2. REVIEW OF LITERATURE:

Kanpur’s origin until the thirteenth century was shrouded in the mist. Though no reference to Kanpur is found in history, two of its suburbs, Jajmau, which dates back to the Vedic age and Bithoor, where Lord Brahma performed the Ashvamedh Yajna and where the famous sage Valmiki has written the Sanskrit epic Ramayana, can be traced back to legendary times. The region covered by the present district of Kanpur was once included in the ancient kingdom of Panchala which extended from the Himalayan mountains in the north to the chambal river in the south. Kanpur’s first mention was found in 1207 AD when Raja Kanti Deo of Prayag was attached to the throne of Kannauj and established the village Kohna, which later came to be known as Kanpur. Kanpur continued its association with Kannauj during the reins of Harsha Vardhan, Bhoj, Mihir, Jai Chand and early Muslim rulers. Later it came under the Jaunpur rulers and the Sur Dynasty. The first mention of Kanpur was made in 1579 during Sher Shah’s regime. From 1773 to 1801, it was part of the Oudh kingdom. In 1801, it came under the control of the British. In 1803 Kanpur became a district and also an important military station of the country. At that time British infantry lines and the parade grounds were established in the south of Parmat. Indian infantry too occupied the space in Kanpur. The Company Bagh was laid in 1847 and the construction of the Ganga canal was commenced in 1854.

Kanpur has become an important centre during the great revolt of 1857. It was the time when Nana Saheb Peshwa succeeded in liberating the city from the British for a short period. Sati-Chauraha Ghat (Cantonment) from where the British were to leave Kanpur was a scene of a terrible conflict and consequently came to be known as Massacre Ghat; so was Bibi Ghar where some British families were taking shelter. Besides military importance, Kanpur has also made significant contribution in the literature and fine arts. The legendary Birbal, a minister in the court of Akbar and known for his wit and wisdom was born in a village, Takuapur, of Kanpur District. Various acclaimed writers and poets of Hindi literature belonged to this area. Kanpur had been the centre of patriotic Hindi magazines and newspapers such as Brahman, Saraswati, Vishwamitra, Veer Arjun and Pratap.

The waves of industrialization reached the city in 1858. The first major industry, the Harness and Saddlery, was established in 1860. Other mills such as The Elgin Mills, The Cawnpore Woolen Mills (Lal Imli at present) and the Victoria Mills were set up in 1864, 1870 and 1885 respectively. After the First World War, several mills, the Swadeshi, the JK and the Lakshmi Ratan Cotton Mills were established. The first re-rolling mill of India was
established in 1928 by the Singh Engineering Work. The Second World War gave fresh impetus to industrial complex. In the post independence years, Kanpur has changed from a town of mill owners and mill workers to that of a city consisting of large middle class population of entrepreneurs and artisans. To cope with the industrial growth a second thermal power station was built at Panki in 1966 for augmenting the older riverside power station. Panki now produces a total of 284 MW of power.

The city has gradually emerged as a dynamic city of academic importance. Kanpur’s beginning as a knowledge centre was in the mid 19th century when Christ Church College, the oldest educational institution in the city, was started as a high school and became a degree college in 1919. Modern day Kanpur is host of several institutes of repute such as Indian Institute of Technology Kanpur, two universities, viz. Kanpur University and Chandra Sekhar Azad University of Agriculture and Technology, a Medical College and technical institutions such as the National Sugar Institute, the Central Textile Institute, Harcourt butler Technological institute and the Leather Institute etc.

To understand the problems better and how to address them with target some case studies are to be done in detail where the city problems are addressed in a judicious manner. Some of these studies will include the infrastructure planning of Singapore, Curitiba and other Indian cities.

**Work done by Researchers in the field of planning Infrastructure in various cities as well as Kanpur**

Formulation of Traffic Management Strategies in Disasters by Dr. Anil Minhans in Institute of Town Planners, India Journal 7 - 2, 85 - 97, April - June 2010 describe a traffic management (TM) strategy is a collection of traffic to act management measures intended upon a given transport situation (traffic problems, special events or transport development states). Such strategies should contain mutually supportive measures; otherwise the desired impact is not obtained and often leads to counter-productive results. This paper presents TM strategies which could be implemented in special cases of disasters [1].

