups and the poor, by creating adequate housing stock on rental or ownership basis. It envisages the role of the public agencies as facilitator through policy and strategic interventions.

Housing need

As per census 2001, Municipal Corporation, Ludhiana has 233982 census houses under the category of residential houses which accounts for 63.8% of housing stock used for residences and it has been observed that 36.2% Census houses has not been put to their optimum use. The households are accommodated in a variety of housing types including different categories of planned built housing, squatter settlements, unauthorized colonies, traditional areas and villages. The component of housing through non-institutional sources, viz., unauthorized colonies, squatters etc. is quite significant. This trend has continued in current decade and has to be kept in view while determining the options and strategies for housing.

Based on the projected population of 40 lakh by 2021 for Local Planning Area, Ludhiana, the additional demand for housing is required to be estimated keeping in view the other urban and a number of rural settlements which falls within it. In addition, it is worth mentioning that housing has a strong spatial relationship with socio-economic factors. With the increasing income level, the lifestyle and living habits are changing. For example; joint families are disintegrating and demand for nucleous housing is on rise and if one person owns a house in old part of the city, with economic affordability he desire to build another one in outer areas with good environment. Thus, housing demands cannot merely be assessed with projected population but such factors(as aforesaid) are also needed to be taken into account while assessing demand for housing.

Keeping in view the socio-economic composition of the population, it is estimated that lion's share of the housing requirement would be for the urban poor and the economically weaker sections in the form of houses with minimum of two rooms. Based on past experience, it is necessary to distinguish between the urban poor comprising the inhabitants of squatter settlements and pavement dwellers, etc. The role of the government

would be less as a provider but more as a facilitator. The housing for the urban poor is to be broadly created in old and new urban areas through up-gradation of old/traditional areas, employers and industrial housing, group housing and also as infills regularized colonies.

Housing Strategy

The proposed housing strategy incorporates specific approaches for development of new housing areas, up-gradation and re-densification through redevelopment of existing housing areas including unauthorized colonies, housing in villages. Looking at the possible distribution of housing types, the future requirement of shelter provision will be dominated by small dwelling units. In view of the limited availability of land, land prices and increased requirement of housing especially for Lower Income Group & Economically Weaker Sections, Plotted residential development should be discouraged and flatted development encouraged.

It is proposed to adopt a multi-pronged housing strategy for provision of housing stock and for delivery of serviced land, involving the private sector to a significant extent, public agencies and cooperative societies etc.

In the context of housing strategy, it is essential to optimize utilization of land and space with a view to increase net residential density. These norms and controls would also be reviewed periodically by Local body/GLADA and suitably modified/updated to meet the requirements of the citizens. It has been observed that the practice of prescribing FAR/density norms without distinguishing between housing categories in terms of plinth area, can result in over population or under population on the one hand, and non optimal design and under utilization of the utility network, on the other.

To make the construction activity more cost-effective, energy efficient and environment friendly, the choice of alternative building materials and techniques have to be reoriented and promoted for construction activity. Building technology parks and mobile expositions for cost effective materials and techniques are to be explored for new housing areas and redevelopment schemes. Standard specification would also require to be incorporated in the Government Schedule and adopted for public and private housing schemes. Research and development in creating affordable housing should be the focus area .

New housing areas

To overcome the existing housing backlog and to cater to housing need of future population up to 2021, would require specific action plans to be evolved by the State and parastatal agencies with reference to the following:

- i) Determination of area requirement for creating the housing stock ;
- ii) Identification of the areas for housing development;
- iii) Redefining the pattern and norms for new housing development;
- iv) The mode and manner of development, and the roles of the private and public sectors in the process.

The new housing development through the aforementioned methods should be based on a composite area basis and should cater to the special needs of elderly, handicapped, single occupants and other sections of the society . Considering these issues, it is recommended that need for future housing based on demand and supply , socio-economic composition of the citizens of Local Planning Area Ludhiana vis-a –vis real estate analysis should be assessed separately by some expert group/ consultants.

Traditional Zone (old city) and unplanned areas:

The congested areas of the city have a predominant residential component. The localities have a role to play as provider of housing stock. All these areas should be redeveloped ensuring modern services and amenities for a healthy residential environment and in the process, eliminating risk prone structures and activities. The owners can jointly redevelop the areas based on the prescribed guidelines.

The old city areas are fast changing their residential character to non-residential use, but still have a considerable proportion of residential component. The non-residential uses of varying degrees have developed with time depending on their location, related with accessibility and the established trade. The basic objective of Redevelopment in traditional areas is to bring about in situ improvements which help in improving architectural character of the area, i.e., design and layout, as well as revitalizing trade and commerce in the area.

The redevelopment plans should ensure that the permissibility of mixed use zoning at property or within the premise level is compatible to the predominant residential areas.

UNAUTHORIZED/REGULATED UNAUTHORIZED COLONIES:

Large number of unauthorized colonies in Ludhiana are posing serious problems in the city as major proportion of the population is living in these colonies. The issue of unauthorized colonies has engaged attention since mid seventies and the problem was

further aggravated during mid eighties when large scale migration took place to Ludhiana from within the Punjab state and other states of the country due to disturbed law and order conditions. This led to mushrooming of large number of unauthorized colonies in the city. Department of local bodies evolved a policy for the regularization of unauthorized colonies. A number of unauthorized colonies were regularized but many more unauthorized colonies have come up since then. Such colonies are to be identified by M.C. Ludhiana and GLADA. The Municipal Corporation Ludhiana is regularizing unauthorized colonies by providing basic services and infrastructure to improve the environment and living condition of the inhabitants. However, in reality it has not brought much tangible improvement.

The Govt. should formulate a comprehensive policy to regularize the unauthorized colonies existing till date. Further appropriate framework should be created so that no unauthorized colony is allowed to come up in future. It needs to be ensured that for improvement of physical and social infrastructure, the minimum necessary/feasible level of services and community facilities are provided.

HOUSING FOR URBAN POOR:

The category of urban poor for purpose of the Plan would mainly comprise the houseless population, inhabitants of squatter settlements and informal service providers. Such services could include domestic help, hawkers and vendors, low paid workers in the industrial, commercial and trade/business sectors, etc; This would also include both existing population and future migrants. In terms of housing, provision of shelter for these categories continues to be the single biggest challenge and would require a mix of innovative approaches and solutions.

New housing should be largely in the form of built up units, which should be developed through public and private agencies and cooperative societies. As this category constitutes bulk of the housing stock that has to be created at an affordable price to the lowest income bracket as housing for Economically Weaker Sections (EWS), this is often achieved by the system of cross-subsidization.

For this purpose, adequate land should be earmarked for EWS housing. The private as well as Govt. agencies at the time of developing group housing should ensure that minimum 10% of the build up dwelling units and 10% of the total plotted area of the scheme under residential use, as the case may be, is earmarked for housing of Community-Service Personnel/EWS or lower income group. In old built up areas, this may be achieved

through redevelopment schemes or industrial workers housing etc.. In urban areas, the acquisition and development cost of the land for EWS housing should be borne by rest of the project.

The pattern of EWS housing should be such as to ensure optimal utilization of land in a sustainable manner. For that purpose, multi- storeyed housing will be the preferred option. Apart from mandatory provision for EWS housing in all group housing projects/schemes, the primary responsibility for creating adequate stock of housing for urban poor shall have to be discharged by public agencies.

NIGHT SHELTER:

The provision of night shelters is envisioned to cater to the shelter-less population which are proposed to be provided near the city nodes such as Railway Terminals, Bus Terminals, Wholesale /Retail market, Freight Complexes etc. as per requirements and should be identified keeping in view major work centers. Special provisions should be made for the homeless, destitute women and children including the disabled, orphans and old. In addition, multi-purpose use of the existing facility buildings may be allowed for night shelter purpose. Provision should also be made for converting existing buildings, wherever available, with suitable modifications into night shelters.

On the basis of the 2001 Census, to cater to the houseless population, adequate number of sites should be earmarked in Ludhiana for night shelters. In order to make the provision of this facility financially sustainable for the local body, innovative concepts such as integrated complex with commercial space on the ground floor and night shelter on the first floor should be explored. The guidelines and incentive package should be designed by the concerned local body in collaboration with the parastatal agencies with a view to achieve self-sustainable night shelters.

DEVELOPMENT CONTROLS FOR RESIDENTIAL USE ZONE

The residential use zone has been further divided into three sub zones:

- i) RD₁- Densely populated zone comprised in the inner zone (old city) of the city.
- ii) RD₂ - Moderately populated residential areas mainly falling in the middle zone of the city.
- iii) RD₃ -Low density residential areas which have come up or are likely to come up in peri- urban zone of the city.

The subdivision of residential use zone into use premises and subsequent approval of layout plans shall be governed by following norms:

The residential area can have both the plotted and group housing. In case of group and plotted development, minimum plot size, ground coverage. FAR, Height, Parking standards and other norms shall be as per building bye laws of the concerned local body/GLADA and Govt. instructions issued from time to time if any. The provision of requisite social infrastructure shall be governed by the norms prescribed by concerned municipal body/GLADA and as per instructions issued by the State Govt. from time to time. However, the following will be taken into consideration;

- (a) Rainwater harvesting shall be an integral part of the storm water drainage plan at the time of sanction of layout plan for all the plots.
- (b) The natural drainage pattern is not to be disturbed.
- (c) Dual pipe system of recycled water is recommended in new areas and redevelopment schemes.
- (d) Electric sub stations shall be provided as per requirement.
- (e) Pole mounted electric transformers for augmenting electric supply in already developed areas are recommended.
- (f) Non- conventional sources i.e. solar energy etc is recommended for public areas in all the establishments.
- (g) Provisions for decentralized sewerage treatment plant and segregated waste disposal arrangement should ensure that no untreated effluent is allowed to exit/ spill out of the scheme area.
- (h) Suitable landscape plans for the neighbourhood shall be prepared, for the landscape development of the parks and roadside plantation etc
- (i) Suggestive norms/lower norms could be adopted in specially identified built up areas etc.

BUILDING CONTROLS

A. Residential plot- plotted housing &

B. Group Housing

Maximum ground coverage, FAR, set backs, height and number of dwelling units for different size of residential plots shall be as following:

i) Within M.C. Limits:

For sites falling within municipal limits area requirement, planning norms, ground coverage, set backs, height and FAR etc. shall be applicable as per norms and building bye-laws of the local/municipal body concerned.

ii) Outside MC limits :

For sites falling outside municipal limits area requirement, planning norms, ground coverage, set backs, height and FAR etc. shall be applicable as per norms and building bye-laws of PUDA/GLADA and instructions/guidelines issued by the State Govt. from time to time.

Land use zoning regulations:

Residential zone:

Uses permissible in residential zone of RD1, RD 2 and RD 3 are given in the Part-IV containing land use zoning regulations.

Section-C

MIXED LANDUSE ZONES

The need for creating mixed use zones in Master plan Ludhiana arises from the fact that Ludhiana city being an important economic centre of the state has a large number of areas characterized by a mix of different land uses which have similarity in compact built form, narrow circulation space and low-rise high-density developments, mainly accommodating residential, commercial-both retail or wholesale and industrial uses. Therefore, it is important that the areas, which are already established with identified uses, continue to play an active economic role. The strategy is to provide suitable framework for allowing mix use activities appropriate to the character of the areas as per the individual schemes having greater flexibility in terms of permitting variety of uses namely, commercial (shops, offices, banks etc.), household and green category industries or outlets for specialized services etc. This character is more prevalent in inner zone of the city. Beside this few areas of the middle zone also exhibit this character. The mix land use zones are primarily divided into two categories:

- (a) Mix land use along road network
- (b) Mix land use in Pockets.

(a) **Mix land use along road network:**

The following major roads have been identified for mixed land use in the Master Plan.

- G.T. Road (N.H. 1) Ambala side
- G.T. Road (N.H. 1) Jalandhar side
- Bye pass Road from Sherpur Chowk to Jalandhar Bye pass Chowk
- Ludhiana – Ferozepur Road
- Ludhiana – Chandigarh Road
- Ludhiana-Malerkotla Road
- Ludhiana-Pakhowal Road
- Ludhiana-Rahon Road
- Sidhwan-bet road
- Road in Shaheed Bhagat Singh Nagar from Pakhowal Road to Ludhiana Ferozepur road excluding the area covered under Bhai Randhir Singh Nagar Development Scheme and Shaheed Bhagat Singh Nagar Development Schemes of Improvement Trust, Ludhiana.
- Link road from Bharat Nagar Chowk to Samrala Chowk.

- Roads / Localities where the change of land use has been permitted by the Local Government Punjab from time to time subject to the decision of the Hon'ble Court. However the mix land use will be regulated by following pre-conditions :
- i) In case of Scheduled roads and Bye passes the distance upto which mix land use along the road is permitted, excludes the distances within which building activity is prohibited under the provisions of U/S 143 of “The Punjab Regional and Town planning and Development Act, 1995”.
 - ii) The mixed landuse along road fronts shall be permissible maximum depth upto 500 ft. subject to the condition that the frontage of the plot/ property to be considered for mixed landuse must abut the main road.
 - iii) The mixed landuse on the above said roads within Municipal Corporation limits shall be governed by Municipal Corporation subject to fulfillment of its building controls and instructions of the Govt. issued from time to time.
 - iv) The mixed landuse zone along abovesaid roads shall not include uses like manufacturing and industries prohibited in such area by the Science, Technology and Environment Deptt. However, existing industrial units may continue as per the provisions made in Section 79 of Punjab Regional & Town Planning and Development (Amended) Act 2006. Activities and the proportion in which these activities are to be allowed in mixed land use zone along the specified road outside the municipal corporation limits shall be governed by the zonal development plans of the area.
 - v) The mixed land use along the roads already declared by Municipal Corporation Ludhiana/ Local Govt. by its different notifications as stated above in the mixed Landuse zones is subject to the decision of the case/cases pending in any Hon'ble Court .
 - vi) The multi-storeyed buildings will be allowed to be erected/constructed on Sidhwan Canal with the prior permission/approval of competent authority/Govt./Local authority, subject to the conditions/fulfillment of other building bye-laws/controls, structural and fire safety norms and height restrictions of air safety (Air Authority) norms.
 - vii) The other development controls along roads where mixed landuse development has been proposed shall be as per annexure-II.

viii) Mix Land use Localities:

The localities (Pockets) with mix Land use character have been further divided into two distinct categories i.e. commercial mix and industrial mix. Areas where houses and commercial activity exist side by side is called **commercial mix** and the areas where houses co-exist with industrial and commercial activity has been defined as **industrial mix**.

(i) Commercial mix areas:

The following localities mainly falling in the inner zone (old city) have been identified to be proposed as areas where commercial activity may co-exist with residential activity:

Chaura Bazaar, Gur Mandi, Ghass Mandi, Saraf Bazaar, Karimpura, Mochpura, Lakkar Mandi, Neem Wala Chowk, Chouri Sarak, Gali Malaria, Sag Wali Gali, Dal Bazaar, Madhopuri(except area under T.P. scheme), Kuldip Nagar, Jagat Nagar, New Atampuri, Sardar Nagar, Jagdish Nagar, Sarvanand Colony, Balmik Nagar, Guru Nanak Dev Nagar, Tilak Nagar, Daresi Ground, Hazuri Road, Bandian Mohalla, Ghaati Jiva Ram, Brahmpuri, Chowk Saidan, Wait Ganj, Naughara Mohalla, Chauri Sarak, Sanglanwala Road, Iqbal Ganj, Nimwala Chowk, Gul Chaman Gali, Bagh Khazanchian, Phalai Bazaar, Lalu Mal street, Mehmood pura, Islamia School Road, Harbanspura, Circular Road, Kashmir Nagar, Gaushalla Road, Mohalla Taj Gunj etc.

(ii) Industrial mix areas:

The areas (Pockets) in the Master Plan as listed below have been identified for the purpose where industry may co-exist with residential activity.

Dashmesh Nagar(excluding development scheme of Dashmesh Nagar). Chet Singh Nagar. Aarjan Dev Nagar. Kot Mangal Singh. Patap Nagar. Vishkarma Colony. Parbhat Nagar. Bhagwan Nagar. Ram Nagar. Sahebjada Ajit Singh Nagar. Sewak Nagar. Ramgarhia Nagar. Sant Pura. Jammu Colony. Abdullapur Basti(S.Gian Singh Rarewale Development Scheme).Muradpura. Guru Ravidas Nagar/Indra Nagar. Basant Bagh. Adhai Mohalla. Kabir Nagar. Jagdish Nagar. Farid Nagar. Balmik Ghatti. Saida Mohalla Brahmpuri. Vakeelan Mohalla. Jiwaram Ghatti. Madhopuri(except area under T.P. scheme).Gha Mandi. Tilak Nagar. Wait Ganj. Mehmoodpura. Dhokan Mohalla. Nanakpura. Sartaj Nagar. Anandpuri. Azad Nagar. Inder Vihar. New Anandpuri. Sriansh Nagar. Gobindpuri. Bank Colony. Gandhi Nagar. Basant Nagar. Krishna Nagar. Valabh nagar. Maan Nagar(Dhaba Road). Vijay Nagar(Dhaba Road). Guru Teg Bhadur Nagar. Guru Ramdas Nagar. Sua Road(Makkar Colony). Bachittar Nagar. Preet Nagar. Jagdishpura. Manjit Nagar. New Sakati Nagar. Sakti Nagar. Anandpura. Attal Nagar. Basti Jodhewal. Jagat Singh Nagar.

New Atampuri. Kirpal nagar. Sekhewal. Indra Colony. Basant Vihar Ext. Lajpat Nagar. Hira Nagar. Gagandeep Colony. Panchsheel Colony. Chhowni Mohalla. Janak Puri street no. 0, ½ and 1.

Governing Principles for Mixed Land Use:

The principles governing the mixed land use in residential area shall be :-

- i) Mixed use means the provision for non-residential activity in residential premises.
- ii) The proposal aims to balance the socio-economic need for such activity and minimize the environmental impact of the said activity on residential areas.
- iii) Mixed use allows access to commercial activity and industrial activity (as permitted by Punjab Pollution Control Board in non industrial zone(except approved residential areas) in the proximity of the residences and reduces the need for commuting across zones in the city i.e. walk to work principle. However, at the same time, it needs to be regulated in order to manage and to mitigate the associated adverse impact related to congestion, increased traffic and increased pressure on civic amenities.
- iv) Mixed use, shall not be permitted in approved residential development schemes developed by Improvement Trust Ludhiana, residential Urban Estates set up by Punjab Urban Planning and Development Authority (now GLADA), Government housing, Institutional/ staff houses of public and private agencies and buildings and precincts of heritage buildings and residential colonies developed by Private developers after due approval of competent authority.
- v) The mixed use shall not be permissible in the streets/roads having width less than 10 mts. However the existing mixed use in the streets having width less than 10 mts may continue (excluding obnoxious, hazardous, inflammable, non compatible and polluting substance or process), without any further extension/expansion , for a maximum period of 10 years. These streets should be declared as pedestrian mixed use streets and should not be open to motorized transport.However, this needs to be debated and the inhabitants of the area be provided with workable alternatives of mobility.The Municipal Corporation may evolve a package after consensus on the issue.

Mixed Use in Residential Areas- Need for differentiated approach:

- i) The need for differentiated approach to mixed use policy arises due to the fact that Ludhiana being a centre of economic and industrial activity has a large diversity in the typology of residential areas. Apart from the planned residential colonies built by Ludhiana Improvement Trust, PUDA (now GLADA) and many Private developers, there are authorized unplanned residential areas within and outside the urban limits of the city. There are also regularized unauthorized colonies, unauthorized colonies as well as slums and juggi jhompris, cluster in various parts of Ludhiana.

Moreover, the extent of non residential activity, as being necessary or desirable by the residents themselves, varies from area to area based on the socio economic status of the residents as well as the past pattern of development in the area. While certain colonies may need non residential activity as an integral part of their livelihood, some others may wish to preserve the residential character of their colonies and neighbourhood.

Identification of mixed Use Areas in Existing urban areas and urbanizable areas

The identification of mixed use areas/ streets in both the urbanized as well as urbanisable areas of Ludhiana would be as follows:

In already urbanized areas/ urban areas, mixed use (except industrial use) shall be permissible in the following areas:

- i) On all streets/roads already declared commercial by the department of Local Government Punjab subject to the decision of case/cases pending in any Hon`ble Court.
 - ii) Streets/ Areas where commercial use was allowed in the previous Master Plan of Ludhiana shall continue to the extent as permissible in the previous Master Plan, Ludhiana.
- ii) Future identification and notification of mixed use streets/ areas falling in (i) and ii) above shall be based on the criteria and procedure prescribed below and given wide publicity by the concerned local body/ authority/any other Competent Authority.

Mixed use Areas/ streets in Urbanisable areas in future

The mixed land use in above areas shall be permissible in the following areas:

- i) Roads and localities earmarked in the Master Plan as mixed use streets and areas where abutting road shall have ROW 18 mts. or above.
- ii) The layout plan in newly developed urban extension shall earmark such stretches/ plots and notify them under the mixed use category at the time of grant of permission for layout plan provided provision of adequate parking as per norms specified is provided . However in such cases 50% of such area shall be counted towards the commercial area subject to the overall limit of commercial component permitted .

The notification/declaration of mixed use areas/ streets by the govt. would necessitate compliance to the following terms and conditions:

- i) The layout plan/scheme for such areas/streets shall be subject to the prior approval of the local body/GLADA.
- iii) The layout plan/scheme for such areas/streets should indicate adequate provision for circulation, parking, open spaces and other planning norms.
- iv) Common parking areas shall be provided as per norms considering the additional load of traffic and parking consequent upon declaration of area/street as mixed use.
- v) The plot owners/allottees on these areas/streets will have to pay land use conversion and other fees/ charges at the rates fixed by the Govt. for that particular category of land at the time of approval of their building plans from the local body/GLADA or any other concerned agency.
- v) Any other condition that may be prescribed by the Govt. from time to time.