Disaster Management:Need of Revival in Policy Framework by Nirmita Mehrotra, Institute of Town Planners, India Journal 7-2, 98-102, April-June 2010 is a paper propagates that disaster safe neighbourhoods must be recognized as a basic human right and continued responsibility of local government. Emergency response is what most people associate with disasters. Timely, efficient and effective response relies on careful planning for quick action.
by different actors and institutions in alliance. The local bodies can be effective instruments in tackling disasters through early warning system, relief distribution, providing shelters to victims, medical assistance, etc [2].

Bio-Medical Waste Management in Shiraz City of Iran is a paper written by P. Lakbala and Dr. T. M. Mahesh, Institute of Town Planners, India Journal 8-1, 56-64, January - March 2011 tries to document the practice of biomedical wastes (eg. collection, storage, transportation and disposal) along with types and amount of wastes generated by hospitals and level of awareness and knowledge of workers/staff about bio-medical wastes. The results of a survey on medical wastes generation, and methods adopted in hospitals of Shiraz city of Iran for disposal and management of bio-medical wastes in the city are discussed [3].

Temporal Transition of Global Space:Cities in Transition , Prof. Kavas Kapadia, Institute of Town Planners, India Journal 8-1, 65-72, January-March 2011 as per the author, the most significant component of urban growth, time, is not quite clearly understood. A human settlement not only grows but develops and matures with time. Just like a person. Taking today as the time time dividing the past and the future the author tries to project what the future of the city holds for us and concludes that the future of cities is seen to be confronted with very real concerns about environmental issues such as pure air, shelter, traffic, water supply, sanitation, solid waste besides the other issues of poverty, social justice and a growing sense of insecurity [4].

Emerging Challenges in ‘Water and Sanitation’ Problems and the Need for Appropriate Human Resource Developmen by Prof. Subir Paul, Institute of Town Planners, India Journal 8-1, 73-89, January-March 2011elaborates India’s performance in improving access to safe water and sanitation (assessed under the MDG program) has been far from satisfactory compared to neighbouring countries with lower economic growth in spite of Government of India's own program 'Total Sanitation for All' and increased funding. Through a brief study of Postgraduate academic programs in 'Public Health Engineering' and 'Environmental Engineering', the author argues that it has turned into a 'backyard subject' having failed to update itself resulting in failure to produce appropriate human resources. In order to meet emerging challenges, it requires rejuvenated academic programs to attract and motivate more bright young students with wider exposure to the field, innovative pedagogy, and improved communication skills [5].
Urban Planning and Real Estate Development written by Dr. K.R. Thooyavan, Institute of Town Planners, India Journal 8-1, 90-94, January - March 2011 throws light on Urban Planning by its nature is concerned with shaping the future of urban settlements and allocation of land for residential, commercial, institutional and industrial development. Planning and development means the physical and economic growth which meets effectively the social needs of the human society. Real estate development is a field of business activity dealing with land and buildings for providing value added services in developing residential, commercial, institutional and integrated projects and related infrastructure [6].

Redevelopment of Industrial Land in Urban Areas:A Case Study of Textile Mill Land Redevelopment in Mumbai by Ramakrishna Nallathiga, Institute of Town Planners, India Journal 8_1, 95-106, January - March 2011 clearly brings forward Bombay as shown how to build the enormous potential in industrial production become one of the and almost country's backbones of industries and economy. However, concentration of industries and industrialization have also left many demands on city’s infrastructure and housing, and pressure began to mount on making the city inhabitable through shifting of industries to the outskirts. In the subsequent periods, 'decongestion, policies were laid down in the era of first regional master plan proposed both industrial as well as population decongestion, at a time when the population rise and industrialization were on move. This paper traces the changes in industrial planning and policy in Mumbai that have some important implications for the development of industrial land in cities [7].