Permission for mixed use can be cancelled or revoked by the concerned local body/ Government in case of violation of any of the conditions under which such mixed use was permitted or considering the larger interest of the locality/ community /city.

GENERAL TERMS AND CONDITIONS GOVERNING MIXED USE IN INDIVIDUALS PLOT

Mixed land use shall be permitted subject to the following terms and conditions:

- i) No encroachment shall be permitted on the streets or public land.
- ii) Development controls/norms as applicable for the particular residential use will continue to be applicable, even if the plot /dwelling unit is put to mixed use.
- iii) Where service road is available or provided by the concerned authority then mixed use premises should have approach from such service road and not directly from the main road.
- iv) Parking as per State Govt.'s prescribed norms shall be provided within the premises. Existing norms are as under :

Commercial -	3 ECS/ 100 Sq.Mt Covered area
Industrial -	1 ECS/100 Sq.Mt or fraction thereof
Other activities -	2 ECS/100 Sq.Mt
Profession activity -	2 ECS/100 Sq.Mt
- v) If no parking space is available, land/ plot on the said street, parking should be made available by the applicant or trader association either by acquiring additional area for construction or by creating multilevel parking. Development of such parking facilities shall be done by either the applicant solely or traders association of that area or by the local body subject to the payment of the cost by the beneficiaries.
- vi) No industry other than those permitted by Punjab Pollution Control Board shall be allowed in the industrial mix areas.
- vii) The existing obnoxious, hazardous, inflammable, non-compatible and polluting industries shall have to move out to the designated industrial zone within a period of ten years from the publication of notification of the Master Plan.
- viii) However in case of voluntary shifting of this industry before the specified period, to designated industrial zones, the owner shall be eligible to put his/her plot, so vacated, to any other compatible use (including commercial use) subject to the provision of building bye laws and Master Plan conditions applicable for that particular land use in that particular area by paying

conversion charged as fixed by the Local Body/Govt. from time to time besides providing incentive ,as may be decided by the Govt.

- ix) The conversion of land use shall be subject to the payment of defined charges.

Mixed use premises and payment of charges

In case of residential premises already under mixed use or intended to be put to mixed use in industrial mix and commercial mix areas earmarked in the Master Plan Ludhiana, the owner/allottee of the dwelling unit/plot shall be liable to pay such fee and charges on the rate to be fixed by the State Government.

No modification to the building for using residential premises for non residential activities under mixed use zone shall be permitted unless owners/ allottee has obtained sanction of revised building plans and has paid necessary fee and charges

Section-D

TRANSPORTATION

Traffic hazards and the difficulties of commuting from one place to another are major concerns in metropolitan cities because traffic is the regular killer of people rather than problems like shortage of drinking water, poor drainage and sewerage and accumulation of garbage etc.

No city can make room for an unlimited influx of vehicles on its roads. Therefore, the rich nations adopt short and long term policies to impose restrictions on the use of lanes by vehicles with less occupancy, restrict entry of vehicles in some central parts of the city, create rail based and other modes of public transport, provide dedicated lanes for buses/public transport and go for long term policy measures in the manufacturing, registration, licensing and fuel pricing for vehicles to discourage dependency on private vehicles.

In India, urban policies in transportation management and enforcement of traffic regulations are guided more by liberalism. Strict discipline and policy measures can help to manage traffic problems in a city like Ludhiana. It is of paramount importance to plan concurrently for the existing and increasing traffic within the given circumstances with better options.

The concurrent planning of urban and rural growth in Ludhiana Local Planning Area and the transportation system is required to provide an integrated, safe and efficient system for transporting people and goods. The system is intended to meet the projected travel demands in that area. In addition, the transportation system in Ludhiana local planning area would also serve commuters and through traffic.

The travel demand in the city is increasing with population and economic growth. Further the inadequacy of public transport system has resulted in phenomenal growth of personalized vehicles.

A detailed study was conducted by RITES on behalf of Municipal Corporation Ludhiana in December 2000 for managing traffic and transportation in the city. Based on detailed study and analysis RITES gave the following conclusions and recommendations.

"The travel speed on roads is falling due to ever increasing transport demand, limited road capacity, and poor public transport system, high share of slow moving modes and high growth of personalized vehicles. The vehicular pollution level is also increasing.

- A total of 24.46 lakh vehicular inter-zonal trips are expected to be generated daily in Ludhiana by 2011. If this demand is catered by the existing system, it will lead to congestion on all roads, substantial reduction in vehicular speeds, increased delays at junctions and increased pollution levels.
- The trip Assignment for the year 2011 on future road network of Ludhiana shows that on major corridors, the transport demand is likely to be much more than 10000 peak hour peak direction trips (Phpdt) for mass transport. This is beyond the capacity of road based mass transport systems.
- Future trip assignment on road network shows that travel desire would be concentrated along the following three major corridors in Ludhiana:
 - i) Chandigarh Road between Jamalpur and Shingar Cinema
 - ii) Ferozepur Road between Agriculture University and G.T. Road
 - iii) Buddah Nallah and G.T. Road between Mata Rani Chowk and Railway Station
- The trip assignment also shows that along the above corridors, the transport demand may be 4-6 times of the present demand. This clearly indicates the need of introducing rail-based transport system along these corridors.
- After development and evaluation of alternative mass transport networks, the following alternative II is considered most suitable. This alternative network consists of;
 - a) Circular Corridor following Buddah Nallah, Shringar Cinema, Transport Nagar, Jagraon Bridge, Bharat Nagar Chowk, Fauvara Chowk, Domuriya Pul and joining Buddah Nallah on G.T. Road
 - b) Ferozepur Road from Bhart Nagar Chowk to Punjab Agriculture University
 - c) Maler Kotla Road from Dasmesh Nagar to Engineering College
 - d) Chandigarh Road from Shringar Cinema to Jamalpur Chowk
 - e) Rahon Road from Police Division 3 to Viram Colony
 - f) Haibowal Road from Old Courts to Dairy Complex

The total length of the network would be 31.6 km. This is likely to carry 4.89 lakh passengers daily by the year 2011. Phase I of the system, comprising of the Circular

corridor, Ferozepur road and the Chandigarh road, a length of 24.12 km, will carry 4.28 lakh passengers daily by 2011.

- Maximum Phpdt on sections of the recommended network is expected to be 25000 by the year 2021 for full system as well as for Phase I. Hence a suitable long range mass transport system needs to be developed to provide an acceptable level of service to users considering merits and demerits of various road and rail-based systems.
- Light Rail Transit (LRT) system is considered most suitable for Ludhiana. This system will provide a capacity up to 25000 Phpdt and will attain an average speed of about 30 km/h on exclusive right-of-way, LRT system can negotiate sharper curves encountered on roads and follow the road alignment on elevated track reducing the need for space and damage to build up private property. LRT with 2-vehicle train running at suitable intervals is proposed to be used. As the peak hour traffic demand increase, it is proposed to increase the train composition to 4 vehicles with 3-minute frequency.
- The complete rail based mass transport system alignment is proposed to be on elevated track. In accordance with the directive of 'Ministry of Railways' Broad - gauge (BG) i.e. 1676 mm is proposed to be adopted for Ludhiana LRT system.
- A bus transport system has been developed and in all 24 routes have been designed to cater to the travel demand of the residents. A scheduling plan has also been devised and a total fleet size of 98 buses is estimated to meet the anticipated demand.
- Phase I of the LRT is estimated to cost Rs. 1192.6 crores at 1999 price level.
- The proposed system will offer an Economic Internal Rate of Return of 36%, which is much higher than the accepted value.
- Capital intensive mass transit systems are generally not financially viable on the basis of fare box revenues alone. The project capital cost can not be met by budgetary allocation and therefore various concessions will need to be provided to keep the fares affordable."

Besides the aforesaid report 'City Development Plan' prepared by Municipal Corporation Ludhiana under JNURM, have also analysed the traffic and transportation network in Ludhiana Metropolis. This report reveals that Ludhiana Municipal Corporation has felt that

“there is a dire need for adopting an integrated Road Development strategy to solve the present conditions of the roads. This will help in reducing the apathy of commuters and also cut down the air pollution within the city.

Integrated Road Development shall include overall upgradation of city’s infrastructure in terms of traffic and transportation. Various options are being looked into to study the possible strategy best suitable and easily applicable for the city. Present strategies and possible options being looked into by the Corporation under Integrated Road Development are:

1. Construction of peripheral Ring road
2. Dedicated Pedestrian and Cycle tracks / lanes
3. Improvement (widening, strengthening and surfacing) of existing internal roads of the city
4. Construction of bridges over Budha nalla and Canal
5. Construction of flyovers, elevated roads
6. Construction of RUB and ROB
7. Construction and development of Parking garages and lots

Proposal – Under Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

- **Improvement (widening, strengthening and surfacing) of existing internal roads of the city.**

Ludhiana Municipal Corporation had appointed M/S Feedback Ventures to do Roads Rehabilitation study. This was done to determine the condition of roads, requirement for widening, strengthening and resurfacing. The study was carried out on all the major roads falling within the city limits. The surveyed roads include:

1. Major roads transferred from PWD since 1995.
2. Other main roads of the city.

The study helped to determine priority of the roads that needs attention. Some of the main roads are shown below:

List of Roads – finalised on 1st August, 2006 in MC - Ludhiana

Sr. No.	Name of Project Road	From	To	Length (m)	Divided / un-divided	Width of metalled carriageway		Details of median	
						Left (m)	Right (m)	Width (m)	Length (m)
1	2	3	4	5	6	7	8	9	10
1	Old G.T. Road	Jagraon Bridge	Clock Tower	1000	DIV	10.0	10.0	2.50	1.0
		Clock Tower	Budha Nallah	1000	DIV	10.0	10.0	2.50	1.0
2	Rahon Road	Budha Nallah	G.T. Road Bypass	720	DIV	9.0	9.0	1.50	0.72
				550	UDIV	15.0		--	--
		G.T. Road Bypass	Upto M.C. Limit	1840	DIV	7.50	7.50	1.50	1.50
				1676	UDIV	10.0		--	--
3	Link Road	Bharat Nagar Chowk	Bus Stand	800	DIV	15.0	15.0	1.50	0.80
		ROB Ferozepur	Radewala Market	600	DIV	20.0	20.0	0.50	0.60
		Gill Chowk	Cheema Chowk	1375	DIV	10.0	10.0	1.50	1.30
		Cheema Chowk	Samrala Chowk	1375	DIV	10.0	10.0	1.50	1.30
4	Ludhiana Chandigarh Road	Samrala Chowk	Octroi Post	8100	DIV	10.0	10.0	1.50	8.0
5	Pakhawal Road	Ferozepur Road	Sidhwan Canal	1770	DIV	9.25	9.25	1.20	1.70
		Sidhwan Canal	Octroi Post	2250	DIV	6.75	6.75	1.20	2.20
6	Ferozepur Road	Jagraon Bridge	Octroi Post	7350	DIV	11.0	11.0	1.25	7.30
7	Gill Road	Gill Chowk	Vish. Chowk	1300	DIV	10.0	10.0	--	--
		Gill Chowk	Sidhwan Canal	2600	DIV	10.0	10.0	1.80	2.60
		Sidhwan Canal	Octroi Post	1000	DIV	10.0	10.0	1.50	1.00
8	Samrala Road	Samrala Chowk	CMC Chowk	1300	DIV	10.0	10.0	1.2	1.3
				1000	UNDIV	10.0		--	--
9	Gokal Road	GT Road	Khawaja Chowk	2000	UDIV	6.50		--	--
10	Circular Road	Ghati Balmiki	Gaushala Shamshan Ghat	450	UNDIV	7.50		--	--
11	Tajpur Road	G.T. Road Bypass	Baba Jiwan Singh Nagar	1830	UNDIV	15.25		--	--
12	Main Tibbe Road	G.T. Road Bypass	Krishna Vihar	1220	UNDIV	10.0		--	--
13	Overlock Road	Partap Chowk	Gill Road	1000	DIV	6.0	6.0	0.9	1.0
14	Dana Mandi Road	Gill Road	Dhuri Rly. Line	600	DIV	6.0	6.0	1.0	0.60
		Dhuri Rly. Line	Pakhawal Road	1500	DIV	6.50	6.50	1.0	1.50
15	Bal. Portion of Jaspal Bangar Octroi Post to Vill. Kanganwal	Jaspal Bangar	Kanganwal	1000	UNDIV	5.50		--	--
16	Vill. Lohara to Jaspal Bangar	Lohara	Jaspal Bangar	1000	UNDIV	4.90		--	--

Sr. No.	Name of Project Road	From	To	Length (m)	Divided / un-divided	Width of metalled carriageway		Details of median	
						Left (m)	Right (m)	Width (m)	Length (m)
1	2	3	4	5	6	7	8	9	10
17	Dhandhari Ring Road to Campa Cola Road	Dhandhari Ring Road	Campa Cola Raod	1000	UNDIV	8.25		--	--
18	Ring Road Vill. Jugiana	G.T. Road	Vill. Daba	1500	UNDIV	5.0		--	--
19	Shivpuri Road	Budha Nala	G.T. Road Bypass	600	DIV	7.00		1.00	0.60
20	Jassian Road	Haibowal Mal Road	Jalandhar Rly. Line	4000	UNDIV	7.0		--	--
		Jalandhar Rly. Line	G.T. Road bypass	800	DIV	6.00		--	--
21	Hambra Road	Session Chowk	Dandi Swami Chowk	750	DIV	10.0	10.0	1.50	
22	Convent School Road	Ferozepur Road	Pakhowal Road	1815	UNDIV	8.00		--	--
23	Lodhi Club Road	Ferozepur Road	Rly. Line	1070	DIV	7.0	7.0	3.50	1.070
24	Haibowal Road	Budda Nallah	Police Station	1400	UDIV	10.00		--	--
25	Kanganwal Road, Industrial Area C	Garg Furnace	Village Kanganwal	1500	UDIV	9.15		--	--
26	General Mohan Singh Road	G.T. Road	Sua Road	1100	UDIV	9.15		--	--
27	Singla Cycle Road	G.T. Road	Village Dhandari Kalan	1520	UDIV	6.70		--	--
28	Dugri Road	Link Road	Sidwan Canal	1900	UDIV	7.0	7.0	1.0	1.6
		Sidwan Canal	300 ft. Wide Road	1500	UDIV	7.0		--	--
29	Sua Road	Sidwan Canal	Pakhowal Road	1500	UDIV	5.0		--	--
30	Brown Road	CMC Chowk	Laxmi Cinema G.T. Road	3000	UDIV	10.0		--	--
31	Labour Chowk to Sidhwan Canal	Labour Chowk	Sidhwan Canal	1500	UNDIV	5.50		--	--
32	Phase IV & IV-A Focal Point Roads	--	--	4880	UDIV	5.5		--	--
33	Focal Point	HP Dharam Kanta	Sherpur Chowk	1250	DIV	7.0	7.0	1.25	1.25
34	Phase V backside Research Centre	--	--	1380	UDIV	5.5		--	--
35	Phase V Focal Point	--	--	2256	UDIV	5.5		--	--
36	Phase VI Focal Point	--	--	1100	UDIV	5.5		--	--
37	Sarpal Park Focal Point	Main Focal Point Road	Jivan Nagar Chowk	1050	UDIV	5.0		--	--

Sr. No.	Name of Project Road	From	To	Length (m)	Divided / un-divided	Width of metalled carriageway		Details of median	
						Left (m)	Right (m)	Width (m)	Length (m)
1	2	3	4	5	6	7	8	9	10
38	RCC road in Transport Nagar	Main Road	Telephone Exchange	1500	UDIV	6.70		--	--
39	Truck Parking	--	--	11525 sqm		11525 sqm		--	--
40	Phase VIII	Chandigarh Road	D-274	1330	UDIV	5.5		--	--
41	Phase VIII	B-63	C-223	500	UDIV	5.5		--	--
42	Phase VIII	Chandigarh Road C-209	Dainik Jagaran C-219	1400	UDIV	5.5		--	--
43	Phase VIII 34 acre scheme			1500	UDIV	5.0		--	--
44	Focal Point	Jiwan Nagar Road	Gold Star	900	UDIV	5.5		--	--
45	Road Along Buddha Nalla LHS	Kashmir Nagar Nallah Bridge	New Madhopur Bridge	365	New construction	Proposed 6.5 m width		--	--
46	Road Along Buddha Nalla RHS	Jalandhar Rly. Line	New Kundanpuri Bridge	366	New construction	Proposed 6.5 m width		--	--
47	Road Along Buddha Nalla RHS	Chandan Nagar Chotti Puli	Hebowal Bridge	1037	UDIV	6.5		--	--
48	Road Along Buddha Nalla RHS	Haibowal Bridge	Pawitter Nagar BRidge	1100	UDIV	6.5		--	--

Construction of roads in peripheral areas

The peripheral areas of the city don't have pucca roads. The population in these areas has increased and hence there is a requirement to construct pucca roads in these areas.

Construction of bridges over Buddah Nalah and Canal

The bridges over Canal are old and hence are structurally unstable. Also due to increase in density on either sides of Budha nalla the requirement of bridges has increased.

Proposed Bridges and flyovers on Buddah Nalah and Canal

Sr. No.	Name	Carriage way
1.2. On Budda Nallah-Access on both sides of the abadies		
1	Jagdish Pura	Dual
2	Dhobi Ghat	-do-
3	New Upkar Nagar	-do-
4	Peeru Banda	-do-
5	Shanker Puri	-do-

6	Haibowal I	-do-
7	Haibowal II	-do-
8	Chander Nagar	-do-
9	Dairy Complex	-do-
10	Deep Nagar	-do-
1.3. On Canal to provide access to abadies on both sides		
1	Opposite Barota Road	-do-
2	Dugri	-do-
3	Lohara	-do-
4	Shimla Puri	-do-
5	Dana Mandi	-do-
6	Milk Plant	-do-
7	Raghunath Enclave	-do-
8	BRS Nagar	-do-
9	Near Punjab Agriculture University	-do-
10	South City	-do-

As stated in foregoing paragraphs that a report on 'Multi Model Public Transport Plan' was prepared by RITES on behalf of Municipal Corporation, Ludhiana and a City Development Plan has been prepared under Jawaharlal Nehru Urban Renewal Mission. The proposals made in both the said reports have been made an integral part of proposals made in the Master Plan.

Ludhiana Metro Rail Project:

The Punjab Infrastructure Development Board has engaged Delhi Metro Rail Corporation Limited (DMRC) for the preparation of detailed project report for setting up of Metro Rail System at Ludhiana. The proposed length of the Metro Rail System is expected around 25 Kilo meteres in the first phase. The detailed report of DMRC will include

- . Traffic Survey Data with analysis and estimation of ridership, including sectional and station loads for the corridors.
- . Horizontal and Vertical alignment and station locations for the corridors based on Topographical surveys.
- . Report on Geo- technical investigation works.

Thus, the development of Metro Rail Project can be undertaken after the feasibility recommendations of the project report which is being prepared by Delhi Metro Rail Corporation Limited.

In addition to the aforesaid, the problems of traffic and transportation in Ludhiana Metropolis have further been studied and analysed in foregoing Chapters- V & VII. Based on the analysis made some other proposals have been suggested as under to make further improvement in the transportation system of the Local Planning Area of Ludhiana. These include:-

Proposals Of Railway/Road Overbridges,Elevated Road & Under Passes:

Endeavor has been made to further improve the management of traffic and transportation in Master Plan proposals. Therefore a number of railway/road over bridges, under passes and another elevated road from Bhai Bala Chowk to Bharat Nagar Chowk has been proposed. A priority based list of over bridges and under passes is attached at **Annexure IV**.

Priority Of Proposed Overbridges/Flyovers & Under Passes:

Though there is an urgent need of over bridges/flyovers and under passes to facilitate the movement of passengers and goods transportation yet their priority of construction is also required to be fixed because of limited resources and their requisitic judicious use. Accordingly, keeping in view the volume of rail/road traffic, frequency and intensity, smooth flow of inter city traffic, traffic congestion in central areas of the city, priority has been evolved. Based on aforesaid factors basically three preferences has been envisaged i.e. large volume of through traffic, inner city congestion & traffic bottlenecks and comparatively less problems in outer growth of the city. Thus preferences has been given in proposal of over bridges on Grand Truck Road to ensure smooth flow of inner city traffic and to avoid mixing of inter and intracity traffic in the city area. Therefore, over bridges at Samrala Chowk, Jodhewal Basti, intersection of Shivpuri/ Noorwala Chowk on bypass road, Bahadurke Road Chowk on bypass road, Jalandhar bypass on G.T. road, Oswal Chowk on bypass road, Sherpur Chowk and Giaspura chowk on G.T. road near Avon cycle factory railway crossing has been proposed in order of preference # 1 to 8.

Secondly, the problems of congestion and bottlenecks for intra city traffic has been considered and next priority has been given to area between inner city and outer growth, accordingly extension of Dhuri railway flyover upto Gill Chowk has been proposed at preference # 9. In addition, the following overbridges have also been proposed under this preference. These include;

- i) on Sahnewal- Kohara road on Ambala railway crossing
- ii) on railway crossing, Gobindgarh and focal point
- iii) on Sidhwan Canal bridge chowk Ferozepur road
- iv) on Sidhwan Canal-Malerkotla Bridge
- v) on Sidhwan Canal on the junction of Ferozepur railway crossing and Pakhowal road
- vi) on Dugri road over Sidhwan canal
- vii) on Dhuri railway line along Sidhwan canal
- viii) over bridge on Gill road near A.T.I. and
- ix) near New Grain Market (Gill Road) railway crossing.

Priority Of Proposed Under Passes

Besides the proposal of an elevated road and a number of over bridges and flyovers as aforesaid, about a dozen under passes have also been proposed. The provision of these would be economical considering the limited resources and their requisitic judicious use. Following underpasses are preferred to overbridges because they are cheaper to construct, have better ambience and merge well with the surroundings and face less resistance of nearby stakeholders and thus faster to get executed. Priority to build these under passes has also been evolved.

Therefore in the light of the above five under passes have been proposed on G.T. road (NH-I) which would help reducing conflicting points and achieve fast, efficient flow of inter city traffic. These under passes are being enumerated as under:

- i) under pass near Apollo Hospital
- ii) near Dhandari Kalan railway over bridge,
- iii) Jalandhar side near Greenland school
- iv) Jalandhar side near Amaltass hotel
- v) Jalandhar side near Aerens Mega Project

Under passes near Appolo Hospital and Dhandari Kalan railway over bridge have been proposed to ensure smooth flow of inter city through traffic. Mixing of inter and intra city traffic would also be avoided. While proposing these under passes, the proposals of over bridges at Sherpur Chowk, Giaspura Chowk and already existing over bridge on railway line near Dhandari Kalan was also taken into consideration.

vi) Considering the available road width and volume intra city traffic, under passes have also been proposed on Pakhowal Road Railway crossing and Shastri Nagar Railway crossing.

vii) Another under pass has been proposed on Ferozepur Railway crossing near Lodhi Club while proposing under pass at this point it was considered that this road is not a through road beyond Pakhowal road. No industrial development is there on this side of the city and purely residential growth is taking place, may be some commercial development later on. Thus, it has been decided to propose here an underpass instead of over bridge which would be less costly and also merge with the ambience of the over all development.

Similarly to provide relief to problems of local (intra city) traffic, three additional under passes have been proposed on Ferozepur road;

viii) near Ansal Plaza

ix) near PAU gate no.2

x) near PUDA Bhawan.

xi) Another under pass near Jamalpur Chowk on Chandigarh road have been proposed for catering to the local traffic between residential localities and industrial focal points.

The location of all the aforementioned over bridges/flyovers, elevated roads and under passes have been shown on map **Traffic and Transportation Network plan** and at annexure IV

In order to cater to the additional passenger and goods transportation requirements it is proposed to provide for more bus and truck terminals along major arterial roads and industrial areas. The tentative identification of the proposed and required sites for aforesaid services is mentioned below:

Proposed Bus terminals

i) Along Chandigarh road – Around Ramgarh minor

ii) Along Ambala road - Somewhere near Airport

- | | | |
|------|-----------------------|--|
| iii) | Along Ferozepur Road- | Near I.T.B.P. complex) outside restricted/
prohibited zone of Badowal |
| iv) | Along Jalandhar road- | Near or opposite Kadian somewhere between
railway line and G.T. road |

Proposed Truck Terminals

- | | | |
|------|----------------------------|---|
| i) | Jalandhar road-
railway | Near or opposite Dadian somewhere between
line and G.T. road |
| ii) | Chandigarh road – | Around Ramgarh minor |
| iii) | Rahon road- | Near Meharban and Khwajka villages |
| iv) | Along Ambala road | Somewhere between Sahnewal and Doraha |

Extention of Air Port Upgradation and extention of existing air port at Sahnewal is also proposed to be undertaken.

The entire city will be served by a well structured and well defined road hierarchy in order to cater to the traffic needs of the city population arising from a residential house to the industrial/residential/commercial complexes. This would include redefining of existing road network and the network is to be created in the newly developed area proposed to be brought under urbanization. The network would clearly defined the needs for inter and intra-city traffic and the segregation by effecting means, therefore creating a high speed corridors in the shape of ring roads. The location of these speed corridors is being indicated in the Master Plan but their final alignment is to be decided after a detailed feasibility study. These roads (R-1) will have width above 200'. In addition to these high speed corridors city would have a well defined system of road net work. In order to effectively cater to the intra city traffic needs the following pattern of road hierarchy is proposed:

S.No.	Road	Width
1.	R-1	200' and above
2.	R-2	150'
3.	R-3	100'
4.	R-4	80'
5.	R-5	60'
6.	R-6	40'

In addition the new residential areas will be planned in a manner so as to minimize the use of vehicles while traveling. Since traffic and transporation is a function of land use, so land use pattern of the city has been evolved in such a manner so as to minimize the

travel needs within the city. The objective has been achieved through the juxta positioning of living and work areas. In addition all residential sectors proposed to be planned and developed on self contained neighbourhood bases in terms of day to day needs including health, shopping, entertainment and education etc. A well defined hierarchy of infrastructures have been proposed in easy reach of the citizens to minimise their travel.

While taking an advantage of existing link roads, mostly these link roads have been proposed to be widened and upgraded in the local planning area of Ludhiana. This endeavour would hopefully open these links for development on one hand and space for their widening would be left by individual projects and their construction would be made possible through the collection of external development charges.

The upgradation of existing road net work, creating high speed corridors and well defined hierarchy of roads would help in rationalizing the traffic and transportation within the city. Creating LRT (Light Rail Transit) System/Metro for mass transportation net work for Ludhiana would reduce the use of personalised vehicles and congestion on the roads thereby improving the quality of life and speed of movement within the city.

It is also proposed that a debate can be initiated at the Municipal Corporation level to arrive at consensus to adopt Ahmedabad pattern of using set backs in exchange for F.A.R. for road widening in the Ludhiana Metropolis.

Note: The existing link roads which are not becoming part of road hierarchy of R-1,R-2 & R-3 are proposed to be widened to 60 '.

Section-E

INDUSTRY

Ludhiana, popularly known as 'Manchester of India' is industrial Hub of the State of Punjab. The surveys reveal that Hosiery & Textile Products (garments), Cycle and Sewing Machine Parts units constitute the large number followed by Servicing & Repair and Transport Equipment & Parts.

But the existence and continued growth of industries in non- conforming areas and lack of planned industrial estates for tiny industry is the major issue of concern. The continued existence and further proliferation of industries in contravention of Master Plan provisions have given birth to the pollution and negative environmental impact of industries. Keeping in mind the position brought out above as also in the context of continuing pressure of population growth in Ludhiana city, the following broad parameters are proposed to be required for the industrial sector.

Strategy

- 1) New areas are proposed to be added as industrial zones where more industrial units especially of small scale sector would be accommodated.
- 2) In these new proposed industrial zones, efforts should be made to provide planned industrial estates with private public partnership especially for tiny/ small scale industrial units so as to minimize the presence of these industrial units in residential areas of the Master Plan.
- 3) Modernization and technological upgradation of existing industries is required to be encouraged for day to day needs of the people of the city.
- 4) Promote high tech and low volume- high value added industries which are less labour intensive.
- 5) Provide suitable incentives and disincentives and other measures, for shifting and relocation of industrial units not conforming to the land use norms.
- 6) Review, and possibly widen, the scope of permissibility of household industrial units subject to adherence to pollution control norms and environment considerations, fire safety regulations and other relevant factors; particularly the aspects of infrastructure services.

Classification of industries

The classification of industries is proposed to be simplified with Light & Service and Medium & Heavy industries subject to proposals regarding specific category of industry permitted in different use zones. The standards prescribed by Punjab Pollution Control Board would have to be met by all industrial units in addition to other specific conditions in terms of plot size, ground coverage, F.A.R., height, parking norms etc.

No heavy and medium industry should be permitted to be setup in light & service industry zone. The existing industrial units falling under red category (as classified by Punjab Pollution Control Board) need to relocate themselves outside Ludhiana Municipal Corporation Limits within period of 10 years from date of publication of this Master Plan.

Existing planned industrial areas

The present planned industrial areas in Ludhiana are industrial area A, industrial area B and focal point phase I- VIII. Out of these industrial areas A and B were developed in 60's and over the years, have deteriorated considerably in terms of physical infrastructure and, in some cases deficiencies on this score have persisted in an overall sense. Besides, there have been changes in the nature of activities in some of the areas and there have also been demand for using part of the plots for activities, which could be classified as commercial. There may also be a need to see whether further densification is possible in terms of creating smaller plots by sub divisions to accommodate a large number of industries/units. Guidelines for redevelopment of existing industrial areas should be framed by the Local Body.

There is, therefore, a need for modernization and upgradation of the existing old industrial areas with due regard to environmental considerations. Since these industrial areas are located along main transport corridors, there is also a need for optimizing the use around these areas through the process of redevelopment.

Industrial activity shall be conducted at the following locations in the industrial use zone, as indicated in the land use plan:

Existing unplanned industrial areas

Besides the planned industrial areas, a number of other areas have come up as clusters of industrial concentration having more than 70% plots in the cluster with industrial activity. The prominent unplanned areas in Ludhiana are around Ludhiana-Ambala G.T. road comprising the areas around villages Dhaba, Giaspura, Lohara, Jhungian, Kanganwal, Jaspal Bangar, Gobindgarh, Dandari Khurd, Dandari Kalan, Mangli Nichi, Mangli Unchi,

Mundian Kalan and Mundian Khurd. Beside this a number of areas falling b/w Ludhiana-Jalandhar G.T. road and Rahon road, b/w Rahon road and Chandigarh road have also developed as industrial areas like area around villages Hambran, Bahadurke, Bhattian, Nurwala, Bajra, Meherban, Sirah, Kakka, Khasi kalan, Jhabewal, Ramgarh, Jandiali etc.

In practical terms, these areas are deficient in terms of services and endangered the environment. The redevelopment for the widening of roads, laying of services, development of open spaces and parking etc in these areas should be taken up with the participation of owner/ entrepreneur in a systematic manner.

New industrial zones

Keeping in view the extension of industrial corridor from Mumbai to Ludhiana, the industrial status of Ludhiana city, the existing physical conditions of industry, continued existence of industry in residential area and further proliferation of industries in contravention of Master Plan provisions. The following new industrial zones in addition to existing industrial areas have been proposed:

A) Light and Service industry

- i) Area b/w Tajpur road and Rahon road comprising areas of villages Bhamian Kalan (Partially), Tajpur Bet (Partially), Bhukri kalan (Partially), Bhukri Khurd (Partially), Dhanasu (Partially), Kariana Khurd, Khasi Khurd, Khasi Kalan, Dhoola, Rawat, Hawas, Jiwanpur, Walipur, Mangli Qadar, Magli Khas etc.
- ii) Area b/w G.T. road Jalandhar side and Rahon road comprising areas of villages Kaneja, Dheri, Sattowal, Mangat, Gonsgarh, Gadapur, Mangli Tanda, Boothgarh, Sasrali, Boont, Chuharwala, Sujaatwala, Jamalpur Leli, Kasabad, Qutabwal Araiya, Fathegarh Gujran etc.

B) Medium and Heavy industry

- i) Area b/w Sidhwan Canal (Doraha side) and Ambala G.T. road comprising areas of villages Khakat, Pawa, Natt, Garibnagari, Harnampura, Rampur, Paddi, Dugri, Dharaaur, Umedpur, Majra, Bilga, Sahewal Khurd, Ajnaud, Rajgarh, Jaipura, Ranwa, Kaddon etc.
- ii) Area b/w G.T. road Ambala side and Chandigarh road comprising areas of villages Kotla (Partially), Sahnewal Kalan (Partially), Bhairo munna (Partially), Bet Sahnewal (Partially), Panglian, Barwala, Rampur, Kanech, Chhandara, Katana, and Katani kalan etc.

- iii) Area b/w Chandigarh road and Tajpur road comprising areas of villages Sahibana, Buddhewal, Paharuwal, Mehlon, Mangal, Hiran , Chak sarwan nath, Kohara, Laton joga, Laton dana, Raian, Bhaini sahib, Katani Khurd, Kot Gangurai, Nilon Khurd, Nilon Kalan, Bohapur, Panjeta (Partially), Bhamian Kalan (Partially),Tajpur Bet (Partially),Bhukri Kalan (Partially), Bhukri Kurd (Partially), Danasu (Partially), Khasi Kalan etc.
- iv) Area around Sidhwan bet road comprising villages Salempur, Ghaunspur, Hambran, Burj lambra and Khaira Bet (Partially) etc.

Section-F

TRADE AND COMMERCE

Shopping and commercial enterprises reflect the economy and the image of the city. As per the Economic survey 2005 there were about 89246 lakh retail enterprises in Ludhiana with an employment of 4.5 lakh engaged in carrying out trade, commerce and providing allied services. It is expected that the number of enterprises in retail trade are likely to increase and the corresponding employment is also likely to be increased. In addition to these, large number of enterprises in other sectors such as restaurants and hotels, finance and insurance, real estate and business operated from commercial centres will generate additional employment and promote economy of the city. This indicates the predominance of retail and allied service activities in the economic structure of the city.

The major changes in the economic structure are due to liberalization of the economy, entry of multinational companies in the consumer sector, improved telecommunication system, increased per capita income and the purchasing power of the people.

PRE 2000/MPL-2000-21 COMMERCIAL AREAS

Areas and streets/stretches earlier proposed as commercial areas/streets in MPL-2000-21 shall continue to operate at least to the extent as permissible in MPL-2000-21.

HIERARCHY OF COMMERCIAL AREAS

With a view to provide appropriate level of commercial areas to cover the entire city to meet day today needs and special requirements a five-tier system of Commercial Areas is envisaged to accommodate required shopping, commercial office and other service activities like cinema, hotel and restaurant and various community services and facilities in an integrated manner.

In addition, some components of commercial use are also proposed to be provided under mixed use, non-hierarchical commercial centres, and informal sector in the selected areas along the road corridors

Table No. - 1

Five-Tier System of Commercial Areas

Tier	I	II	III	IV	V
Population		About 5 lakhs	About 1 lakh	About 10,000	About 5,000
	Metropolitan City Centre (Pertains to already developed Central business District).	District Centre	Community Centre	Local Shopping Centre	Convenience Shopping Centre
Area (Ha.)	-	40	4.0	0.3	0.1
Activities Permitted	Retail Shopping, Stockists and dealers of medicines and drugs, Commercial and Offices of local bodies, PSUs, Cinema, Cineplex, Hotels, Restaurants, Banquet Halls, Socio-Cultural activities / Recreational Club, Service Appts, Coaching Centres/ Training Institutes, Police Post, Fire Post. Tel. Exchange, Post & Telegraph Office, Petrol Pump/ CNG Station, Bus Terminal, Informal Trade.	Retail Shopping. Stockists and dealers of medicines and drugs, Commercial and Offices of local bodies, PSUs, Cinema, cineplex, Hotels, Restaurants, Banquet Halls, Socio-Cultural activities/ Recreational club, Service Appts, Coaching Centres/ Training Institutes, Police Post, Fire Post. Tel. Exchange, Post & Telegraph Office, Petrol Pump / CNG Stn. Bus Terminal, Repair /Services, Bank, ATM, Guest House, Nursing Home, Informal Trade.	Retail Shopping, Stockists and dealers of, medicines and drugs, Commercial and Offices of local bodies, PSUs, Cinema, Cineplex, Hotels, service Appts. Restaurants, halls, Guest House, Nursing Home, Dispensary, Clinical Lab. Clinic & Poly Clinic, Coaching Centres/ Training Institutes, Police Post, Post Office, Petrol Pump/ CNG Station, Repair /Services, Bank, ATM, Informal Trade. Multilevel parking.	Retail Shopping, Stockists and dealers of medicines and drugs, Commercial Offices, Clinical Laboratory, Clinic & Poly Clinic, Repair / Services, bank, ATM, Guest Home, Informal Trade. Coaching Centres/ Training Institutes, Restaurant.	Retail Shopping, Local level service activities. Repair, Office, Bank, ATM, informal Trade, Restaurant.

- i) Besides the above, retail shopping of desired level shall also be provided in all work centres and transportation nodes.
- ii) Utilities, Public Conveniences shall be provided as per requirement.
- iii) Service & Repair and informal activities should be provided as Service markets and Informal bazaar.
- iv) The mandatory requirement of parking as per prescribed standards would be met through multi level parking as far as possible in these centres.
- v) The activities allowed in higher level hierarchy centres shall be permissible in lower level hierarchy centres.

METROPOLITAN CITY CENTRE

The existing CBDs is Chaura Bazaar and its extension, commercial areas in old City. The City Centre needs to be seen in the light of the historical legacy of the pre-colonial and post colonial and is envisaged as a city level activity for shopping, entertainment, socio-cultural and all other activities. However considering the rapid increase in population and future growth of the city another metropolitan city centre is also required to be developed in the new areas to cater to the needs of the city and minimize congestion in the core areas. The site should preferably be ideally located but away from main inter city roads to avoid traffic congestion. A large vacant land is another pre-requisite. It should obviously be towards residential expansion than industrial. Keeping these factors in mind and the example of ribbon development along Mehrauli-Gurgaon road, it is felt that mixed land use zone from Pakhowal Road (Shaheed Bhagat Singh Nagar) to Ludhiana-Ferozepur Road ,as described at page 201 is the best available and ideal site for the new Metropolitan City Centre. Nearby city centre, Shaheed Bhagat Singh Nagar (in developing stage) and GLADA site at ferozepur Road near GLADA office (in developing stage) shall compliment this Metropolitan City Centre.

Chaura Bazaar (old city) and extensions

The commercial areas in old city like Chaura Bazaar and extensions should be treated as special areas for the purpose of development since this area cannot be developed on the basis of normal regulations. These traditional areas need to be treated carefully and sensitively in view of their high density and multiple uses. The aim is to revitalize the glory of old city and its economic potential.

District centre

The district centres are meant to serve as a apex multi- nodal activity centre of the city, which should be conceived as a major shopping centres, while serving the community with a reasonable variety of other services and facilities and also as centres of socio- cultural activity where the community can meet. The following commercial centres are proposed to be dealt as district centres. The emphasis in these centres should be on promoting commerce and their related activities. In all eight district centres are proposed to be developed including the existing one and under development in order to cater to the needs of the city in the decentralized manner. These include:

- Feroze Gandhi Market (Existing) and Canal colony commercial centre (in developing stage)

- Sector 39-A Samrala(Chandigarh) road(Yet to come up) and Urban Estate sector 32-A market on Samrala Road (In the developing stage)
- Old district and session courts site (yet to come up) and Mall road area

Non- hierarchical commercial centres

Beside above district centres, the following non –hierarchical centres developed/ developing on road fronts are also providing services at the city level, would also need to be strengthened by providing appropriate facilities including parking lots, loading and unloading infrastructure etc.

- Ghumar Mandi market
- Mall road market
- Malhar road
- Market on Ferozepur road
- Pakhowal road
- Cluster of multiplexes coming up on G.T. road Jalandhar side
- Malerkotla road (Gill road) market
- Model town market
- Jawahar Nagar camp
- Shastri Nagar market
- Sarabha Nagar Market(developed)

Community Centre, Local Shopping Centre/Convenience Shopping Centres

Community centres are proposed to serve the commercial needs of one lakh population. The community centres listed below should be conceived as shopping centres catering to the needs of the population at community level. These centres may have retail shopping, commercial and government offices, cinemas, cineplexes, hotels, restaurants, banquet halls, guest houses, nursing homes, dispensaries, laboratories, clinics, polyclinic facilities together with other community facilities.

The following market centres are proposed as community centres/ Local shopping centres:

In addition to community centres, Local shopping centres and convenient shopping centres are proposed to be provided to serve the day today needs of community at sector & sub-sector level.

Commercial centres in urban extensions

In Urban Extension, District centres and community centres could be developed wherever possible, along major transport networks. Such corridors will have non residential uses like commercial, recreational, public and semi public, utilities, service and repair etc . The sites for this purpose can be specified in sector zoning plan

Local level commercial areas

In case of urban extensions it is proposed to combine and integrate LSC and CSC at neighbourhood level to ensure their location within walkable distance.

Hotels

Ludhiana is emerging as a major international centre of trade and commerce, education, health care and business, which require complementary facilities such as hotels catering to various income groups. Such uses are proposed as part of mixed commercial use (community centre and above), public semi public facility, wholesale market, transport nodes, etc.

To cater to low tariff accommodation, a hierarchy of guest house, lodging and boarding house/Dharmshala/ hostel have been proposed under respective landuses.

Hotel is permitted in commercial use zone, commercial centres in industrial use zone and transport nodes (ISBT, bus depot/terminal, Railway Station, Integrated freight complex) and other use zones- where already existing and where building plans are approved by the competent authority. This is subject to the provision of parking as per norms.

Service markets

Special attention is required for the low turn over and space extensive shops for fruits and vegetables, service and repair, junk and scrap materials (Kabari), building materials, automobile workshops, scooter/car bazaars etc. The grouping of such activities with planned retail markets leads to conversion of shops into high profit commercial activity. To avoid continuance of this situation, special areas are proposed to be developed into service markets.

In urban extensions, sites for such service markets at two levels are proposed to be established in the initial stages of development to avoid unauthorized ribbon development and misuse of residential premises.

Table No: 2
Norms for service markets and organized informal bazaars

Sub City level (DC/CC)		Community level(LCS/CC)
Population	About 5 lakhs	About 1,00,000
	Service market	
Area (Ha.)	6.0	0.2
Activities permitted	Service and repair activities like auto work shops, fruit and vegetables, general merchandise, hardware and building materials, gas godowns etc.	Service and repair activities like auto work shops, fruit and vegetables, general merchandise, hardware and building materials, kabari etc.
	Informal bazaar	
Area (Ha.)	5.0	0.1
Activities permitted	Informal shops, weekly markets, organized eating places, handicraft bazaar, used book/furniture/building materials bazaar, cycle and rickshaw repair, kabari etc.	Informal shops, weekly markets, handicraft bazaar, cycle and rickshaw repair, kabari etc.

Note: Utilities, public conveniences shall be provided as per requirement.

Informal sector

Large sections of unemployed and underemployed population in rural areas and small towns look forward to the metropolitan cities like Ludhiana for employment and enter the city to move up economy ladder. This brings forth a multitude of small enterprise and petty trading activities in the informal sector. Thus a metropolis like Ludhiana has organized sector and equally large informal sector. This sector with highly reduced needs of floor space and investment is important as a source of employment and services in the economic fabric of the city.

A survey on unorganized trading activity in Ludhiana estimated total number of unorganized trading enterprise as 7206. The contribution of this sector, which is measured in terms of Gross Value added to the economy of Ludhiana, is tremendous.