Purushottam Kesar and Prof. S Chattopadhyay have talked about forecasting Regional Economic Potentials for Economic Regions - Special Economic Zones and Investment Regions by, Institute of Town Planners, explains Industrial development is primarily linked with increasing investments, generating employment and socio-economic development of the region. The task has gained a further significance with the increased focus of governments on specialized economic regions such as Special Economic Zones (SEZs) and Investment Regions (IRs) as the prime generators of employment and revenue. This paper tries to address the challenges faced while planning for these regions such as delineating the area and making the process inclusive [8].

Sabarmati Riverfront Development Project Wikipedia, the free encyclopaedia. Htm speaks of present, the Sabarmati riverfront lies neglected and is characterized by unplanned urban development. The river has a wide channel with encroachment by slum dwellers and others at
several places" 250/o of the city remains unanswered & wastewater is released into the river untreated. The Sabarmati riverbanks provide a place to stay & livelihood for many poor citizens [9].

Tibbalds, Francis in his Making People-Friendly Towns: Improving the Public Environment in Towns and Cities London is passing through the centre of Ahmabad city, the Sabarmati River is a major source of water for the city. The river has been subjected to severe pressure and abuse owing to the fast pace of urban and industrial growth of the city. It has been proposed to remodel and reshape the channel to a uniform smaller width and the additional land including back filling behind the river banks is to be developed as a river front with roads, parks etc [10].

Bhargava, Gopal K. Shankarlal C. Bhatt in Land and people of Indian states and union territories, 28. Uttar Pradesh. In their book proposed to remodel and reshape the channel to a uniform smaller width and the additional land including back filling behind the river banks is to be developed as a river front with roads, parks etc. The development of this riverfront can improve the quality of environment and life in Ahmabad city. To achieve this objective, the Ahmabad Municipal Corporation established the Sabarmati River Front Development Corporation Ltd. (SRFDCL) [11].

City Development Plan (2005) for Nanded, River Front Development explains Location banks of the River Godavari in the Marathwada region of Maharashtra state, Nanded is the second largest urban centre of the region (after Aurangabad) is a popular pilgrimage center for Sikhs and is visited by thousands of devotees throughout the year from all over India. Nanded city is also the District Headquarters housing all the institutions governing /administrating the district requirements. Its close proximity to large urban centers like Hydrabad, Nagpur and Aurangabad makes it an important regional center [13].

Biswa, S. K. (1987) writes about Hydrocarbon exploration in western offshore basins of India focusing on issues creating health hazard due to local industrial waste. Total area of the city is 5100 ha with population of 430733 people. Its density is 52 persons/ha. The, Nanded Waghala City Municipal Corporation (NWCMC) has proposed the riverfront development through infrastructure provision to provide good quality life to the citizens in an integrated equitable and sustainable manner. The river divides the city in nearly two equal parts and
passes through the city from the west to the east. It is the source of water supply to the city [14].

Rashmi asht (2009) elaborates the Impact of Mehrauli- Gurgaon MRT Corridor and Strategies of Development. Within a city there is an inherent relationship between accessibility[63], population Density and spatial distribution of land use activities, economic activities, transport network and activity hierarchy, between human demands, transport network, spatial activity distribution and simultaneously result in activity pattern and land use configuration unique to the urban area. These interrelationships between all these factors determine and influence a constantly evolving urban form and structure. Therefore, it is important to understand this complex relationship [15].

Barter P. And Raad T. is pointing on Taking steps: a community action guide to people-centered, equitable and sustainable transport, Sustainable Transport Action Network for Asia and the Pacific’, the SUSTRAN Network , theorists, social scientists, planners and transport engineers have tried to establish relationships between these factors i.e. spatial distribution of people and Activities, activities and land use pattern, land use pattern and transportation and so on. The mentioned literature study attempts to trace theories and definitions on urban form and structure, so as to comprehend the relationship between transport system and urban form and structure , reflected through cause and effect relationship between transport system ,on one hand and spatial distribution of activities and land use pattern, on other [16].

Schoon, J.G. (1996) Transportation Systems and Service Policy: Introduction to Planning and Design Policy, Springer Publications, New York writes and describes Spatial distribution of activities over space is closely related to land use pattern, to accessibility level provided by transportation system and to economic costs of the same. The need of the community, a self-sufficient and secure environment providing social and gender equity, having a defined boundary and sharing a common socio cultural and economic values, is characteristic of urban areas represented by activity areas. Thirdly, High level of accessibility is needed to nodes to lower the cost and travel and transport cost should also be lower. The key words that emerge from above definitions of urban form and structure are -Physical , Socio-cultural, Economic , Land use , Accessibility, Transport system , Markets ,Community , Nodes, Landmarks ,Districts, Edges ,Pathways, Administration and Traditions [17].
Dastur, A., Maruyama, H., Moffatt, S., Suzuki, H., & Yabuki, N. (2010). Eco² cities: Ecological cities as economic Cities. Washington, DC: The World Bank combat the added pressures on its water resources caused by climate change, the tiny city-state of Singapore (with its 4.8 million people) integrated its water efficiency objectives with other public and private sectors’ activities to create a comprehensive water management strategy. To control use, Singapore implemented tariffs based on usage (but subsidized use by the poor). The city-state requires rainwater collection systems for new developments and incentivizes rain catchment installation, desalinization, and waste water recycling on existing buildings [18].

Brees G. (1969) in his paper Urbanization in Newly Developing Countries, Prentice-Hall, New Delhi integrates its transportation and land use planning with its energy policies. To lower automobile use and emissions, Singaporean drivers pay as they drive, where they drive, and when they drive. A vehicle quota system was established that limits newly registered cars to only 3 to 6 percent yearly Finally, to incentivize lower use, electricity is not subsidized [19].

Helmer, Richard and Hespanol, Ivaniildo (1997) publishes a Water Pollution Control –A guide to the use of Water Quality Management Principles, Published on Behalf of the United Nations Environment Programme, the Water Supply & Sanitation Collaborative Council and the World Health Organization. Due in part to its small land area, Singapore already supports a dense population; however, its island locale also makes it more susceptible to the less subtle effects of climate change (such sea level rise). Therefore, it is in Singapore’s best interests to institute water and energy saving programs to be better prepared for the future. Like Stockholm and Curitiba, Singapore successfully integrated its urban planning efforts across municipal departments while including community and business stakeholders in the process to create truly locally supported solutions [20].

Lane, R., Powell, T. J. and Prestwood-Smith, P. (1971) in their approach in Analytical Transport Planning, Duckworth, London talks about 1983 Singapore MRTS is the largest public Project. In the first phase it passed through highly dense central area. The concept plan incorporates how orbital and radial lines in further covering about 500 kms. Development controls for development of Areas with in 200m. of MRT stations, residential development in Singapore % increase above Base Plot ratio. Less than 50% of site falling with in Boundary, allowed increase 5%, more falling with in demand Boundary, allowed increase10% [21].
Michel, C. (2007) Metro Rail increases property values in News Business Reporter, June talks about residential with commercial use on storey only. Such as shop, houses and developments with shops at 1 storey with flats above. The commercial Use & restricted to 1 storey only excluding basement. Base and Bonus Plot ratio calculation - Large Sites or closeness to MRT. Station could result in intensive comm. development-To regulate 6 pr controls of this site are based on ‘base plus bonus’ component. A Base plot ratio is to assign value to the plot. Variable increases over and about these plot ratio will be considered if the site comply with the following conditions.

a) Proximity to area within 200m. radius around MRT Station Box.

i) For sites less than 50% of site within the area of influence the allowable increase is 5%.

ii) For site with 50% or more of site within the area of influence the allowable increase is 10% [22].