The informal sector units locate themselves strategically near work centres, commercial areas, outside the boundaries of schools, colleges, hospitals and transport nodes and near large housing clusters. A very high %age of this activity has been observed in the old city and old commercial areas. A large number of units are mobile in nature.

Policy for existing areas

With a view to make informal sector, an integral part of the planning process and keeping in view the National Policy on Urban Street vendors, the following provisions are proposed to be made for the informal sector:

- i) The location/concentration of present stationary informal units shall be considered on case to case basis and steps for relocation/improvement shall be taken. It should be ensured that such activities do not spill over on the road

network in the right of way. The Govt. /concerned local agency would coordinate to achieve the objective.

- ii) The areas of informal sector shall have suitable public conveniences and arrangement of solid waste disposal arrangements.
- iii) Formulation of guidelines for schemes would include 'Hawking' and 'No Hawking' zones. Specific areas would be earmarked for stationary and mobile street vendors by the concerned local authority.
- iv) The local authorities would take up new design of stalls, push-carts and mobile vans of various sizes and with cleaning facilities, giving due consideration to urban design requirement of specific area, where informal shopping is being permitted.
- v) No informal unit should be permitted along/near the intersection in order to avoid traffic congestion and accidents.

Organized informal sector places (haat)

There are large numbers of informal sector units operating which are scattered all over the city. They occupy critical areas causing congestion and unhygienic conditions. There is a need to provide for organized informal eating places along with casual shopping, etc. to be located strategically in the city. The implementing agency would identify locations as per requirement for such activities.

Informal bazaar

In new urban areas, informal bazaars would form part of the planned commercial areas at two levels. These could be implemented in the initial planning stages along with development of residential areas. The planning norms are given in the table no 3

Apni Mandi (Weekly Markets)

Apni Mandi i.e. weekly markets selling fresh vegetables, fruits and other daily use items are becoming very popular in Ludhiana among the people from all walks of life. These markets are held in various areas. In the absence of defined space they are located in an adhoc manner causing lot of inconvenience to the users and the traffic. Accordingly well defined spaces need to be provided to cater to this activity. Further, parking and open spaces within the service markets and commercial centres should be so planned that these weekly markets can operate on these areas. The specific locations and days/time of operation of such markets should be specified and regulated by the concerned local body in collaboration with other concerned agencies.

Planning norms for informal trade

As already stated informal sector is proposed to be made an integral part of planning process. Accordingly the informal sector trade should be incorporated in the planned development in various use zones. The provision of informal sector trade units should be ensured at the time of sanction of building plans/layout plans as per the norms given in the table no 3.

Table No.3
Planning norms

s. no.	Use zones/use premises	No. of informal shops/units
i	Retail trade: Metropolitan city centre, district centre, community centre, convenience shopping centre	3 to 4 units per 10 formal shops(to be provided in informal bazaar/service market components)
ii	Government and commercial offices	5 to 6 units per 1000 employees
iii	Wholesale trade and freight complexes	3 to 4 units per 10 formal shops
iv	Hospital	3 to 4 units per 100 beds
v	Bus terminal	1 unit for 2 bus bay
vi	Schools Primary Secondary/ Senior secondary/integrated	3 to 4 units 5 to 6 units
vii	Parks District parks Neighbourhood parks	8 to 10 units at each major entry 2 to 3 units
viii	Residential	5 unit/1000 population
ix	Industrial	5 to 6 units per 1000 employees

Development controls –Commercial Centres

The ground coverage, F.A.R., height, parking standard and other controls for commercial activities as per the building byelaws of the concerned Local Body/GLADA or any other agency as per Govt. instructions issue from time to time.

Wholesale trade

Around 80% of the total establishments dealing in the wholesale trade (except bulky material like timber, iron and steel, marble, grain and fruit etc.) of Ludhiana city are located in old city(inner zone). All wholesale markets dealing with hazardous materials are proposed to be developed in decentralized manner and shifted to suitable areas outside the old city. All unauthorized encroachments/projections on roads would be removed to facilitate easy movement of traffic. Further extension of the wholesale activity in the old city should be totally stopped by giving incentives and disincentives.

i) Incentives

- a) The liaisoning offices of the traders/ agents to continue in the present location.
- b) Development of new well planned and well serviced markets for wholesale trade and ware housing.
- c) Incentives such as reduced taxes to be provided to enable the existing business/trader to the new markets.
- d) Providing shops at affordable price on priority to the existing traders shifting to the new markets.
- e) Incentives in terms of reduced conversion , external development charges and licence fees can be considered .

ii) Disincentives

- a) Restriction on the entry of heavy goods vehicles in the old city during the peak hours/day time
- b) Discouraging/disallowing storage of hazardous/inflammable commodities like paper, plastic/PVC, chemicals, petroleum and its products.
- c) Restricting on storage/ ware housing of bulky commodities like food grains, fruits and vegetables, dairy, poultry/ fish products, iron and steel, and building materials
- d) Non renewal of trade licenses for wholesale trade especially operating in the narrow lanes of less than 6 mt. width.

Proposed Retail / Whole sale markets

It is proposed to develop new Retail/whole sale markets as future markets to cater to the existing need and to meet the demand of growing population of Ludhiana only, near the rail and road entry points. These markets would be linked with the proposed retail/Whole sale markets with in integrated freight complexes where the whole sale business could operate more efficiently in a better environment. The breakup of land requirement for different

commodities at various locations would be decided at the time of preparation of schemes for the complex by the implementing agency.

The new Retail/Whole sale markets shall provide facilities for:

- i) Intra urban freight moment and inter change of mode.
- ii) Ware housing and storage facilities.
- iii) Servicing, lodging and boarding, idle parking and other required facility.

Some of the existing planned whole sale markets, ware housing and transport centres are listed below:

Location	Commodity/ activity
Karabara,G.T. road byepass	Fruit and vegetable
Salem tabri	Fruit and vegetable
Malerkotla Road near arora cinema	Food grain
Malerkotla Road b/w Vishkarma and Gill Chowk	Iron and steel
Transport Nagar	Transport/ware housing
Container freight station Dandari Kalan	Transport/ware housing

In addition to above, the following Retail/Whole sale markets are proposed to be developed:

- i) Pakhowal Road
- ii) Ferozepur Road
- iii) Malerkotla Road
- iv) G.T. Road Jalandhar Side
- v) G.T. Road Ambala side
- vi) Chandigarh Road

The different commodities to be provided at various locations would be decided at the time of preparation of schemes by implementing agency. These markets shall have adequate parking, repair and service facilities for which land should be identified while preparing sector zoning plan but the establishment of such markets will not be permissible in ribbon development along road to avoid traffic congestion.

Development controls for Retail/Wholesale trade

The site specifications, ground coverage, F.A.R., height, parking and other controls for Retail/Whole sale markets shall be as per provisions in the building bye laws of the local body or any other implementing agency and as per govt. instructions/ guidelines issued from time to time for the specific activity.

SECTION-G

ENVIRONMENT

Creation of a sustainable physical and social environment for improving quality of life is one of the major objectives of the plan. Almost unprecedented scale and speed of urbanization in Ludhiana has resulted in enormous pressures on the physical environment with a severe adverse impact in terms of pollution, and today Ludhiana is considered to be among the most polluted cities in the country.

The city's environment essentially be seen in terms of two components of urban management- the environment habitat, and service management. The former pertains to the natural features and resources including: the elements of air, noise, water (water bodies- Rivers, lakes, drains and ponds and ground water) and land with reference to open spaces, green areas and other surface and sub- surface conditions. The latter is related to the built environment and includes the environmental infrastructure- water supply, sewerage, solid waste disposal, and the transportation network.

In the above stated background the following three fold approach and strategy will need to be adopted:

- (i) Management of natural resources and the related environment infrastructure and services in a manner that would lead to optimization of use of natural resources, and reduction/ abatement of pollution.
- (ii) Conservation and development of the natural features with the view to enhancing their environmental value ; and
- (iii) Development and preservation of open spaces, greens and landscape/ recreational areas.

A clear approach towards management of 4 types of wastes generated in Ludhiana, namely solid waste, hazardous waste, bio medical waste and industrial waste, should be adopted. The approach should take into account the need for adopting the Clean Development Mechanism (CDM) and the awareness of the carbon credits that can be earned and encashed through a planned and organized mechanism, to be developed for this purpose.

NATURAL RESOURCES

Natural resources conservation includes management of water (surface and ground), air and noise.

WATER (SURFACE AND GROUND)

- (a) The surface water resources in Ludhiana are basically comprised of the river Satlej, drains and ponds. The ground water in Ludhiana occurs at depths varying from 10 - 20 mt. below the ground level and in the alluvial terrain, several sandy aquifers also occur at different levels.

Some of the striking features about surface water of Ludhiana are as follows:

- (i) The Satlej tributary called Buddha Nallah is highly polluted;
 - (ii) The supply of water for human use is too much in absolute terms, but is characterized by iniquitous distribution in per capita terms in different areas and significant wastage is there.
 - (iii) Assuming that 80% of the water is converted into waste water, the capacity to treat waste water is grossly deficient; various options for the re-use of treated waste water must be explored and implemented.
 - (iv) The actual quantity of waste water treated is very less on account of non functioning of STPs being constructed at village Balloke and at Jamalpur. The only STP working so far located at village Bhattian.
 - (v) The planned re-use of treated waste water management is missing.
 - (vi) A large number of the traditional water bodies in the form of ponds and drains etc. have been encroached or have other wise become defunct.
 - (vii) The standards for STP/CETP developed by Central Pollution Control Board/ Punjab Pollution Control Board should be adhered to.
 - (viii) The public participation and education programmes must be encouraged so that the sensitivity of the water resource is understood by the consumers, students and RWAs.
- (b) Ground water is the only source of water supply in Ludhiana city and its surroundings. Rapid urbanization leading to reduction in recharge of aquifers, increasing demand in the agriculture, industrial and domestic sectors,exerts stress on ground water resources in summers, deficient rain fall have been mainly responsible for decline in ground water levels. The average annual rain fall in Ludhiana is 649.9 mm. However, recharge of ground water gets limited due to decreased availability of permeable surfaces owing to urbanization, and the runoff getting diverted into the

sewers/ storm water drains that convey the water into Budha Nallah and ultimately to river Satlej.

The following steps should be taken for the conservation of ground water:

- (i) The existing water basins should be made self sustainable in water management by integrating water- sewerage- drainage system.
- (ii) New projects and up gradation of present infrastructure should be taken up in addition to promotion of water conservation through an integrated and a community driven model.
- (iii) To stop the wastage of ground water, the supply of tap water should be intermittent restricted to limited hours twice a day.
- (iv) Development of parks and green corridors along the nallahs should incorporate conservation of ground water and water bodies. To recharge the ground water, conservation of water bodies and rain water shall be essential.
- (v) To increase sub surface soil water through seepage of rain water, porous paving tiles should be used in the pavements and soft parking areas. All the new bridges/ flyovers must have the provision of rain water harvesting.

AIR

The air quality in the city, in terms of pollution levels, is a matter of concern, and has been responsible for a number of respiratory diseases, heart ailments, eye irritation, asthma, etc. The three main sources of air pollution in Ludhiana are vehicular emission, industrial emissions and from other sources such as diesel generator sets and domestic cooking and burning of bio mass, etc.

Apart from the issue of pollution on account of industries, the major area of planning and intervention would relate to transport planning. With the phenomenal growth in the number of vehicles, almost 3 times in the last decade in absolute terms, the most significant aspect in the context of congestion and pollution, relates to the growth in personalized transport as compared to the availability of public transport. It has been estimated that buses, which constitute barely 0.3% (as per RITES Report 1999) of the total number of vehicles, cater to around 5 % of the total transport load, while personal vehicles- cars and scooters, almost 72.2.% (as per 2005 data) of the total number of vehicles, cater to around only 95 % of the travel demand. Such a huge share of private vehicles in Ludhiana obviously creates tremendous pressure on road space, parking, and pollution directly and through congestion. Public transportation planning must, therefore, drive the future policy. So far public transport is largely seen as the transport mode for the not so well off and poorer sections of

the community, who can not afford to own/use personal transport. An important element of policy would now also have to aim to make public transport a mode for personal vehicle owners and users through a mix of incentives and disincentives. Apart from aspects like frequency, inter-modal integration, a possible single ticketing system, use of parking policy as a means to influence to vehicle use, etc., the quality of public transport particularly buses, would need to be significantly up graded, inter-alia, keeping the element of clean transport in view.

Another issue which has been raised in context of vehicular congestion and pollution relates to the policy of mixed land use, which will also have to be carefully considered.

The other elements which would need carefully thought out policy measures relates to the operation of existing industries, both in terms of pollution control in designated industrial areas, and relocation of non- conforming industries.

To control ambient air quality of Ludhiana, it may be made mandatory that all commercial vehicles (like trucks/auto rickshaws and tempos) are converted into CNG. But CNG needs to be made available in Ludhiana.

NOISE

Noise is emerging as a major pollutant and irritant as well as a constant source of disturbance and health hazards. Against a permissible level of 50-60 dB (A), the sound level in Indian cities often exceeds 80 dB (A). Faulty and leaking silencers, over use of horns and vehicles plying on roads accentuate noise level, besides the noise from commercial and industrial activities, unabated use of sound amplifiers, generator sets and fire- crackers etc.

The Noise Pollution (Regulation & Control) Rules 2000 specify the noise levels in the industrial area, commercial area, residential area and silence zone. It also specifies banning of all noise creating activities between 10 PM to 6 AM, which may be adhered to by the concerned agencies.

By proper land use planning, such, as location of public, semi-public and commercial activities along major transport arteries, a buffer can be created for residential zones. Green buffer through thin leaved trees, land formations, mounds embankment, etc. along major roads could also provide effective barriers to transmission of noise. It is also necessary to improve monitoring and effective implementation of the Noise Pollution, (Level) Rules 2000 and, to notify certain areas as 'No Horn Zones'. The design and surface material of roads and pavements should also ensure reduction of noise. The concerned authorities should prepare area wise traffic calming schemes and a Noise Monitoring and Control Plan (NMCP).

Working in night shifts for household industries or non-conforming industries in the residential areas should be prohibited.

Environmentally stressed zones in Ludhiana should be identified and local area environment management plans should be prepared for such areas, together with regular monitoring.

NATURAL FEATURES

The major natural features of Ludhiana are the river Satlej and its tributary locally popular as Budha Nallah. Both of these are in a state of considerable degradation and it is of vital importance to conserve and rejuvenate these eco systems. The major source of pollution in river Satlej is discharge of untreated water of Budha Nallah. Under the Satlej Action plan an attempt is being made to save both of these natural features from degrading.

Measures for rejuvenation of Budha Nallah

The Govt. of Punjab vide its notification No. 18/145/06-GC(4)/16168 officially constituted the P.Ram Committee for dealing of Budha Nallah on 11/10/2007. This committee in the status report have suggested the following measures to be taken to rejuvenate Budha Nallah:

- (i) Banning of discharge of treated or untreated sewage into Budha Nallah.
- (ii) Demarcation of entire length of Budha Nallah and removal of encroachments.
- (iii) Desilting of Budha Nallah should be ensured.
- (iv) The entire length of Nallah especially with in the city limits should be paved and channelized.
- (v) Conversion of the whole Budha Nallah into a green belt acting as a bio point runoff from the city into Budha Nallah.
- (vi) Greening of Budha Nallah within the city limits.
- (vii) Dustbins on selective sites along Budha Nallah be provided for solid waste collection.
- (viii) The solid waste dumped into Budha Nallah should be removed and shifted to designated land fill sites of Municipal Corporation.
- (ix) No solid waste or cow dung should be allowed to be dumped in and along Budha Nallah. New land fill sites should be identified for the disposal of solid waste of all categories.

- (x) All the textile/dyeing and electroplating units in and around Ludhiana city should be directed to set up treatment plants individually or collectively to achieve zero liquid discharge.
- (xi) The discharge of cow dung/liquid waste from dairies located along Budha Nallah into Municipal sewers/Budha Nallah should be stopped immediately.
- (xii) Land should be identified immediately for setting up of power plants based on cow dung for complete utilization of cow dung being generated from the Ludhiana city.
- (xiii) The work of segregation, collection and transportation of solid waste should be taken up immediately and land be identified for setting up power plant to generate electricity from the solid waste.

Besides the aforesaid the following measures can also be considered for further rejuvenation of Budha Nallah.

- i) Fresh water from Sirhind canal should be released into Budha Nallah to keep the water flowing and for cleaning of Budha Nallah.
- ii) Public awareness campaign should be carried out and the public should be awakened not to spoil the natural source by throwing domestic/ industrial waste into Budha Nallah. NGO's should be involved for public participation in the project.

Sidhwan Canal

Sidhwan Canal, a tributary of Sirhind Canal flows through the southern part of the Ludhiana city. The canal has a sizeable discharge of water. Due to irregular flow, water is not being sourced for supply to the city for the time being. Although this canal mainly supplies water for irrigation but the district Moga also get drinking water from this canal. For the last few years dumping of cow dung, domestic/ medical waste into and along Sidhwan Canal is taking place which not only spoils the beauty of water body but also pollutes the water. The embankments of canal have been encroached at a number of places by JJ dwellers. They also dump rags along canal banks. Recently the people of Ludhiana have started feeling concerned about it and a NGO headed by Baba Balbir Singh Seechewal (a renowned soul behind the cleaning of Kali Bein) and many other prominent personalities from Ludhiana have taken initiative for cleaning the canal.

Keeping in view the degradation taking place of the canal, the following measures should be adopted to save the canal deterioration:

- (i) The work to de-silt the canal should be taken up immediately.
- (ii) Municipal Corporation should provide dustbins on selective points along Sidhwan Canal.
- (iii) Enforcement machinery of the irrigation department and the district police should be geared up for preventing the public from throwing rubbish into or along the canal. Regular patrolling along the canal especially during night shall be very effective.
- (iv) The JJ clusters set up on or along Sidhwan Canal banks should be immediately made to vacate the lands.
- (v) The lands so vacated and other open areas along the Sidhwan Canal banks should be so landscaped that people start spending their leisure time on these areas.
- (vi) The residents of colonies along Sidhwan Canal should be discouraged through public awareness campaign against throwing garbage into the canal. A strict action should be taken against the defaulters.

Green/ recreational areas

The area under green/ recreational use shall be in the form of city parks, community parks, neighbourhood parks/ tot- lots in residential use zones. In addition to this plantation in large chunks of land along river Satlej, Sidhwan Canal, Budha Nallah, road sides, plantation in PAU, Defence installations and forest reserves etc are also included in this category.

SECTION-H

PHYSICAL INFRASTRUCTURE

A key issue related to the sustainable development of Ludhiana and a minimum quality and standard of living pertains to the availability and accessibility to basic infrastructure facilities viz. water, power, sewerage, drainage and solid waste management. The rapid and almost uncontrolled growth of population has put these facilities under severe pressure, and there are significant deficiencies. Thus critical need of advance action and arrangement is required for the adequate provision of physical infrastructure. For each component a broad augmentation plan is essential to meet the projected requirement. Municipal Corporation should prepare a detailed and integrated plan in coordinated with concerned authorities. NGOs and community groups.

The Master Plan envisages an integrated approach that packages mutually supportive infrastructure components i.e. water- sewerage-drainage for recycling, harvesting and optimal use of water; solid waste-sewerage- power for power generation, etc. innovative techniques for the use of alternative technologies like solar energy, recycling etc., are also to be encouraged. The plan accepts the need for institutional capacity building, “User Pays” approach and public private partnership as tools for institutional strengthening. To improve the efficiency and to boost the performance, more community participation and decentralized management is required. Technical feasibility of rehabilitation/ augmentation network of sewerage, water supply and drainage is required on priority.

Water requirement for 2021

Ludhiana depends on ground water for supply of water to its residents. Ludhiana presently has an average water availability of 135 LPCD and the distribution of the same is uniform. At present about 95% of the population is covered. For this purpose 448 tubewells have been installed. The supply of water is intermittent total for 10 hours during the day. As per Master Plan the projected population in 2021 is expected to be 40 lac persons. The number of more tubewells required shall be about 350 calculated @ 5000 persons/ tubewells. But keeping in view the declining levels of ground water in the area it is suggested that surface water available in Sidhwan Canal running in the southern part of the city should be made available for human consumption in future. It is estimated that out of the total water

supplied about 60% of the tap water is wasted due to negligence of the public and only about 40% water is actually being used.

To improve the water supply in accordance with the projected requirement upto the year 2021 and to promote water conservation through an integrated and community driven model the following measures should be adopted:

- (i) The conservation of water is must to stop wastage of water the supply of water should be meterised.
- (ii) The treatment of the waste water should be started and treated waste water be recycled for gardening irregular etc purposes with separate lines.
- (iii) Ground water extraction is to be controlled through rain water harvesting, conservation of water bodies and controlling ground water extraction.
- (iv) It is vital to identify the potential surface water sources to strike a balance for utilization between them and ground water extraction.
- (v) River Satlej, Budha Nallah and Sidhwan Canal, three major surface water sources of this area, have become highly polluted with indiscriminate dumping of waste. These need strict pollution control measures and eco- sensitive land use controls, water flows needs to be controlled and stabilized.
- (vi) Water supply in new areas should incorporate separate lines- one for washing, water coolers and garden taps, the second for supplying potable water. All non-residential buildings having a discharge of over 10,000 litres a day should incorporate a wastewater recycling. The capacity of the sewage treatment plants/ recycling plants would be equal to or more than the water inflow requirements so that it may be possible to treat major part of the discharge except toilets and kitchen discharge. Keeping in view the uses of recycled water, a policy should be formulated for determining the optimum water requirements for various uses.
- (vii) The wasteful practice of drill, pump, and spill has to be replaced by efficient methods of water conservation, use, and recycling as standard and mandatory procedures. There is a need to incorporate the mandatory stipulation of water saving/waterless flushing system in the building bye laws.
- (viii) At the time of preparation of zonal development plans, water bodies, large depressions and other ground water recharging areas should be identified and protected from unintentional filling and encroachments.

Sewerage

Sewerage is the core element of physical infrastructure that determines the environmental status of any city and requires proper planning, development and management. Development of appropriate sewerage system with efficient sewage treatment is vital to facilitate balanced and harmonized development. Augmentation of existing inadequate systems/ treatment facilities as well as adoption of new technologies of waste treatment demands special efforts. About 80% of the population within Municipal Corporation Limits is covered under organized sewerage system. Rest of the 20% population does not have proper access to sanitation facilities. The sewage treatment facility is new and inadequate. The increasing pollution in Budha Nallah is a major indicator of lack of sewage treatment facilities.

By the year 2021 entire Ludhiana should be served by regular sewerage system. It should be developed in a phased manner. The areas where immediate regular sewerage system is not available, low cost sanitation by individual families could be adopted as a short term provision. These should be planned in such a way that in the long term regular sewerage could be provided. To improve the sewerage and sanitation, the surface drainage and sewerage systems would have to be developed in an integrated manner.

Planning of the city must incorporate land at appropriate locations for sewage treatment plants (STPs), sewage pumping stations, recycling plants for waste water, sewage treatment plants, common effluent treatment plants (CEPTs) with supportive distributive infrastructure i.e. conveyance system to be laid to carry treated waste water from STPs to the areas for alternative uses. Decentralized STPs with smaller capacities are to be provided at the community/ sub city level. Possibility of recovering energy/ gas as fuel from sewage shall be explored.

The liquid waste should be taken care of by augmenting the capacity of existing treatment plants as well as through new sewerage treatment plants. The sewerage system is designed to handle domestic liquid waste @80 % of the water supply, which has to cater to 120 mgd (4950 mld) of waste water by the year 2021. The needed capacity has to be monitored with provision of water recycling infrastructure and mini/ decentralized treatment plants. The treated sewage effluent should be recycled for non-potable uses like gardening, cooling towers, etc. The sewerage augmentation plan is given in table on next page.

Sewerage augmentation plan

Sr.No.	Treatment plant	Existing capacity in MLD	Total capacity after augmentation in MLD
1	Jamalpur	48	98
2	Baloke	152	252
3	bhattian	111	211

The total waste water treatment capacity of above three sewerage treatment plants even after augmentation shall be 561 MLD whereas the present sewage disposal is 311 MLD and total sewage generated per day is 650 MLD. Hence to remove this deficiency two new sewerage treatment plants have been proposed to be set up at village Bhamian one for handling domestic sewage of the capacity of 48 MLD and another for treating industrial sewage of capacity 60 MLD. More new sewage treatment plants should be provided at appropriate locations in future to meet future requirements of the city.

Besides this desilting of existing sewers at regular intervals should be ensured by the concerned agency and there should be separate sewer lines for sullage and storm water.

Storm water sewer

Storm water sewer is an essential component of sewerage system. Although about 80% of Ludhiana city is covered by sewerage system but the area covered by storm water sewer is just about 10%. In other words Ludhiana is devoid of storm water sewer facility. During rains domestic storm water is diverted to sewerage lines which are not meant to handle storm water and as a result the sewer lines get choked. Due to absence of storm water sewer the roads and streets become water channels and remain flooded for hours causing inconvenience to public.

The following steps are suggested to tackle the problem of storm water sewer:

- (i) The project under JNNURM scheme should be prepared to provide storm water sewer facility to whole of Ludhiana. The project may be taken up in phases taking the priority areas in first phase.
- (ii) Storm water drainage should be integral part of road development plans/flyovers for rain water management.
- (iii) Regular de-silting of existing storm water sewer lines should be taken up.

SOLID WASTE MANAGEMENT

The problem of solid waste management in Ludhiana is assuming serious proportions due to increasing population, urbanization, changing life styles and consumption patterns. Because of limited disposal facilities the solid waste are dumped in haphazard manner in various parts of the city causing thereby not only environmental problem but also serious health hazards. The National Conservation Strategy and policy statement on Environment and Development has laid stress on adopting stringent measures for prevention and control of pollution due to indiscriminate disposal of solid waste on land and into water.

Quantity of solid waste

The city daily generates about 850 MT of garbage. Per capita waste generated per day is 535 gins. The Municipal Corporation provides garbage collection facility in 100 % area within Municipal limits.

Various types of solid wastes generated at Ludhiana can be categorized in three groups

- Municipal Solid Waste (MSW)
- Hospital Solid Waste (HSW)
- Industrial Solid Waste (ISW)

Sources and Type of MSW

S. no.	Sources	Typical facilities, activities & location	Type of MSW
1.	Residential and Open areas (56.31%)	Single & multi family dwelling, streets, parks, bus stand	Food waste, rubbish ashes, street waste
2.	Commercial (23.95%) including street sweeping	Offices, Institutions, markets Hotel's, restaurants, stores auto repair shop, Medical facilities, streets etc.	Food waste, rubbish ashes, street waste occasionally hazardous waste
3.	Industrial (19.74%)	Small/medium scale industry, Offices, Canteen	Office waste, food waste packaging material

Quantum of projected Municipal Solid Waste

The projected average garbage generation of Ludhiana up to the year 2021 is estimated @ 0.68 kg. per capita per day and the total quantum of the solid waste is expected around 2700 MT per day. For effective solid waste management its segregation at the community and neighbourhood level is imperative. The waste should be segregated and collected in

separate chambers. For this the public awareness campaign should be launched and help of rag pickers, Residents Welfare Associations (RWA) and NGO's should be taken.

Solid waste management system

• Collection system

Household waste:

Presently the waste generated at individual premises is removed initially by the owner or his employee. This collected solid waste is then dumped at various collection points identified by the corporation, and other unauthorized open places. There collection points consists of various community bins (containers), designated open sites and portable bins. However in many cases the waste is not dumped directly into the community bins. It is dumped either outside the bin, into any open areas or just dumped on the road side.

Roadside waste:

The waste lying on the road sides is collected by the staff employed by the Corporation. The waste dumped outside the community bin (containers) and portable bins are also dumped inside the bin by the Safai sewaks. The safai sewak has been given wheel barrows to lift the waste and transport it to the identified dump site. **Road sweeping:**

Corporation has employed various safai sevaks to sweep the roads daily and collect the solid waste. Each safai sevak is given approximately 2km of road length for sweeping of municipal roads. They are also given cycle rickshaws to dump their collected waste to the designated site.

Community Bins / Collection points:

The collection points serve as an intermediate transfer point from household and road side waste to landfill site. Presently the community bins in use for collection and storage of Municipal Solid Waste (MSW) at Ludhiana are two broad categories as follows:

Community bins

1. Portable bins (i.e. containers)
2. Designated open dumping sites

Transportation:

The solid waste from various designated collection site is transported to the dumping site by municipal corporation staff regularly. MSW collected in the community bins and at other places is presently transported to the dumping site by using different type of vehicles. The containers are lifted with the help of dumper placer and transported to the final disposal site (landfill).

Disposal:

The solid waste is transported to designated landfill site / dump sites identified by the corporation.

Waste Dump Sites

S.No.	Site	Land area acres	Average depth in it	Future life years	Distance from city centre
1.	Jamalpur	25	8 to 10	25	11 km.
2.	Jainpur	10	Completely filled	Nil	10 km.
3.	Noorpur Bet	21	12 to 15	25	14 km.

None of the three landfill sites are lined and land filling is being done in unscientific manner. The waste is directly dumped (without segregation) into the site and a JCB is employed to spread the waste. However, proper compaction is not done to actually compress the waste into the site and other machinery including Road Rollers are required.

The constituents of Municipal Solid Waste are broadly of three types:

1. Bio degradable
2. Non- Bio degradable
3. Re- cycleable

For bio degradable and recycleable waste, which should be segregated at source, decentralized treatment may be adopted while for non- bio degradable, centralized treatment may be followed.

The other type of specialized waste includes bio medical waste; hazardous waste from industries; construction debris and fly ash; meat processing centre etc. Disposal of bio medical waste is to be as per bio medical waste rules and hazardous waste requires special handling according to the hazardous waste handling rules. Proper dumping, recycling and re use of construction debris and fly ash have to be linked. Meat processing centre waste is to be re cycle for chicken feed etc.

Considering the nature of solid waste and the economic aspect of its disposal, major part of solid waste especially non bio degradable has to be disposed off in sanitary land fills. Re cycling should be prefer than disposing of the waste in sanitary landfill site when ever possible. A segregation of solid waste should start at the point of generation of the waste.

It should be collected into separate bags of green and black colour. The involvement of RWAs and rag pickers association will reduce the quantum of waste drastically. And it will also result in the reduction of area required for land fill sites. Further, some more viable alternatives to land fills are vermiculture, fossilization, composting etc. Waste Minimization Circles (WMCs) should be constituted and made effective. Implementation and monitoring & bio medical waste (handling and management) Rules, 1998, for hospitals, nursing homes, and clinics should be taken up. The filled up sites may be re used for plantation or as recreation area. The new sites for sanitary land fill and composed plants are to be finalized by the Municipal Corporation Ludhiana. For this purpose the less fertile Govt. lands in villages adjoining Ludhiana city may be considered keeping in view the parameters guiding the location of sanitary land fill sites.

POWER

Power sector hold the key to economic development but due to increasing population, urbanization, rapid industrialization and changing life styles, the consumption of power has increased manifold than the supply. Although the Govt. is making all out efforts to cope with this situation but still the supply side is not improving. The shortage of power is definitely going to effect the GDP of not only of the city but also of the state. Since the addition of electric power generating sources take long time, the conservation of electricity is the only way. The present master plan envisages the following steps for conservation of electric power :-

- iii) The concept of energy efficiency should begin with the idea of zero fossil energy development and renewable sources of energy should be encouraged.
- iv) Loan management techniques and energy accounting should be adopted. Schemes to minimize power thefts/ losses by, improved metering arrangements should be enforced.
- v) Non-convention energy sources like generating power from sewerage and solar energy etc. should be used for street lighting, lighting at public places, open areas and traffic signals etc.
- vi) As per Asian Development Bank's report(1997) potential in saving due to better overall efficiency in domestic sector is about 20% by adopting following measures:-

- a) Replacement of low efficiency incandescent lamp with high efficiency fluorescent tubes (CFLs) without compromising with the lumens output.
- b) Similarly for refrigerators, which account for 30% of total electricity consumed, measures like increased thickness of foam insulation, use of high coefficient compressors, increased evaporator surfaces, use of tighter door seals and through technical improvements, can reduce consumption from 540 KW/year to 300 KW/year (for a 165 litre refrigerator).
- c) Incandescent bulbs, neon tubes and fluorescent lamps are giving way to light-emitting microchips that work longer, use less power and allow the use of light in new ways. This eventually results in huge savings in terms of energy and maintenance costs.

SECTION-I

SOCIAL INFRASTRUCTURE

Health

The city has many specialized health facilities, which serve the city population as well as that of the region. As per available statistics, the total number of health units are 251. The existing bed capacity is 10,000 in the city. The World Health Organization (WHO) has recommended a norm 5 bed per thousand population. It is estimated that the total number of beds required in the year 2021 will be about 20,000.

The following broad strategies are proposed in order to meet the requirements of health related infrastructure:

- (i) Shortfall in the availability of number of beds per 1000 population is proposed to be met through
 - a) Enhancement in FAR for various levels of health facilities;
 - b) Promoting rebuilding of existing old hospitals.
- (ii) Essential provisions shall be made for Old Age Home-cum-Care Centres for Senior citizens and Mentally Challenged by way of specialized/target group oriented facilities, which will also relieve the pressure on general hospitals to some extent.
- (iii) Premises earmarked for health facilities should also include other medical streams like Ayurvedic/homeopathic medicine, governed by any statutory code/body.
- (iv) Complementary health facilities at par should be developed in the satellite towns (Sahnawal, Doraha, Mullanpur, Phillaur) to reduce the burden on Ludhiana city.

There shall be following 5-tier health facilities for the city population:

- i) Hospital category:
 - a) Category A-501 beds and above
 - b) Category B-201 beds to 500 beds
 - c) Category C-101 beds to 200 beds
 - d) Category D-up to 100 beds
 - e) Other health facilities, which include maternity home, nursing home, family welfare centre, etc.

- ii) For health care of animals and pets the following 3 tier of health facilities has been proposed:
- Veterinary Hospitals for pet/domestic animals and birds should be provided as per need.
 - Dispensary for pet animals and birds should be provided in all the zones at community level.
 - Pet clinic is permitted in all land use zones except in recreational use zone.

Planning norms and Standards for Health facilities

Sr. no.	Category	Population/Unit (approx.)	Plot area
1.	(i) Hospital A (501 beds and above) (ii) Hospital B-201 beds to 500 beds (iii) Hospital C-101 beds to 200 beds (iv) Hospital D-up to 100 beds	5.0 lakh 2.5 1.00 1.00	2.5 ha.-4.5 ha. 1.5ha.-2.5 ha. 0.5 ha.-1.0 ha. 0.25 ha.-0.5 ha.
2.	Other health facilities a. (i) Maternity home (ii) Nursing home/polyclinic (iii) Dispensary	1 per 50,000 1 per 50,000 1 per 10,000	1000 -2000 sq.m. 1000 -2000 sq.m. 800 -1200 sq.m.
	b. (i) Family welfare centre (ii) Pediatric centre (iii) Geriatric centre (iv) Diagnostic centre	1 each per 50,000	500-800 sq.m. each
3.	a. Veterinary hospital for pet animals and birds	1 per 5.0 lakh	2000 sq. m.(subject to availability of land)
	b. Dispensary for pet animals and birds	1 per 1.0 lakh	300 sq. m.
4.	a. Medical college	1 per 10 lakh	As per norms of the competent authority
	b. Nursing and paramedic institute	1 per 10 lakh	
	c. Veterinary institute	As per requirement	

Development Controls for Health facilities

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

EDUCATION

The literacy rate in Ludhiana has increased from 69% in year 1991 to 78% in the year 2001. In over all terms Ludhiana has a fairly elaborated network of educational institutions from the pre- primary/ primary to the higher education and professional education levels. At present there are 394 primary/ elementary schools and 191 secondary/ sr. secondary schools. At the higher/ professional educational levels, there are 29 colleges for general education, 8 engineering colleges, 2 universities (1 agricultural and one veterinary).

However, there is a deficiency in few planning zones, particularly in the field of school education. Further, keeping in view the fast changing national and global economic scenario, the employment and educational requirements are also undergoing a rapid change involving the development of new professional and vocational avenues for specialized education. A number of coaching centres, computer training institutes and language/ training classes are opening up. However, these are mainly operated by the private sector. With the consequent potential for availability of financial resources for this purpose, involvement of the private sector in the development of education facilities is growing.

Keeping the need for expansion and diversification as brought out above, the availability of land could become a major constraining factor. It has, therefore, become necessary to develop policies and norms, which would enable optimal utilization of land and available educational infrastructure. As far as school education is concerned, the policy should be geared to encourage integrated schools from the pre-primary to the higher secondary level, rather than allocating space separately for nursery schools, primary schools and middle schools.

Following planning policy parameters are proposed:

- i) Differential norms and standards for various educational institutes/ institutions shall be applicable in light of norms of the concerned controlling authorities e.g. university grants commission (UGC)/ All India for Technical Education (AICTE)/Central Board of Secondary Education (CBSE)/Punjab School Education Board(PSEB) etc.
- ii) The educational institutions premises may be permitted to function in

two shifts, subject to statutory approvals and any other conditions they may be stipulated by the relevant competent authority.

- iii) Nursery school may function as part of primary school/ secondary school/ senior secondary school, where ever need. Separate/ exclusive nursery schools are permitted in residential premises as per the mixed use policy.
- (iv) Requirement of schools and training centers for mentally and physically challenged with differential development norms are given.

Planning norms and standard for education facilities

Sr.No.	Category	Population/unit (approx.)	Plot area
1	Primary school	10,000	0.2- 0.4 ha
2	Sr. Secondary school	10,000	0.6- 0.8 ha
3	School for mentally challenged	10.0 lakh	0.2 ha
4	School for physically challenged	10.0 lakh	0.2 ha.

Development controls for education facilities

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

Table Planning norms and standard for education facilities (Higher Education)

Sr.No.	Category	Population/unit (approx.)	Plot area
1	Vocational training centre (L.T.I. /Polytechnic/ vocational training institute/management institute/teacher training institute etc.), research and development centre.	5.0 lakh	0.4 ha
2	General college	5.0 lakh	As per UGC norms
3	Professional college (technical)	5.0 lakh	As per AICTE norms

Upto 10 % variation in plot size permitted.

Development controls for education facilities (Higher Education)

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

SPORTS FACILITIES

Ludhiana is emerging as an important centre for State and National sports events.

Sizeable sports facilities have been developed in the city. However, sports activities, so far, are being dealt with as a part of recreational use. Thus, there is an evident need for a properly planned and structured sports infrastructure in the city.

There is also a trend for development of gyms, spas, bowling alleys etc. at neighbourhood level. Since these are mostly being established as commercial ventures, provision of land/ space for these should be made in commercial premises.

Provision of sports facilities

Sports activities are an important part of physical and social development of an individual and, at another level sports activities have a significant aspect of, and potential in the form of congregational and competitive events at the community, city and National levels. Keeping this in view norms and space standards separately for sports facilities at neighbourhood level and city level have been proposed with the aim of development of sports and play areas for all age groups at appropriate levels.

Planning norms and standards for sports facilities

Sr.No.	Category	Population/unit (approx.)	Plot area (Ha.)*
1	Divisional sports centre/ golf course	10 lakh	10-30 & above
2	District sports centre	5.0 lakh	3-10
3	Community sports centre	1.0 lakh	1-3
4	Neighbourhood play area	10,000	0.5-1
5	Housing area playground	5000	0.5

* Subject to availability of land.

Development controls for sports facilities

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

COMMUNICATIONS - POST/ TELEGRAPH/ TELEPHONE FACILITY

With liberalization and technological advancement, communication has been very important medium of accessibility. Following the means of communication is available:

Post and telegraph

Post and telegraph is one of the most popular means of communication. At present Ludhiana have 153 post offices and 2 telegraph offices. Although, the number of telegraph offices is decreasing due to availability of other easier, cheaper and faster modes of communication these facilities still serve considerable population both at the city level and National level. The future space norms have been worked out accordingly.

Planning norms and standards for communication facilities

Sr.No.	Category	Population/unit (approx.)	Plot area (Ha.)*
A	Post and telegraph		
1	a. Post office b. Courier service office	1. No specific site reservation to be kept in the layout plan. 2. Permitted in all use/zones/under mixed use as per requirement except in recreational zone.	
2	Telegraph office (Booking and delivery)		
B	Telephone		
4	a. Telephone exchange b. RSU (Remote Subscriber Units)	10.0 lakh 1-3 Km. radius	2500 <u>sq.mt</u> 300 <u>sq.mt</u>

Development controls for communication facilities

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

SECURITY- POLICE

Law and order are increasingly becoming a matter of concern in Ludhiana. For maintenance for proper law and order, the security force must keep pace with the growth and development of an area. The main agency looking after security aspect in the city is Punjab Police. At present there are 19 police stations and 31 police post, 1 police line and 1 district jail.

Planning norms and standards for security (Police) facilities

Sr.No.	Category	Population/unit (approx.)	Plot area
1	Police post	1.0 lakh	1000 Sq.mt
2	Police station	2.5 lakh	1.0 Ha
3	District office and battalion	1 for each administrative zone	1.0 Ha
4	Police lines		2.0 Ha
5	District jail	25.0 lakh	5.0 Ha
6	Police training institute/ college	City level (to be located in fringe area)	5.0 Ha
7	Police firing range		upto10.0 Ha
8	Police camp including central police organization/ security forces	As per requirement	upto 10.0 Ha
9	Traffic and police control room		

Development controls for security (Police) facilities

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

SAFETY

Fire

Fire services have to play pivotal role and be fully prepared in protecting people from fire hazards, building collapse, road accidents and other unforeseen emergency etc. At present there are five fire stations in city.

Planning norms and standards for safety/ fire facilities

Sr. No.	Category	Population/unit (approx.)	Plot area
1	Fire post	3-4 Km radius	2000 <u>sq. mt.</u>
2	Fire station	5-7 Km radius	1.0 Ha.
3	Disaster management centre	1 in each administrative zone	1.0 Ha. along with suitable open area (2 ha.) for soft parking, temporary shelter, parade ground etc.
4	Fire training institute/ college	City level (one site in urban extension)	3.0 Ha.

Development controls for safety/ fire facilities

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

Guidelines for locating fire stations & other fire fighting facilities in urban extension:

- i) Fire station should be so located that the fire tenders are able to reach any disaster site immediately within minutes.
- ii) Fire station shall be located on corner plots as far possible and main roads with minimum two entries.
- iii) In new layouts, concept of under ground pipelines for fire hydrants on periphery, exclusively for fire fighting services should be considered.
- iv) Fire stations are permitted in all land use zone/sectors except in Recreational use zone.
- v) Necessary provisions for laying underground/over ground fire fighting measures, water lines, hydrants etc. may be kept wherever provision of fire station is not possible.
- vi) The concerned agencies shall take approval from Fire Department for fire fighting measures while laying the service for an area.

Disaster Management Centre

According to the Indian Seismic Zone Map, Ludhiana is placed in Seismic Zone IV, which means high damage risk zone. Such natural and man made disasters neither can be prevented nor predicted. However, with the technological advancement to some extent mechanism can be developed to mitigate the after effects of the disaster. Areas of vulnerability can be identified and necessary measures can be proposed by the concerned agencies. The concerned local bodies should keep updating the building bye laws to safe guard against disasters and ensure effective and impartial enforcement. Following policies and strategies for disaster management are proposed:

1. Pre-Disaster Preparedness

(i) a) Micro-zonation surveys should be referred for land use planning and be considered while preparing the sectors/Zonal Plans and Layout Plans.