Curitiba. (n.d.). Our parks are our ‘beaches.’ Retrieved July 2011 from: http://www.curitiba.pr.gov.br/idioma/ingles/nossosparques explains about Curitiba, Brazil, a metropolitan area of 3.26 million people, sought a cost effective and highly integrated approach to sustainable economic development. The city formed the Institute for Research and Urban Planning of Curitiba (IPPUC) as an independent public authority responsible for project research, planning, implementation, and management. Its efforts reflect a regionally based sustainable strategic vision that exists outside of any one mayor’s political agenda [23].

Dastur, A., Maruyama, H., Moffatt, S., Suzuki, H., & Yabuki, N. (2010). Eco² cities: Ecological cities as economic Cities. Washington, DC: The World Bank.is an effort that reflect a regionally based sustainable strategic vision that exists outside of any one mayor’s political agenda. The IPPUC coordinates efforts between government agencies, local organizations, and businesses to ensure consistency and “[path] dependency … in terms of [the] spatial, institutional, and cultural [aspects] (p. 169)” of any and all projects. New development is permitted only in areas accessible by the city’s innovative Bus Rapid Transportation (BRT) system and/or along predefined “axes” that together is an urban growth boundary to curb unplanned sprawl [24].

Fazzano, A., & Weiss, M. A. (2004) In Curitiba, Brazil: Metropolitan economic strategy report. Global Urban Development says that according to Friberg (2000), Curitiba’s BRT system cost (US) $8 to $12 million per kilometer to construct, while a typical subway costs
(US) $50 to $100 million/kilometer. The system pays for itself due to its high (45%) ridership rate; a result of its five minute service frequency, flat rate, and ubiquity. Automobile traffic is regulated to single lanes, each separated by on street parking, buildings, BRT, and pedestrian sidewalks. A consequence of its highly integrated public transportation and land use, Curitiba’s fuel usage is 30% less than other major cities in Brazil [25].

Friberg, L. (2000) in Innovative Solutions for Public Transport: Curitiba, Brazil. Sustainable Development International, elaborates transfer of development rights are used to increase green areas around rivers and throughout the city as a flood control measure. Vaz Del Bello and Vaz (2007) report that the “cost of buildings parks and relocated favela (slum) dwellers has been estimated at five times less than cost of building concrete canals.” Grass is controlled and fertilized using Sheep, resulting in an 80% savings over lawn mowers. High end housing built around parks further subsidizes park development and cost. Taxes are lowered for tree planting; slum dwellers and the poor are given bus tickets and food in exchange for removing trash (Curitiba, n.d.). Recycling is supported through city and school education and awareness programs and children are even given “school supplies, chocolate, toys, and show tickets when they collect recyclables [26].

UN Habitat, ‘Urban World: Harmonious cities India and China in focus’. A Report that says that Curitiba has managed to sustainably control sprawl while improving the economic and personal health of its citizens. According to the World Bank, the IPPUC, and Global Urban Development, none of this has negatively affected the economic freedom of investors, diminished the flow of capital, or weakened large and small businesses ability to generate wealth. A 2004 Global Urban Development Report states that Curitiba’s economy is both expanding and healthy; and unlike the rest of Brazil, income inequality is not rising [27].

Parasram, V. (2003) talks about Efficient Transportation for successful Urban Planning in Curitiba, Horizon Solutions Site Intern. GDP has grown the growth has been evenly distributed amongst all citizens, meaning that the standard of living has improved for not just the city’s wealthier citizens, but everyone. In other words, by working to mitigate and reduce the effects of climate change Curitiba has created a stable and predictable economic atmosphere [28].

Urban Environmental Management: A report from Human Settlements Management Institute, HUDCO states that the city of Stockholm, Sweden is utilizing integrated stakeholder and
resource management to be free of fossil fuels by 2050. The city promotes densification by contractually obligating developers to participate in the planning, design standards, and city environmental program elements pertinent to each development .. Graphically, the model resembles an ecosystem rather than a traditional or “linear” urban system wherein an input – be it water, a consumer product, or even heat – is discarded after use [29].