- Seismic micro-zonation for selected areas having high growth rates should be taken up on priority.
- On the basis of vulnerability studies and hazard identification, which includes soil conditions, probable intensity of earthquake, physiographic conditions of the area, fault traces, etc., local level land use zoning and planning should be undertaken.

(b) Building bye-laws should incorporate the aspects of Multi Hazard Safety, and Retrofitting.

- Priority should be given to public buildings (such as hospitals, educational, institutional, power stations, infrastructure, heritage monuments, lifeline structures and those which are likely to attract large congregation) for their ability to withstand earthquake of the defined intensity.
- Suitable action should be taken for retrofitting and strengthening of structures identified as vulnerable as per earthquake manuals and National building code. A

techno-legal regime has to be adopted for provision Multi Hazard Safety aspects. (ii) Ludhiana Fire Services being the nodal agency for disaster management should identify vulnerable areas such as areas with high density and poor accessibility in the City and propose suitable measures. Proposed Disaster Management Centres should be established in every zone/sector to deal with the disasters, including bio-chemical and nuclear disasters.

(iii) Sensitize people, particularly school children, about after effects of disaster.

(iv) Make people aware through media campaigns and advertisements about emergency procedures and location of emergency shelters etc.

2. Post Disaster Management

(i) It has been observed that any disaster is generally followed by break down of communication lines and disruption of essential services. Therefore, the key communication centres should be protected from natural disasters i.e. flood, fire and earthquake etc. and services restoration should be taken up on top most priority. Necessary setup should be created in each of the concerned department for **such** eventualities.

(ii) Standard type designs and layout should be prepared by the local bodies and made available to the people so that crucial time is not lost in approval of layout plans and building plans after disaster.

Disaster Management Centres have been proposed to serve people in the case of disaster and provide emergency shelters.

DISTRIBUTIVE FACILITIES

Milk, Fruit, vegetable and LPG are the basic requirements of the day-to-day life, and should have proper distribution set up.

Planning Norms and Standards for Distributive Services

Sr. no.	Category	Population/unit
1	Milk Booth /Milk and Fruit & Vegetable Booth	One per 5000 population. As per standard design of the concerned department.
2	LPG godown including booking office.	3 LPG godowns per one lakh population
3	SKO /LDO outlets	As per standard design of the concerned department

Development Controls for Distributive Services

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

SOCIO-CULTURAL FACILITIES

Planning Norms and Standards for Socio-Cultural Facilities

Sr. no.	Category	Population/unit (approx.)	Plot area
1	a. Banquet Hall b. Multipurpose Community Hall which may include provision for marriages, small public gathering, function, eating joint and library etc.	10000 1.0 lakh	800-2000 <u>sq.mt.</u> 2000 sq.m.
2	a. Community Recreational Club b. Recreational club	1.0 lakh 5.0 lakh	2000 sq.m. 5000 sq.m.
3	Socio-Cultural activities such as auditorium. music, dance & drama centre/meditation & Spiritual centre etc	1.0 lakh	1000 sq.m.
4	Exhibition-cum-Fair Ground	2 sites in new urban extension	Up to 40 Ha. each
5	Science Centre	10.0 lakh	As per requirement

Development controls for Socio-Cultural Facilities

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

OTHER COMMUNITY FACILITIES

The planning norms, standards and development controls for other community facilities such as old age homes, religious facilities etc are given in table below:

Planning Norms and Standards for Socio-Cultural Facilities

Sr.no.	Category	Population/unit (approx.)	Plot area
1	a. old age home b. Care centre for physically-mentally challenged c. Working women- men hostel. d. Adult Education Centre e. Orphanage/Children's centre. (One each) f. Night shelter	5 lakh each category for 10 lakh	1000 <u>sq.mt.</u> subject to availability of land
2	Religious Facilities (a) At neighbourhood level (b) At sub city level in urban extension	5000 10 lakh	400 sq.m. 4.0 Ha.
3	Anganwari (a) Housing area/Cluster	5000	200-300 sq.m.

Development controls for Socio-Cultural Facilities

As per Zoning Plan/Building Byelaws of the local body/any other concerned agency or as per Govt. instructions issued from time to time.

CREMATION GROUND, BURIAL GROUND &

CEMETERY At present there are 16 cremation grounds.

- i) In the existing cremation grounds, provision of crematorium is to be made.
- ii) In proposed urban extension new burial grounds/crematorium cremation grounds/cemetery etc. are to be planned with proper parking and landscape provisions. The area to be about 0.4 Ha. per 5.0 lakh population for a cremation ground and upto 1.0 Ha. per 10 lakh population for a cemetery and burial ground subject to availability of land.

Activities Permissible In Different Facilities:

Activities permitted (Health Facilities)

Hospital, Dispensary, Nursing home, Clinical Laboratory, clinic, veterinary hospital, Surgeon's lab, office, Operation theater, Examination room, wards, Reception, Store, Kitchen, Voluntary health service, Administrative office, Staff accommodation, Patient attendant accommodation, Institutional hostel, Medical college, Parking, Retail shop (canteen, confectionary, grocery & general merchandise, books and stationary, chemist, barber, launderer, vegetable), Bank extension counter, Watch and ward residence,

Activities permitted (Educational Facilities)

Creche & day care centres, Watch & ward residence (upto 20 sqm.), Nursery school, Primary school, Middle school, Sr. Sc. School, School for mentally/physically challenged, college, other educational institutions, Books & Stationary shop, Soft drink & snack stall, Canteen, Bank extension counter, Play ground, Auditorium, Indoor games hall, Swimming pool, Art gallery, Post office counter facility, Residential flat (for maintenance staff), Hostel, Retail shops (Chemist, Barber, Launderer, vegetable), commercial and secretarial training centre, Research and development centre

Activities permitted (Sports Facilities)

Sports related commercial components, Multiuse stadium, Multipurpose hall for exhibition, trade shows, banquets, multiple sports and related events, Aquatic centre(covered or otherwise with full size competition pool, a training/lap pool, diving pool which can also be used for water polo and synchronized swimming as well as other aquatic recreational facilities like water slides, water pool, hydrotherapy pool, akhara, facilities for outdoor sports like cricket, football, hockey grounds, skating rinks, jogging track, including extreme sports and golf course/range, sports academy for multiple sports events, sports medicine centre, residential accommodation/hostel, watch and ward residence, bank, post office, play ground, indoor stadium with ancillary halls for basket ball, badminton, table tennis, volleyball,

Activities permitted (Communication Facilities)

Post office counter, watch and ward residence, telegraph office, head post office, general post office, telephone exchange/RSU, logistic, radio and television station, hostel, library, canteen, transmission tower, satellite and telecommunication centre, residential flat(for maintenance staff), observatory and weather office

Activities permitted (Security Facilities)

Police post, police station, police offices, essential staff housing, canteen, bank extension counter, civil defense and home guard residential flat(for maintenance staff), hostel, playground, police line and related facilities, jail and related facilities, training institute/college, retail shops(confectionary, grocery & general merchandise, books and stationary, chemist, barber, launderer, vegetable), auditorium, indoor, outdoor games, swimming pool, post office counter facility, police firing range(temporary structure only), temporary traffic and police control room, forensic science laboratory and related facilities

Activities permitted (Safety-fire)

Fire post, fire station, fire training centre, hostels, residential flat for staff, service workshop, watch and ward residence, disaster management training centre, hospital, open grounds for practice and relief camps, communication center

Activities permitted (Distributive services)

Booth/built structure for display and sale of dairy products/fruits and vegetables, dairy farm, watch and ward residence, all structures shall be temporary in nature, poultry farm, piggery shed, booking office, store/ godown, care taker office.

Activities permitted (Socio-cultural & community facilities)

Community hall, watch & ward residence, canteen, soft drink and snack stall, library, music, dance and drama training centre, auditorium, yoga centre, meditation, spiritual and religious discourse centre, recreational club, residential components, library, swimming pool, indoor and outdoor games facilities club, hall for public gatherings, marriages, cooking facilities and other logistics, open air theater, fair ground, residential flat(for maintaining staff), exhibition centre(temporary in nature), restaurant, police post, fire post, bank extension counter facility, post office counter facility, cultural and information centre, hostel, social and cultural institute, art gallery, international convention centre, planetarium, night shelters and related facilities, kitchen, toilet, hall, dharamshala, personnel service shop of barber and launderer, flexible use given to a primary school, community centre or any such community building, reformatory and orphanage, temple, mosque, church, gurudwara, synagogue, ashram, bathing ghat, gau shala, dargah, charitable dispensary, overhead tank, under ground tank, oxidation pond, septic tank, sewerage pumping station, public toilet & urinal, electric sub station, dustbin, dhobighat, machine laundry

Activities permitted (Cremation/burial ground and cemetery)

Burial ground, cremation ground, cemetery & crematorium, retail shops of wood, flowers and related materials, watch and ward residence, facility for registration of deaths, sheds for performing rituals, drinking water, parking etc.

Note:

As per the existing policy, acquisition through Government is not likely. The major development is to be through private sector development. In case of Ludhiana, every Promoter who intends to develop residential colony, minimum area requirement is 75 Acres, out of which 9 to 10 percent is required to be put under institutions, 5 to 6 percent for parks & open spaces and more than 30 percent area is required to be under roads, parking and utilities. Keeping this in view, exact site locations of these activities/ uses has not been shown on Proposed Landuse Plan as it will be determined on the basis of the Layout Plan as and when submitted by the developer for approval. Therefore, the provision of these activities/uses is inbuilt in the system and these uses will be achieved through planning system. If we fix the uses/activities now it will not be achievable and the land owners may resist and not sell that portion of land in which these activities are proposed.

Besides,above, stand alone projects such as institutions, hospitals, hotels are also permissible in the prescribed landuse zone.

Public utilities like Bus Stand, Treatment Plans, Solid Waste Dump sites etc. shall be identified at the time of preparation of detail sector/ zonal plans.

The National Urban Housing and Habitat Policy 2007, envisages that promotion of sustainable habitat is closely linked with reserving a significant proportion of the Master Plan area as ' green lungs of the city,protecting water bodies with special emphasis on the flood plains of rivers and developing green belts around our cities. Accordingly, to achieve the objective of keeping 20-25% of total area as green, provision has been made in the Master Plan to protect forest areas and basin of Satluj River, conservation of Budha Nallah catchment area, creation of rural zone in the Local Planning Area. In addition ,it shall be ensured that proportionate area is left in each Sector/ Layout Plan for recreational use, play grounds, green parks,green spaces in commercial complexes / Group housing schemes, etc. so that over all green space in Local Planning Area is achieved between 20-25 percent.

Part-iv
Zoning Regulations

Section -1

The zoning regulation shall cover the uses and development of land in the Local Planning Area, Ludhiana as shown in Drawing No. DTP(L) 02/2008 dated 22-02-08

The requirements of these zoning regulations shall extend to the whole of the Local Planning, Area Ludhiana covered by the Master Plan proposals shown on the above mentioned drawing.

Section-2

DEFINITIONS

For the purpose of these zoning regulations, the following definitions, unless the context otherwise requires, shall apply:

- ii) “Act” means the Punjab Regional and Town Planning and Development (Amendment) Act, 2006 (Punjab Act No. 11 of 1995).
- iii) The definitions given in Section II of the Punjab Regional and Town Planning & Development (Amended) Act, 2006 shall apply for the purpose of Local Planning Area, Ludhiana declared under the said act.
- iii) “Government” means the Government of the State of Punjab.
- iv) “Chief Town Planner” means the Chief Town Planner of the Department of Town & Country Planning, Punjab or any other officer to whom his powers are delegated.
- v) “Existing Land Use Plan” means the plan showing the different land use existing at the time of preparation of the Existing Land Use Plan of Local Planning Area, Ludhiana and as indicated on Drawing No. DTP(L) 19/2007 dated 20-12-07.
- vi) “Local Planning Area” means the Local Planning Area declared under section 56(1) of the Punjab Regional and Town Planning and Development (Amendment) Act 2006 vide notification No. 12/45/2006-4HGI/5689, dt. 19.7.07 published in the Punjab Govt. Gazette.
- vii) “Non-Conforming Building or Use” means use in respect of any land or building in the Local Planning Area, the existing use of which land or building is contrary to the prescribed land use.

- viii) " Planning Agency" means the Town and Country Planning Department,Punjab designated as such under Section 57 of the Punjab Regional and Town Planning and Development Act(Amendment)2006 for Local Planning Area Ludhiana
- ix) " Proposed Landuse Plan" means the plan showing the proposed any admissible uses of different areas and land use zones covered in the Local Planning Area,Ludhiana.and as indicating on Drawing No.DTP(L) 02/2008 dated 22-02-08
- x) "Sector Plan" means the Layout Plan of a part of master plan approved by the Chief Town Planner,Punjab showing all or any of the following:-
 - a) Plots, streets, roads,public open spaces, parking areas.
 - b) Area temporarily or permanently prohibited for the building operation.
 - c) Building lines,maximum area that can be built up on and permitted uses in respect or each or a group of plots into which the land may be shown to be divided.
 - d) Any other condition or restrictions provided in the layout plan.
- xi) " Zoning Plan" means the plan of area or part thereof or supplementary layout plan approved by the Chief Town Planner and maintained in the office of Competent Authority showing the permitted use of land and such other restrictions on the development of land as may be prescribed in the zoning regulations, for any part or whole of the area such as sub-devision of plots,open spaces, streets,position of protected trees and other features in respect of each plot, permitted land use,building lands, height,coverage and restrictions with regard to the use and developement of each plot in addition to such other conditions as laid down in these regulations hereafter.
- xii) " Mixed land use" means the multiple use of land is allowed to co-exist. This cover to distinct forms of mixed landuse viz. **commercial mix** :areas where residential, commercial and some other uses except industry may co-exist. **industrial mix**: areas where industry can also co-exist with residential and commercial activities.
- xiii) " No Manufacturing Zone" means the area within one kilometer from Dhusi Bandh on both sides of Satluj River where no manufacturing and processing industrial units shall be permissible.

Terms and phrases used, but not defined in these regulations, shall have the same meaning as assigned to them in act.

Section -3

For the purpose of these regulations, the Local Planning Area, Ludhiana has been divided into different landuse zones, as shown on the Proposed Landuse Plan (Master Plan) 2008-2021), Drawig No. D.T.P.(L) 02/2008 dated 22-02-08 and are designated as under :-

- a) Residential
- b) Comercial
- c) Mixed landuse
- d) Industrial
- e) Recreational
- f) Traffic & Transporation.
- g) Utilities
- h) Governmental
- i) Public & Semi-public facilites.
- j) Agriculture and water bodies.
- k) Miscellaneous

1(b). **NON- CONFORMING BUILDING OR USE**

- (i) The continued use of places of worship such as temple, Gurdwara, mosque, church, cremation and burial grounds which were in existence before these regulations came into force shall not be considered as non-conforming uses.
- (ii) All the non-conforming buildings or uses shall be discontinued or shifted to their respective uses or made conforming in the manner and in a period of 10 years as stipulated in Section 79 of the Punjab Regional & Town Planning and Development Act(Amended) 2006 .

I (c) **DISCONTINUANCE OF NON CONFORMING USES**

- i) If a non-confirming use of land has remained discontinued for a period of two years or more, it shall be deemed to have terminated and the land shall be deemed to have terminarted and the land shall be allowed to be re-used re-developed only according to the confirming use.

ii) If a non conforming use building is damaged to the extent of 50 percent or more of its re-production value by fire, flood, explosion, earch quake, war, riot or any other naturl calamity , it shall be allowed to be re-developed only for a conforming use.

2. **PROVISIONS REGARDING USE IN MAJOR USE ZONES**

The following are the uses permitted, uses permissible if allowed in the Sector Zoning Plan or by the Chief Town Planner, Punjab in case the Sector Zoning Plan is not prepared and uses prohibited, in the areas designated for each of the major land use zones :-

A. Residential

- a) RD-1 High density : 150-200 persons per gross acres
- b) RD-2 Medium density : 100-150 persons per gross acres
- c) RD-3 Low density : Less than 100 persons per gross acre

i) Uses permissible:

- **High density:**

Residences (Plotted & Group housing), Hostels and Boarding houses, Retial shops*, Rehri market, Beauty parlaur, Boutiques, Floriculture, Educational Institutions, e.g. Kindergartens, Schools, Colleges, Libraries etc. Medical Institutions e.g. Clinics, Nursing Home/ Health centre, Dispensaries etc., Community centres, Neighborhood, Recreational uses including Clubs, Swimming pools, Parks and open spaces, Social & Cultural institutions like Theater, Auditorium etc. Religious buildings Satsang Bhavan, Public utilities, Public buildings complaint centre, related with different servies Petrol Filling Stations**, Coal/ Wood/Kerosene Oil Depot, Bus que Shelthers, Tonga/Taxi/Scooter and Rickshaw stands, Nurseries and Green houses(related to Nursery).

- **Medium density:**

In addition to uses permissible in high density zone, the following uses shall also be permitted in zone earmarked for medium density residential, commercial complex, Hotels, Sports Complex, Stadium, Entertainment Park, Amusement Park, Technical Institutes and I.T. Park.

* Retail/ convenient shopping shall be allowed only on roads with minimum width of 60 feet and with 20 feet compulsory set back which shall not be covered or enclosed by boundary wall, grill or any other material. It shall be maintained as public space. The height of such retail shopping buildings, shall not exceed three storeys(ground + two floors) The FAR and Parking shall be according to building bye-laws.

** The siting of Petrol pump shall be subject to instructions/guidelines of IRC/MORTH/TCPO /Punjab Govt. issued from time to time.

- **Low Density:**

Low density residential uses like farm houses, plotted/flatted development, marriage palaces, Restaurants, Hotels, Hospitals, Planetarium, Multi purpose cemeteries, Sports complexes, Stadiums, Museums, Auditorium, Satsang bhawan, Amusement park, Technical institute, Research institute, Water treatment plant, Guest houses, Club, Other professional and public semi-public establishments, IT parks, Aatta chakki, Convenient shopping and Service industry, Petrol pump, Gas godowns, Kerosene oil storage, Communication towers, Electric grid station, Transmission lines, Milk chilling centres etc.

ii) Uses permissible if allowed in the Sector Zoning Plan or to be allowed by the Chief Town Planner, Punjab after special appeal in case the Sector Zoning Plan is not prepared.

Commercial offices, Shopping centres, Local service industries, Cottage establishments, Electronics and Computer- related establishments, Professional establishments, offices of professionals.

iii) Uses prohibited:

All uses not specifically permitted in (i) and (ii) above.

Note:

Public and semi public activities shall not be permissible on roads having ROW less than 60 ft. Ground coverage, FAR, Height, Parking standards and other norms shall be as per norms applicable to that area.

3. The siting of Petrol pump shall be subject to instructions/guidelines of IRC/MORTH/TCPO /Punjab Govt. issued from time to time.

B. Commercial

i) Uses permissible:

Retail and whole sale shops, Departmental stores, Super markets, Shopping malls, Multiplexes, Business showrooms, Hotels, Motels, Transit boarding houses like Dharamshalas, Tourist houses, Restaurants, Commercial buildings, Commercial establishments and their ancillary uses, Warehouses, Storages, Business and Professional establishments, Offices, Banks and Financial institutions, Libraries, Museums, Parks, Open air theatres, Trade fair buildings, Social- cultural and welfare institutions, Cinemas, Theaters, Clubs, Newspapers printing presses, Roofed storages for retail business, Public and Semi-public uses and Recreational uses, Entertainment places, Public buildings, Police beat box, Automobile showrooms with no service centre, Loading and unloading yards, Parking spaces, Bus stops, Taxi/ Tonga/ Rickshaw/Scooter stands.

- ii)** Uses permissible if allowed in the Sector Zoning plan or to be allowed by the Chief Town Planner, Punjab after special appeal in case the Sector Plan is not prepared:-

Atta chakkis, Service establishments, Petrol filling stations *and Service garages, Local service industries, Bus terminals, Residences provided they are located on first and higher floors.

* The siting of Petrol pump shall be subject to instructions/guidelines of IRC/MORTH/TCPO /Punjab Govt. issued from time to time.

iii) Uses prohibited

All uses not specifically permitted in (i) And (ii) above.

C. Industrial

i) Uses permissible:

• Light & Service Industry Zone:

All types of light & service Industries, newspaper printing presses, I.T.Parks, Knowledge Park, Industrial Parks, public utilities, public buildings, warehouses and covered storages for industries, residences for watch & ward staff, Warehouses, godowns, Rice Mill, workshops/garages, loading and unloading yards, truck terminals, tempo/taxi stands, bus que shelters, health institutions, dispensaries, Restaurants, Petrol Filling/service Stations*, Police beat box.

• Medium & Heavy Industry Zone:

In addition to uses permissible in above zone all types of medium & heavy industries which are not otherwise objectionable, junkyards, playgrounds, disposal works, power plants, Govt./Semi-Govt./Pvt. Business offices, financial institutions, helipads, medical centres, religious buildings, gas works, farming/quarrying.

*

The siting of Petrol pump shall be subject to instructions/guidelines of IRC/MORTH/TCPO /Punjab Govt. issued from time to time.

ii) Uses permitted if allowed in the Sector Zoning Plan or to be allowed by the Chief Town Planner after special appeal in case the Sector Zoning Plan is not prepared.

Fuels storages, LPG Godowns, Retail shops, Hotels, Hospitals, Institutions, Guest houses, Community centres, Service complaint centres, Recreational facilities, Railway siding yards, Container Yards, junk yards and industrial research centres.

All types of industries permitted in the designated land Use Zone are subject to the fulfillment of requirements of different departments.

iii) Uses prohibited-

All uses not specifically permitted in (i) and (ii) above.

D Traffic & Transportation and Communication.

i) Uses permissible:

Rail yards, Railway station & sidings, Transport nagar, Truck stand, Bus Terminus & depot, Petrol Filling Station & Service garages, Parking spaces,

Bus stop shelter, Taxi/ Tonga/ Rickshaw/Scooter Stands, Post & Telegraph offices & Telephone exchange, Broad casting station, Television Station, Metro Station, Dhabas, Labour yards.

- ii) Uses permissible if allowed in the Sector Zoning Plan or to be allowed by the Chief Town Planner, Punjab after special appeal in case the Sector Zoning Plan is not prepared.

Areas for loading and unloading, Stores, Depots, and Offices of goods booking agencies, public utilities and buildings.

iii) Uses Prohibited

All uses not specifically permitted in (i) and (ii) above.

E. Public and semi-public facilities.

i) Uses permissible:

Governmental and semi governmental offices, Governmental administrative centres, Secretariate, Educational- Cultural and Religious institutions including Theaters, Auditoriums etc. Medical Health Institutions, Community Centres, Defence lands, Government land, Panchayat lands, Banks, Police Stations.

- ii) Uses permissible if allowed in the Sector Zoning Plan or to be allowed by the Chief Town Planner, after special appeal in case the Sector Zoning Plan is not prepared.

Areas for loading and unloading ,Stores,Depots andOffices of goods booking agencies, Public utilities and buildings. Residences and other uses incidental to main use.

iii) Uses prohibited

All uses not specifically permitted in (i) and (ii) above.

F. Recreational

i) Uses permissible:

Parks, Buffer zones, Parkways and Open spaces, Community centres, Sports stadium, Swimming pools,Gardens and other recreational uses requiring extensive open space, Building ancillary to recreational use, Mela grounds and Camping grounds, Amusement parks, Play grounds, Public buildings, Public utilities & services, Exhibition ground, water sports, Golf courses,Golf ranges, Food courts,clubs.

- ii) Uses permitted if allowed in the Sector Zoning Plan or to be allowed by the Chief Town Planner after special appeal in case the Sector Zoning Plan is not prepared.

Theatres, Public assembly halls, Restaurants, and Eatable shops, Public utilities and facilities and uses incidental to Recreational use, Tonga/ Rickshaw/ Taxi/ Scooter stands and Bus stops.

- iii) Uses prohibited-

- i) All uses not specifically permitted in (i) and (ii) above.

G. Governmental

- i) **Uses permissible:**

Local Municipal State and Central government offices, uses for defence purposes, Research institutions, Social and Cultural institutions, Tonga/cooter/ Rickshaw /Taxi stand, Bus stops and Railway passenger stations, public utilities and Building, Local municipal facilities incidental to public offices and other government uses, and other government lands, Petrol filling stations.*

* The siting of Petrol pump shall be subject to instructions/guidelines of IRC/MORTH/TCPO /Punjab Govt. issued from time to time.

- ii) Uses permissible if allowed in the Sector Zoning Plan or to be allowed by the Chief Town Planner after special appeal in case the Sector Zoning Plan is not prepared-

Retail shops and service uses, restaurants and Entertainment places, communication towers.

- iii) **Uses prohibited**

All uses not specifically permitted in (i) and (ii) above.

H. Mixed Land Use

- i) **Uses permissible:**

All types of Public utilities and Public buildings, Regional level entertainment places, Residential use(plotted/flatted), commercial uses like Shopping malls, Multiplexes, Information technology software parks, Institutes, Hotels, Motels, Hospitals, Clinics, Amusement parks, Rides, Water sports, Green houses, Nurseries, Mela grounds, Warehouses, Marriage palaces, Bus terminals, Truck terminals, Check

barriers, Weigh bridges Buffer zones, Electric grid stations, Residences for watch & ward staff, Petrol pumps and Filling Stations.

ii) Uses permissible (In Existing Area)

The following four broad types of mixed use shall be permissible in residential premises:

a) Commercial activity

Vegetables, fruits, flowers, Bakery items, Confectionary items, Karyana, General store, Dairy product, Stationery, Books, Gifts, Book binding, Photostat, Fax, SID, PCO, Cyber café, Call phone, Booths, LPG booking office, Showroom without LPG cylinders, Atta Chakki, Meat, Poultry and Fish shop, Pan shop, Barbershop, Hair dressing saloon, Beauty parlour, Laundry, Dry cleaning, Ironing, Sweet shop, Tea stall without sitting arrangement, Chemist shop, Clinic, Dispensary, Pathology lab, Optical shop, Tailoring shop, Electrical, Electronic repair shop, and Photo studio, Cable TV, DTH Operation, Hosiery, Readymade, Garments, Cloth shop, ATM, Cycle Repair Shop, Ration shop & Kerosene Shop under PDS.

(b) Industrial activity

Uses permissible:

As permitted by Punjab Pollution Control Board in non industrial zones (except approved residential areas) shall be permissible in the industrial mix zone subject to the condition that obnoxious, hazardous, inflammable, non compatible and polluting substance or process shall not be permitted.

(c) Other activity

Uses permissible

The following public and semi-public activities shall also be permitted in the residential plots abutting roads of minimum ROW 13.5 mts. or above, whether or not the road is notified as mixed use street except in approved residential colonies.

Primary/Sr. Secondary school (including nursery/Montessori school, creche), Nursing home, Clinic, dispensary, pathology lab and diagnostic

center, Bank, Fitness center (including gymnasium, yoga/meditation centre), Coaching centre, tuition centre other than those imparting structured courses leading directly to the award of a degree or diploma

Note:

i) The development of above mentioned public and semi public activities w.r.t. plot size, ground coverage, height, F.A.R., parking etc shall be regulated by the building byelaws of the concerned Local Body/ GLADA as the case may be.

ii) It shall be the responsibility of the plot owner/ Allotee to make arrangements for parking so that the parking does not encroach / spill over on public land.

(d) Professional activity

Uses permissible:

Subject to the general terms and conditions governing mixed use professional activity is permissible in plotted development and group housing under the following specific conditions:

a) Professional activities shall mean those activities involving services based on professional skills namely Doctor, Lawyer, Architect, and Chartered Accountant, Company secretary, Cost and Works Accountant, Engineer, Town Planner, Media professionals and documentary Film maker.

b) In group housing, and plotted development with multiple dwelling units, professional activity shall be permitted on ground floor subject to maximum of 25% of the permissible or sanctioned FAR, whichever is less. .

ii) Uses permitted if allowed in the Sector Zoning Plan or to be allowed by the Chief Town Planner, Punjab after special appeal in case the Sector Zoning Plan is not prepared.

Institutional buildings and residences sub- servient to the uses permitted.

iii) **Uses prohibited.**

All uses not specifically permitted in (i) and (ii) above.

I**Utilities****Uses Permissible:**

Water supply, drainage, storm water ,solid waste disposal, electricity,communication systems and related installations.

Uses prohibited

Any other use other than the specific reservation

J**Agriculture & Water Bodies:****i)****Uses permitted:**

Agricultural, Horticulture, Dairy, Piggery, Fishing, Poultry Farming, Milk Collection Centres, Chilling Stations and Pasteiozation plants, Rice Shellters, Brick Kiln, Lime Kiln, Charcoal Kiln, Processing of fsarm products, Cold storage, Farm houses, Retial shops, service industry within village Abadi Deh or the extended belt of phirnis, places of worship, Railway stations, Bus stop and parking area Mela grounds and Camping grounds, Public building and utilities inmcluding Electirc sub- stations, transmission and telephonenumber lines and ploes ,surface drainage, water bodies including irrigation canals, Afforestation including orchards, gardens and Commercial timber, Land preservation and conservation measures such as Strage, Check dams, Taming of rivulets and hill streams and other water harvesting measures Social infrastructure like schools, Dispensaries, Panckayat ghars, Dharamshalas and any other project of Central and State Govt. agencies/Deptt/ Undertakng/ Local Bodies.

ii)

Uses permissible if allowed in the Sector Zoning Plan or to be allowed by the Chief Town Planner after special appeal in case the Sector Zoning Plan is not prepared.

Tele communication towers and stations, Rural purchase centres and Focal points.

iii)

Uses prohibited-

All uses not specifically [permitted in (i) and (ii) above.

K**No Manufacturing Zone**

No manufacturing and processing industrial units shall be allowed.

ANNEXURE-I

POPULATION PROJECTIONS

With a view to determine the existing and the future requirement of infrastructure, services, housing, trade and commerce, traffic and transportation and the extent of the area to be used for urbanization and planning, it will be critical to understand and estimate the extent of population which is going to become the integral part of the Ludhiana Metropolis. Estimation of population becomes important for understanding and estimating the growth mechanism of the city and its requirement. Accordingly, it becomes important that various factors are taken in account while making these estimates. For making the projections, the average growth rate of the last three decades have been made as the basis. In order to arrive at realistic population projection it will be important that population estimates are based on more than one mechanism. Accordingly, four different methods have been used for population projection. These include :-

- Arithmetical progression method
- Geometrical progression method.
- Incremental increase method
- Graphical progression method.

Considering the wide variations of population figures achieved by these methods, a system of averages has been adopted. Further, population projections have been made for a block of 5-years with the base year 2001 unto 2021

					Decade			
Initial year	=	2006			0.5			
Intermediate stage	=	2011			1			
Ultimate stage	=	2016			1.5			
		2021			2			
		2026			2.5			
Year	Population	Increment	Rate of Growth	Incremental Increase				
1971	401176							
1981	607052	205876	0.513					
1991	1042740	435688	0.718	229812				
2001	1398467	352313	0.338	-83375				
Total		993877		146437				
Number of Decade =	3							
(A) ARITHMETICAL PROGRESSION METHOD								
Increase in Population in 3 Decade	=	993877						
Increase per Decade	=	331292						

Population for Base year 2006	=	Population in 2001+ Increase for 0.5 decades
	=	1398467 + 0.5 X 331292
	=	1560699
Population for Intermediate stage 2011	=	Population in 2001+ Increase for 1 decades
	=	1398467 + 1 X 331292
	=	1726345
Population for Ultimate stage 2016	=	Population in 2001+ Increase for 1.5 decades
	=	1398467 + 1.5 X 331292
	=	1891991
Population for Ultimate stage 2021	=	Population in 2001+ Increase for 2 decades
	=	1398467 + 2 X 331292
	=	2057637
Population for Ultimate stage 2026	=	Population in 2001+ Increase for 2.5 decades
	=	1398467 + 2.5 X 331292
	=	2223283
(B) GEOMETRICAL PROGRESSION METHOD		
Geometric mean , r_g	=	$(0.513 \times 0.718 \times 0.338)^{(1/3)}$
	=	0.50
Assuming that the future growth follows the geometric mean for the period 1971 to 2001		
r_g	=	0.50
Population for Base year 2006	=	Population in 2001 X $(1 + r_g)^{0.5}$
	=	1398467 X $(1 + 0.5)^{0.5}$
	=	1708584
Population for Intermediate stage 2011	=	Population in 2001 X $(1 + r_g)^1$
	=	1398467 X $(1 + 0.5)^1$
	=	2092580
Population for Ultimate stage 2016	=	Population in 2001 X $(1 + r_g)^{1.5}$
	=	1398467 X $(1 + 0.5)^{1.5}$
	=	2562876

ANNEXURE-II

Land use and Development Controls along Major Road Net work. (outside M.C. Limits)

Sr. No	Category of road	Width of service lane (in meters) on both sides outside M.C. Limits.	Landuse	Depth along both sides of road (in feet)	Min. size of plot (in acres)	Ground coverage	Minimum set backs (in metres)				Parking ECS/100 Sq.mtr.of built up area.
1.	National Highway Ambala-Ludhiana-Jalandhar Chandigarh-Ludhiana Ferozepur-Ludhiana (Roads with dual carriage way & Service lane)	(with 9 meters carriage way)	Commercial Mixed landuse except polluting industry (No plotted development)	500	2 Acres	40%	Front 30	Rt. 6	Lft. 6	Rear 6	Commercial-3 Institutional-1 Group Housing-2
2.	State Highway Ludhiana-Malerkotla	(with 9 meter carriage way)	-do-(with plotted development)	500	2 Acres	40%	30	6	6	6	As above
3.	Other Inter City Roads i.e. Pakhowal road, Sidhwan road, Rahon road,	(with 9 meters carriage way)	-do-(with plotted development)	500	2 Acre	40%	15	6	6	6	As above
4.	Road from Ludhiana-Ferozepur road to Pakhowal road (along Shaheed Bhagat Singh & B.R.S.Nagar Schemes.	-	-do-(No plotted Development)	500	1 Acre	*	*	*	*	*	*

- Notes:**
- All buildings above 15 meters height will have to seek permission from Fire Protection Authorities.
 - All buildings will have to be made accessible for physically challenged persons.
 - Provision for rain water harvesting has to be made.
 - Aforesaid set backs are minimum or 1/3rd of the height of the building which ever is more shall apply.
 - External Development Charges, land use conversion charges and License/Permission fees shall have to be paid as per the policy and instructions issued by Housing & Urban Development Deptt. Punjab.
 - F.A.R. will be permitted as per building bye-laws and in accordance with the policy of State Govt. as applicable at particular time.
 - Three level basement parking will be allowed which will not be counted in determining F.A.R.
 - Height permitted shall be subject to the condition of clearance of air safety norms.
 - For commercial development minimum 30 meters front would be required.
 - Front set back shall be over & above the proposed widening width, if any.
 - **On sites/portion of road which fall within municipal limits, space norms,ground coverage,set backs,height,parking and F.A.R. etc. shall be applicable as per Municipal building bye-laws.**
 - * As per Municipal Corporation guidelines/ rules.

Important: The existing R.O.W. of roads at Sr. No. 1 to 3 above are detailed in table 1 of Chapter-VII, where R.O.W. is in the range e.g.25-40 meter, future permissions shall be given after leaving R.O.W.on the highest side, for instance 40 meters in this case. Service lane of 9 meters on either side shall be after 40 meters .

ANNEXURE-III

The Noise Pollution (Regulation and Control) Rules, 2000

SCHEDULE

(See rule 5(I) and 4(I))

Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area/Zone	Limits in dB(A) Leq*	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

- Note:-**
1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
 2. Night time shall mean from 10.00 p.m. to 6.00 a.m.
 3. Silence zone is an area comprising not less than 100 metre around hospitals, educational, institutional, courts, religious places of any other area which is declared as such by the competent authority.
 4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
- * dB (A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.
- A " decibel is a unit in which noise is measured.
- "A", in dB(A) Leq denotes the frequency weighting in the measurement of the noise and the corresponds to frequency response characteristics of the human ear.
- Leq: It is an energy mean of the noise level over a specified period.

(F.No.Q-14012/1/96-CPA)
Vijay Sharma Jt. Secretary

Note: The Principal rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000.

ANNEXURE- IV

Priority wise list of Proposed Over Bridges/ Flyovers & Under Passes

Over Bridges/ Flyovers:

<u>Priority No.</u>	<u>Name/Location of Over bridge/ Flyover</u>
1.	Samrala Chowk
2.	Jodhewal Basti
3.	Intersection of Shiv Puri/Noor Wala Chowk on Bye pass Road.
4.	Intersection- Bahadurke Road Chowk on Bye pass Road.
5.	Jalandhar Bye pass on G.T. Road.
6.	Oswal Chowk on Bye Pass Road.
7.	Sherpur Chowk.
8.	Giaspura Chowk on G.T. Road near Avon Cycle Factory-Railway Crossing.
9.	Extension of Dhuri Railway Flyover upto Gill Chowk.
10.	Dehlon-Kohara Road on Ambala Railway Crossing.
11.	Railway Crossing Gobindgarh & Focal Point.
12.	On Sidhwan Canal Bridge Chowk-Ferozepur Road.
13.	Sidhwan Canal- Malerkotla Bridge.
14.	On Sidhwan Canal Ferozepur Railway Crossing and Pakhowal Road Junction.
15.	Sidhwan Canal Dugri Bridge.
16.	On Dhuri Railway Line Along Sidhwan Canal.
17.	Gill Road near A.T.I.
18.	Grain Market- Railway Crossing.

Under Passes

<u>Priority No.</u>	<u>Name/Location of Under Passes.</u>
1.	Near Apollo Hospital on G.T.Road.
2.	On G.T. Road Near Dhandari Kalan Railway Over Bridge.
3.	On G.T. Road Jalandhar side- Near Green Hard School.
4.	On G.T. Road near Amaltass Hotel.
5.	On G.T. Road near Aeren Mega Project.
6.	On Pakhowal Road- Railway Crossing.
7.	Shashtri Nagar- Railway Crossing.
8.	Ferozepur Railway Crossing Near Lodhi Club.
9.	On Ferozepur Road near Ansal Plaza.
10.	On Ferozepur Road near P.A.U. (Gate No. 2)
11.	On Ferozepur Road near PUDA Bhawan.
12.	On Chandigarh Road near Jamalpur Chowk.

Government of Punjab
Department of Housing and Urban Development
(Housing Branch-I)
NOTIFICATION

The 18th July, 2007

12/45/2006-4HGI4/5553- Whereas it appears to the Governor of Punjab that to meet the challenge of rapid growth of Ludhiana City and to provide for a workable framework for comprehensive planned and regulated development, preparation of Statutory Master Plan of Ludhiana City is very essential. Hence in order to develop Ludhiana City and its surroundings in an orderly manner and to prepare its Master Plan under " The Punjab Regional and Town Planning and Development Act, 1995", the Governor of Punjab is pleased to declare the Local Planning area of Ludhiana City within the meaning of sub section(1) of section 56 of the Punjab Regional and Town Planning Development Act(Amendment) Act, 2006. The total area proposed for Local Planning area is 127122 hectares (313991.34 Acres) including Ludhiana City. 4 other urban settlements and adjoining 301 villages. The schedule of boundaries of the proposal Local Planning area is as under:-

SCHEDULE OF BOUNDARY

NORTH: - Starting clockwise from point `A' which is the North-Western common meeting of the boundaries of District Ludhiana and District Jalandhar towards East along the Western boundaries of village Mau (H.B 111) of tehsil Philaur Distt. Jalandhar, village Burj Kalan (1-1:13. No.110) of tehsil Philaur Distt. Jalandhar upto the Northern boundary of village Mau (H.B.No.111). Thence along the Northern boundary of village Mianwal (H.B.No. 122), village Bhaini (H.B. No. 123), village Gane Pind (H.B. No.124), village Nangal (H.B. No. 130), village Ramgarh (H.B.No. 131),village Panj Dhera (H.B. No. 132), Philaur town (H.B.No. 153),village Chhaule (H.B. No. 155), village Jhugian (H.B. No. 157),village Fatehgarh Lakha (H.B.No.158),village Kariana (H.B.No.168), village Raipur Arian (H.B.No. 170),village Salikian (H.B.No.171), village Pawar(H.B. No.172 and

village Lasara(H.B. No.173) upto point which is the common meeting point of boundaries of Distt. Ludhiana and District Jalandhar and District Nawan Shahar. Thence from Point 'B' towards east along the common boundaries of District Ludhiana and District Nawan Shahar upto Point 'C' which is the North-Eastern meeting point of boundaries of District Ludhiana and Distt. Nawan Shahar.

EAST: Thence from point 'C' towards South along the Eastern boundaries of Village Chounta (H.B. No. 26), Village Miani (H.B. No. 18), Village Rattangarh (H.B. No. 19), Village Kishanpur Alias Kum Khurd (H.B. No. 199), Village Panjeta (H.B. No. 209), Village Kot Gangurai (H.B. No. 210) and Village Nilon Kalan (H.B. No. 85), upto point 'D' which is the common meeting point of village boundary of Nilon Kalan (H.B. No. 85) and Southern side of Ludhiana-Chandigarh Road.

SOUTH: Thence starting from point 'D' towards West along the Southern boundaries of Village Nilon Kalan (H.B. No. 85), Village Nilon Khurd (H.B. No. 339), Village Bohapur (H.B. No. 340), Village Katani Kalan (H.B. No. 212), Village Begowal (H.B. No. 251), Village Malhipur (H.B. No. 247), Village Kaddon (H.B. No. 246), Village Deep Nagar (H.B. No. 242), Village Landha (H.B. No. 224), Village Buani (H.B. No. 223), Village Raul (H.B. No. 222), Village Doburji (H.B. No. 219), Village Bhagwanpura (H.B. No. 250), Village Silon Kalan (H.B. No. 251), Village Silon Khurd (H.B. No. 252), Village Bhutta (H.B. No. 253), Village Ghawaddi (H.B. No. 268), Village Bool (H.B. No. 319), Village Kaing (H.B. No. 318), Village Sayan Khurd (H.B. No. 317), Village Qila Raipur (H.B. No. 315), Village Assi Kalan (H.B. No. 283), Village Narangwal (H.B. No. 306), Village Ballawal (H.B. No. 305), Village Chaminda (H.B. No. 304), Village Sahauli (H.B. No. 426), Village Budhel (H.B. No. 87), Village Boparai Kalan (H.B. No. 88), Village Dhat (H.B. No. 108) and Village Morkarima (H.B. No. 109) upto point 'E' which is the common meeting point of village boundary of Morkarima (H.B. No. 109) and Western side of Ludhiana Ferozepur Road.

WEST: Thence starting from point 'E' towards North along the Western boundaries of Village Mor Karima (H.B. No. 109), Village Talwandi Khurd (H.B. No. 76), Village Khanjarwal (H.B. No. 75), Village Chak Kalan (H.B. No. 138), Village Bhattian (H.B. No. 136), Village Hambran (H.B. No. 2) and Village Khaira Bet (H.B. No. 127), upto point 'A' which is the starting point. The boundaries of Local Planning Area around Ludhiana City are specifically shown on the drawing No. DTP(L) 2/2007 dt. 30.03.07. All the provisions laid down u/s 56(2) of the "The Punjab Regional and Town Planning and Development (Amendment) Act, 2006 and all the concerned rules framed under this Act have been taken into consideration.

Place: CHANDIGARH
Date: 17.7.07.

Sd/-
(ARUN GOEL, I.A.S.)
Secretary to Government of Punjab,
Housing & Urban Development Deptt.