Dastur, A., Maruyama, H., Moffatt, S., Suzuki, H., & Yabuki, N. (2010). Talk about Eco cities: Ecological cities as economic Cities. Washington, DC: The World Bank. Within the Hammarby Sjostad district, all energy, water, waste, and sewage, whether residentially or commercially sourced, is recycled, cycled, and/or reused . All building materials are sustainably sourced and toxic materials avoided, water and sewage outputs are unconnected; sewage is converted into biogas which is then burnt to generate electricity (2010). Green roofs and green spaces decrease heat island effects, lower carbon, and help to filter water and avoid flooding (Dastur et al., 2010) . Food waste, combustibles, paper waste, and other outputs are all separated into vacuum powered pipes that lead to central collection locations to be composted or recycled; solar energy is used to heat water and solar panels to supplement electricity generation (Dastur et al., 2010). The city also created a life cycle assessment tool that is used to quantify the total effects of human activity on the environment [30].

Usha Mahavir,’Planning For Inclusive And Harmonious Cities’, Spatio-economic development record, elaborates the Hammarby Model has resulted in the creation thousands of permanent jobs. The city of Stockholm’s infill requirement, like Curitiba’s urban growth boundary, supports density and thus guarantees businesses a consumer population. The model streamlined development and integrated city planning, lowering private and public costs. It saves residents, business, and private interests’ money in resource use and energy cost. The model is a stable and efficient example for a new economic paradigm that can be both economically and environmentally sustainable [31].

South Asia Sustainable Development Unit, The World Bank, 13-14 September, 2006, Avari Towers, Karachi says with a current population of 1.01 million, Brisbane, Australia is one of the fastest growing cities in the world. With electricity and water demand increasing, city officials worry they will be unable to keep up. Despite these challenges, the city committed to reducing its green house gas emissions by half, “reusing all wastewater and restoring 40% of natural habitat by 2026” [33].

Dastur, A., Maruyama, H., Moffatt, S., Suzuki, H., & Yabuki, N. (2010) In their publication Eco² cities: Ecological cities as economic Cities. In the Case Study: Yokohoma, Japan elaborates Yokohoma, Japan is running out of space for its garbage. Therefore this city of 3.65 million developed a plan to reduce waste by 30% by 2010 using 2001 data as a baseline (Dastur et al., 2010) . The city began taxing pollution, to effectively “[extend pollution] producer responsibility ” to the public, private, and household sectors. A regional recycling campaign focused on waste reduction was begun that ranged from schools to train stations to community seminars to educate the public on what and how to recycle (Dastur et al., 2010). Despite Yokohoma’s continued population growth, the city reached its first waste reduction target five years early, in 2005 (Dastur et al., 2010)

Case Study : Brisbane, Australia says with a current population of 1.01 million, Brisbane, Australia is one of the fastest growing cities in the world. With electricity and water demand increasing, city officials worry they will be unable to keep up. Despite these challenges, the city committed to reducing its green house gas emissions by half, “reusing all wastewater and restoring 40% of natural habitat by 2026” [34].

Kshama Puntambekar and Dr. Ashutosh Sharma (2009), Multi-modal Public Transport System for Urban Areas: A Case of Metropolitan Cities in India, Institute of Town Planners, says Mumbai MRTS is the spine of city, handling a load of 2 million passengers daily. The modal split also shows a bend towards, Rail Based MRTS, because of Mumbai’s linear form loading to continuous chaos and congestion in spite of showing high affordability and Socio economic conditions, All most all of these MRTS. stations act as land marks. This MRTS has led to large scale transformations, mentioned further in the study [35].

Meenakshi (2009), Rethinking Street Use: A Need for Pedestrian Sensitive Planning, Institute of Town Planners, focuses The main Pedestrian movement is towards BEST Bus terminal on station road, there is equally large vol. of movement from this terminal, a large
amount of Pedestrian movement & along retail shopping on S.V. marg too. Large Open Square also caters to Modal interchange to Taxi or Auto in front of station [36].