LIST OF TOWNS & VILLAGES FALLING IN
"LOCAL PLANNING AREA" LUDHIANA

Sr. No.	Village/Town Name	H.B. No.	Area (Hect.)	Population		Remarks
				2001	2007	
1	2	3	4	5	6	7
1.	Ludhiana Municipal Corporation.	—	15937	1398467	1611903	
2.	Sahnewal, Nagar Panchayat	—	500	17293	24796	
3.	Doroha. Municipal Council	—	600	18986	24624	
4.	Mullanpur Nagar Panchayat	—	688	13949	16236	
5.	Chaminda	304	360	3124	3944	
6.	Dhaipai	303	538	2490	2654	
7.	Ballowal	305	522	2114	2307	
8.	Jodhan	302	792	5308	6572	
9.	Rattan	301	234	1104	1266	
10.	Chhokar	300	112	604	643	
11.	Mansurran	290	667	3276	3473	
12.	Shahzad	289	194	1202	1269	
13.	Dolor Kalan	288	588	2164	2314	
14.	Dolon Khurd	287	172	907	975	
15.	Beelah	284	372	1508	1654	
16.	Jassowal	282	555	3126	3274	
17.	Chupki	272	164	249	300	
18.	Assi Kalan	283	845	2297	2318	
19.	Narangwal	306	491	2736	2945	
20.	Qila Raipur	315	1605	5665	5850	
21.	Sayon Khurd	317	175	1038	1 152	
22.	Alamgir	273	743	3383	3731	
23.	Dhandra	274	1142	4770	6519	

1	2	3	4	5	6	7
24.	Himayumpur	285	199	1707	1793	
25.	Kheri	281	306	1622	1722	
26.	Jhameri	286	118	491	505	
27.	Mehmoodpura	275	160	605	650	
28.	Mankowal	276	164	571	650	
29.	Thakarwal	280	312	2424	2936	
30.	Dugri	277	56 Partial	Population included in M.C.Ludhiana	Population included in M.C.Ludhiana	The reest of the area of this Revennew Estate falls in Municipal Corporation,Ludhiana (Sr.No.1)
31.	Phullanwal	278	162 Partial	3356	3630	-do-
32.	Dad	279	529	3827	5025	
33.	Tharike	156	484	8884	12870	
34.	Jhande	293	388	1855	1956	
35.	Alakgarh Alias Lalton Khurd	292	219	1456	15892	
36.	Baddowal	294	972	6052	7476	
37.	Lalton Kalan	291	1119	4621	4651	
38.	Pamali	299	246	3210	4236	
39.	Pamal.	298	731	1734	1800	
40.	Hassanpur	297	259	2354	2430	
41.	Bhanohar	296	520	2233	2270	
42.	Jangpur	423	252 Partial	2692	2877	The rest of the area of this Revenue Estate falls in Nagar Panchayat, Mullanpur.(Sr.No.4)
43.	Rurka	424	518	2013	2135	
44.	Khandur	425	792	3250	3510	
45.	Sahauli	426	1095	3010	3098	
46.	Mohi	422	1260	4953	5149	
47.	Hissowal	81	465	2016	2100	
48.	Budhel	87	153	969	1095	
49.	Boparai Kalan	88	1007	3792	3834	
50.	Rakba	79	715 Partial	3334	3414	The rest of the area of this Revenue Estate falls in Nagar Panchayat Mullanpur (Sr. No.4)
51.	Dhat	108	422	1993	2111	
52.	Pandori	78	300	1523	1600	
53.	Mor Karima	109	360	1212	1245	

1	2	3	4	5	6	7
54.	Mandiani	77	812	3103	3283	
55.	RTalkwandi KJhurd	76	627	2083	2174	
56.	Khanjarwal	75	209	905	938	
57.	Mullanpur	140	860 Partial	4048	7277	The rest of the area of this Revenue Estate falls in Nagar Panchayat Mullanpur(Sr. No.4)
58.	Dhaka	142	1371 Partial	5623	6134	-do-
59.	Kailpur	141	333	1768	1908	
60.	Baraich	139	347	947	997	
61.	Gahaur	143	340	1490	1676	
62.	Dewatwal	144	376	2208	2471	
63.	Bains	145	294	1483	1595	
64.	Karimpura	295	79	146	170	
65.	Ayali Kalan	155	560	3442	3935	
66.	Jhamat	154	238	965	1030	
67.	Ayali Khurd	153	300	2285	2472	
68.	Birmi	146	761	1702	1893	
69.	Basaimi	134	264	513	651	
70.	Isewal	135	469	1927	2000	
71.	Bhattian	136	305	1125	1201	
72.	Chak Kalan	138	783	1952	2004	
73.	Changan	137	261	742	795	
74.	Jassian	101	111 Partial	2155	2736	The rest of the area of this Revenue Estate falls in M.C. Ludhiana (Sr.No.1)
75.	Hambran	2	1177	3111	3470	
76.	Salempur	132	221	376	423	
77.	Phagla	133	410	545	616	
78.	Ghaunspur	131	310	821	1033	
79.	Gorha	130	175	251	402	
80.	Burj Lambra	129	145	165	215	
81.	Khaira Bet	127	1526	29018	2201	
82.	Burj Maj Kuar	128	165	152	200	
83.	Nurpur Bet	123	1292	3153	3396	
84.	Bagga Kalan	122	367	351	358	
85.	Charh	121	149	1009	1167	

1	2	3	4	5	6	7
86.	Kharak	120	593	Uninhabited	Uninhabited	
87.	Gorsia	124	198	202	300	
88.	Rajapur	126	215	464	514	
89.	Bholewal Jadid	125	262	226	330	
90	Majara Kalan	119	221	19	90	
91.	Bholewal Qudim	118	185	344	233	
92.	Alowal	117	378	485	650	
93.	Karaike	116	69	Uninhabited	Uninhabited.	
94.	Goindwal	115	153	65	80	
95.	Chhole	114	189	Uninhabited	Uninhabited	
96.	Manewal	113	110	144	172	
97.	Rajowal	112	342	1182	1318	
98.	Bagga Khurd	111	250	486	500	
99.	Qutabewal Gujran	110	202	1834	2087	
100.	Bonkar Dogram	109	242	2038	2522	
101	Talwandi Khurd	108	34	106	116	
102.	Barelwal Dogran	107	126	274	277	
103.	Ladian Khurd	106	219	1058	1062	
104.	Ladian Kalan	105	277	774	900	
105	Chuharpur	104	217	480	509	
106.	Balloke	103	178	1380	1921	
107.	PartapSingh Wala	151	212 Partial	4960	6803	The rest of the area of this Revenue Estate falls in M.C. Ludhiana (Sr.No.1)
108.	Fatehpur	152	111 Partial	281	300	-do-
109.	Baranhara	150	265	823	1006	
110.	Talwara	149	358	769	872	
111.	Jainpur	148	270	604	705	
112.	Malakpur	147	480	1561	1739	
113.	Hussainpura	100	86	581	600	
114.	Rajpura Dogran	99	168	452	705	
115.	Manj	97	87	152	171	
116.	Phaguwal	98	80	259	311	
117.	Ladhuwal	96	141	3512	3982	
118.	Majara Khurd	95	89	128	170	
119.	Talwandi Kalan	94	243	1276	1524	
120.	Fatehgrah Gujran	93	168	643	798	

1	2	3	4	5	6	7
121.	Qutabewal Araian	92	222	685	801	
122.	Qadian	91	214	344	370	
123.	Bhattian Dogran	89	263 Partial	4149	4689	The rest of the area of this Revenue Estate falls in M.C. Ludhiana (Sr.No.1)
124.	Bahadurke	86	277	2510	3316	
125.	Kasabad	85	972	1671	1742	
126.	Jamalpur Leli	84	323	1180	1210	
127.	Sujaat Wala	83	456	679	706	
128.	Kanjea	82	278	1171	1263	
129.	Nurwala	81	336	1142	1158	
130.	Kakowal	80	101 Partial	1437	1670	The rest of the area of this Revenue Estate falls in M.C. Ludhiana (Sr.No.1)
131.	Bajra	76	360	3729	5031	
132.	Dheri	75	338	1155	1245	
133.	Chuharwala	74	221	1191	1255	
134.	Sattowal	73	223	459	480	
135.	Sirah	72	403	1501	1599	
136.	Meharban	71	296	3398	4327	
137.	Jahangirpur	70	127	2262	3371	
138.	Bhoda	69	19	36	48	
139.	Kakka	68	297	909	1040	
140.	Dhoula	67	228	575	633	
141.	Rawat	66	142	479	505	
142.	Khawajke	65	241	779	820	
143.	Mangat	64	502	2723	3440	
144.	Boont	63	313	30	50	
145.	Sasrali	62	486	2259	3278	
146.	Gadapur	61	116	314	354	
147.	Gonsgrah	60	481	821	834	
148.	Hawas	59	465	1016	1134	
149.	Mangli Qadar	58	91	67	90	
150.	Jiwanpur	57	191	947	1121	
151.	Khasi Khurd	56	49	601	681	
152.	Kariana Khurd	55	169	829	923	
153.	Kariana Kalan	54	436	101	1050	
154.	Jaspal Kadar	53	120	476	755	

1	2	3	4	5	6	7
155.	Mianwal	52	255	1206	1305	
156.	Walipur	51	120	467	544	
157.	Mangli Tanda	49	122	1848	2036	
158.	Boothgrah	48	277	2622	2999	
159.	Raur	47	246	1792	1953	
160.	Burj Matewara	46	183	55	70	
161.	Mattewara	45	1022	1356	1638	
162.	Mangli Khas	50	104	594	799	
163.	Garhi Fazal	44	253	490	576	
164.	Sheikhewal	43	219	Uninhabited	uninhabited	
165.	Machhian Kalan	41	377	2256	2591	
166.	Solkian	42	206	228	258	
167.	Machhian Khurd	40	170	428	451	
168.	Bounkar Gujran	39	244	1368	1510	
169.	Bhaini Salu	38	490	735	741	
170.	Bora	36	231	990	1083	
171.	Jhugian Began	37	51	346	393	
172.	Garcha	35	142	333	381	
173.	Haider Nagar	34	298	168	231	
174.	Salempur Bet	33	182	305	350	
175.	Kalewal	32	79	272	380	
176.	Dholanwal	31	192	1722	2050	
177.	Gopalpur	30	74	131	144	
178.	Mand Chounta	27	430	516	734	
179.	Chounta	26	611	1971	2324	
180.	Jhugian Qadar	25	115	476	605	
181.	Bhaini Doaba	24	245	703	770	
182.	Bhaini Kima	23	92	325	363	
183.	Bhaini Nathu	22	156	387	404	
184.	Bhaini Gahi	21	177	551	631	
185.	Gujjarwal	20	170	549	357	
186.	Rattangarh	19	246	543	604	
187.	Miani	18	664	880	1012	
188.	Bhamian Khurd	180	216	1101	1479	
189.	Bhamian Kalan	181	578	5199	7430	
190.	Tajpur Bet	182	266	810	970	
191.	Khasi Kalan	183	957	2228	2461	
192.	Bhukri Kalan	184	351	1158	1255	

1	2	3	4	5	6	7
193.	Bhukri Khurd	185	283	324	333	
194.	Dhanasu	186	707	1546	1744	
195.	Bhudewal	187	443	967	1065	
196.	Paharu Wal	188	175	548	619	
197.	Mehlon	189	265	1206	1644	
198.	Lakhowal	190	348	1049	1220	
199.	Gaddowal	191	419	812	832	
200.	Bhagpur	192	277	1296	1449	
201.	Karor	193	218	206	250	
202.	Gumait	194	216	524	561	
203.	Kum Kalan	195	1189	2162	2200	
204.	Raian	196	452	1898	2140	
205.	Bhani Sahib	197	312	2011	2307	
206.	PartapGarh	198	174	800	936	
207.	Kishanpur Alias Kum Khurd	199	394	1103	1485	
208.	Panjeta	209	409	1595	1677	
209.	Kot Ganjurai	210	700	2150	2283	
210.	Katani Khurd	211	94	848	881	
211.	Nilon Kalan	85	325	962	1024	
212.	Katani Kalan	212	543	2626	2999	
213.	Chhandara	213	220	2236	2524	
214.	Laton Dana	214	157	734	843	
215.	Laton Joga	215	85	567	625	
216.	Chak Sarwan Narh	216	166	662	710	
217.	Hiran	217	306	1482	1717	
218.	Panglian	218	142	1340	1694	
219.	Barwala	219	273	2059	2370	
220.	Kanech	220	333 Partial	3183	3484	The rest of the area of this Revenue Estate falls in M.Council, Doraha.(Sr.No.3)
221.	Bir Sahnewal	221	173	495	583	
222.	Bhairo Munna	222	361	2820	3177	
223.	Mangarh	223	283	1209	1319	
224.	Kohara	224	370	2827	3337	
225.	Jandiali	225	709	4062	4784	
226.	Kotla	226	82	466	651	
227.	Mangi Unchi	235	235	1185	1264	

1	2	3	4	5	6	7
228.	Ramgarh	236	388	2484	2720	
229.	Sahibana	237	571	2302	2474	
230.	Jhabewal Alias Bholapur	238	294 Partial	1834	2409	
231.	Mundiana Khurd	240	81 Partial	2636	3037	The rest of the area of this Revenue Estate falls in M.C. Ludhiana (Sr.No.1)
232.	Mangli Nichi	239	91 Partial	1625	1755	-do-
233.	Gobindgarh	243	92 Partial	2611	3181	-do-
234.	Kanganwal	245	132 Partial	506	700	-do-
235.	Pawa	246	172 Partial	1881	2352	-do-
236.	Khakat	234	131 Partial	1085	1257	-do-
237.	Mundian Kalan	179	147 Partial	Population included in M.C.Ldh.		-do-
238.	Nandpur	233	142 Partial	Population included in Sahnewal Nagar Panchayat.		The rest of the area of this Revenue Estate falls in Nagar Panchayat Sahnewal (Sr.No.2)
239.	Sahnewal Kalan	227		Population included in Sahnewal Nagar Panchayat.		-do-
240.	Dharaaur	232	375	2670	3011	
241.	Umedpur	231	261	2020	2208	
242.	Majra	230	193	1198	1280	
243.	Bilga	229	374	1766	1915	
244.	Sahnewal Khurd	228	213	1259	1494	
245.	Nilon Khurd	339	302	913	968	
246.	Boha pur	340	174	661	775	
248.	Rampur	249	127 Partial	6116	6165	The Rest of the area of this Revenue Estate falls in M.Council, Doraha (Sr. No.3)
249.	Jaipura	245	215 Partial	1216	1266	-do-
250.	Deep Nagar	242	465	1346	1476	
251.	Landha	224	242	1126	1166	
252.	Buani	223	571	2057	2214	
253.	Raul	222	245	825	912	
254.	Rajgarh	243	582 Partial	3306	3496	The Rest of the area of this Revenue Estate falls in M.Council, Doraha (Sr. No.3)

1	2	3	4	5	6	7
255.	Ajnaud	221	314	1182	1231	
256.	Doburji	219	407	1286	1372	
257.	Dugri	220	346	990	1107	
258.	Bhagwanpura	250	138	362	404	
259.	Silon Kalan	251	217	1623	1868	
260.	Silon Khurd	252	211	730	799	
261.	Bhutta	253	107	2370	2500	
262.	Paddi	254	359	2685	3373	
263.	Natt	247	217	1518	1600	
264.	Harnampura	248	239	1746	2076	
265.	Tibba	249	246	1200	1310	
266.	Jassar	255	303	1130	1224	
267.	Khanpur	256	675	3341	3609	
268.	Sangowal	257	343	2365	2567	
269.	Garibnagri	258	188	Uninhabited	Uninhabited	
270.	Jaspal Bangar	259	481 Partial	2440	2640	The rest of the area of this Revenue Estate falls in M.C. Ludhiana (Sr.No.1)
271.	Gill	263	1501 Partial	15062	18444	-do-
272.	Brahman Majra	264	183 Partial	767	900	-do-
273.	Bulara	265	324 Partial	2122	2435	-do-
274.	Rania	266	310	2242	2581	
275.	Dangora	267	150	767	942	
276.	Ghawaddi	268	585	3273	3488	
277.	Jarkhar	269	193	1200	1217	
278.	Sarih	270	382	3136	3729	
279.	Doleh	271	313	1753	1806	
280.	Kaind	318	272	980	1033	
281.	Bool	319	301	989	1089	
282.	Doraha	244	348 Partial	Population included in M.C. Doraha.		The Rest of the area of this Revenue Estate falls in M.Council, Doraha (Sr. No.3)
283.	Kaddon	246	735 Partial	3393	3590	-do-
284.	Haraichan	248	293 Partial	1838	2050	-do-

1	2	3	4	5	6	7
285.	Malhipur	247	267	1567	1760	
286.	Begowal	251	466	3088	3250	
	<u>Distt. Jalandhar.</u>					
287.	Burj Kalan	110	116	361	469	
288.	Mau	111	1025	2647	2787	
289.	Mianwal	122	688	2166	2240	
290.	Bhaini	123	167	788	893	
291.	Gane Pind	124	873	3772	3977	
292.	Nangal	130	362	3867	4407	
293.	Ramgarh	131	241	1965	2554	
294.	Panj Dhera	132	346	1197	1440	
295.	Kila Phillaur	133	61	449	583	
296.	Phillaur	153	722	444	577	
297.	Achanchak	154	186	112	165	
298.	Chhaura	155	429	395	513	
299.	Jhungian	157	308	210	273	
300.	Fatehgarh Lakha	158	93	122	158	
301.	Kariana	168	993	1474	1569	
302.	Raipur Araian	170	519	1641	1777	
303.	Rajauri	169	121	171	182	
304.	Salkian	171	364	1369	1567	
305.	Pawar	172	212	557	724	
306.	Lasara	173	1592	4546	4702	
	TOTAL		127122	1922680	2218219	

Note: The population for the year 2007 has been calculated on the basis of 1991-2001 decadal growth rate of respective villages/ towns.

Sd/-
District Town Planner,
Ludhiana.

GOVERNMENT OF PUNJAB
DEPARTMENT OF TOWN AND COUNTRY PLANNING PUNJAB

Notification

The 21 July, 2011

No. 5081 CTP (Pb)/SL-65 Whereas Master Plan Ludhiana has been notified vide notification no. 7466CTP(Pb)/SL-65 dated 12/9/08. Whereas certain changes were necessitated in the public interest during implementation u/s 77 of The Punjab Regional and Town Planning & Development (Amendment) Act, 2006.

The Government in consultation with The Punjab Regional and Town Planning and Development Board has approved that proposed separate Industrial uses viz light and service industries, medium and heavy industries in the Master Plan Ludhiana shall be considered as industries use only. Thus, uses permissible in Medium & heavy Industry Zone shall also be permissible in Light & Service Industry Zone.

It shall come into operation from the date of its notification.

This issues invites the approval of the Government vide memo no. 12/45/2006-4ਮਓ1(ਭਾਗ-2)/2705 Date 15-7-11

Sd/-

(K.S. Dhaliwal)

Chief Town Planner, Punjab,
Old Estate Office Building, Madhya
Marg, Sector 18-A, Chandigarh

Endst. No. 5082 CTP(PB)/SL-65

Dated Chandigarh, the, 21-7-2011

A copy is forwarded with a spare copy to Controller, Printing and Stationery Department, Punjab. Chandigarh along with soft copy (CD.) and report containing all documents with the request to publish this notification in the Punjab Government Gazette and 100 copies thereof be supplied to this Department for office use.

Sd/-

Chief Town Planner,

Punjab, Chandigarh.

Endst No.5083-CTP(Pb)/- SL-65

Dated Chandigarh, the, 21-7-2011

A copy is forwarded to Secretary, Housing and Urban Development Deptt. Punjab Chandigarh w.r.t. memo no No. 12/45/2006-4ਮਓ1(ਭਾਗ-2)/2705 Date 15-7-2011 for information

Sd/-

Chief Town Planner,
Punjab, Chandigarh

GOVERNMENT OF PUNJAB
DEPARTMENT OF TOWN AND COUNTRY PLANNING PUNJAB

Notification

The 25 August, 2011

No.6008 CTP (Pb)/SL-65 Whereas Master Plan Ludhiana has been notified vide notification no. 7466CTP(Pb)/SL-65 dated 12/9/08. Whereas certain changes were necessitated in the public interest during implementation u/s 77 of The Punjab Regional and Town Planning & Development (Amendment) Act, 2006.

Consequently Punjab Regional and Town Planning and Development Board in its 15th Meeting held on dated 6-8-2009 has approved amended alignment of Missing Link-II from Dhandra road to Sidhwan Canal (Starting from 'A' which is on Dhandra Road and then crossing Ludhiana amlerkotla Rly line upto point 'B' which is on Sidhwan Canal as shown in Drg. No. DTP(L)2/2011 dated 21-02-2011) which shall be incorporated in the Zonal Plan.

It shall come into operation from the date of approval accorded by Punjab Regional and Town Planning and Development Board's Meeting held on dated 6.8.2009.

This issues with the approval of the Government received vide memo no. 12/45/2006-441(भाग-2)/896 Date 4-4-11

Sd/-

(K.S. Dhaliwal)

Chief Town Planner, Punjab,
Old Estate Office Building, Madhya
Marg, Sector 18-A, Chandigarh

Endst No. CTP(PB)/

Dated Chandigarh, the, 2011

A copy is forwarded with a spare copy to Controller, Printing and Stationery Department, Punjab. Chandigarh along with soft copy (CD.) and report containing all documents with the request to publish this notification in the Punjab Government Gazette and 100 copies thereof be supplied to this Department for office use.

Sd/-

Chief Town Planner,
Punjab, Chandigarh.

Endst No. -CTP(Pb)/-

Dated Chandigarh, the, 2011

A copy is forwarded to Secretary, Housing and Urban Development Deptt. Punjab Chandigarh w.r.t. memo no No. 12/45/2006-441(भाग-2)/896 Date 4-4-2011 for information

Sd/-

Chief Town Planner,
Punjab, Chandigarh