Mohan, D.writes about Public Transportation Systems for Urban Areas: A Brief Review, Transportation Research and Injury Prevention Programme, Indian Institute of Technology, Delhi which is Located between the proposed industrial areas, Rohtak road and G.T. road Rohini developed as sub city of Delhi. It is extended over an area of 2947 ha accommodating a population of 8.5 lacs , net density 340 pph and 600 pph gross density ,existing population being 2,6 lacs .It was earlier developed for 80% LIG & EWS. As on today after MRTS[83] in place 40% households are occupied by HIG & MIG because of high land values, property transfer, violations –high far, ground coverage .Transformation of residential to commercial use, land prices high along metro corridor, because of the maximum profit returns. The Employment pattern has changed as distance to work place has increased, suburbanisation increased leading to movement away from the city [37].

Report from Central Leather Research Institute in Kanpur says that Kanpur is a metropolitan city, sprawling over an area of 260 sq km. According to the census 2001, Kanpur has a population of 25.51 lakhs. It is administratively divided into 6 zones and 110 wards with an average ward population range of 19000 to 26000 (refer Map no.1). It is situated on the southern bank of Ganga River and has been an important place in the history of modern India [38].

Report from UPPCB on leather industries in Kanpur elaborates that Kanpur is the biggest city of the State of Uttar Pradesh and is main centre of commercial and industrial activities. The City formerly known as Manchester of the country is now also called the commercial capital of the state. It is known for its cotton and woolen textile and leather industries. Kanpur is one of the biggest producers of Textile and Leather products. Apart from leather and textile industry, the fertilizer, chemicals, two wheelers, soaps, Pan Masala, hosiery and engineering industries are also operating prominently in the city [39].

Report on construction of 210 MLD Sewage Treatment Plant Kanpur, Kanpur Nagar Nigam (JNNURM) describes that Kanpur is situated on the most important national highways no. 2 & 25 and on the main Delhi-Howrah railway trunk line. Kanpur is divided into two districts
namely Kanpur -Nagar and Kanpur -Dehat. Kanpur comprises of 3 tehsil, 2 Municipal Board, 2 Nagar Panchayats and 10 statutory Towns [40].

Engineering Project, Jajmau, Kanpur: Ganga Pollution is a Report on Indo-Dutch Environmental and Sanitary status as the district lies in the Ganga basin which is formed of alluvium of the early quaternary period. In the district, no hard or consolidated rock exposures are encountered. The main constituents (sand, silt and clay) of alluvium occur in variable proportions in different sections. The mineral products of the district of saline earth from which salt petre and salt are derived and limestone conglomerates (U.P. District Gazetteers Kanpur) [41].

Silas, Sandeep (2005). Manchester of the East: Kanpur says that the Second World War gave fresh impetus to industrial complex. In the post independence years, Kanpur has changed from a town of mill owners and mill workers to that of a city consisting of large middle class population of entrepreneurs and artisans. To cope with the industrial growth a second thermal power station was built at Panki in 1966 for augmenting the older riverside power station. Panki now produces a total of 284 MW of power [42].

Singh, B.B. Chief Engineer (Ramganga), (1995-1997), Kanpur Water Supply Scheme Through Ganga Barrage, Detail Project Report, Volume I, UttarPradesh Jal Nigam points on water Supply and sewerage are also obligatory functions of Municipal Corporation as per the 12th schedule of 74th Constitution Amendment Act (CAA), in the case of Kanpur they are looked after by Kanpur Jal Nigam and Jal Sansthan. The corporation is headed by a Municipal Commissioner appointed by state government and supported by two Addl. Commissioners also appointed by the state government [43].

Singh, Harihar (1972). Kanpur is a study in urban geography points on Kanpur’s climate is characterized by hot summer and dryness except in the south west monsoon season. The climate in Kanpur can be divided broadly into four seasons. The period from March to the mid of June is the summer season which is followed by the south-west monsoon, which lasts till the end of September, October and first half of November from the post -monsoon or transition period. The cold season spreads from about the middle of November to February [44].
Singh, Surendra Nath (1999) in his publication Planning & development of an industrial town: a study of Kanpur highlights that Kanpur has traditionally been an industrial city. Prior to Independence, it was the second most industrialized city in India after Calcutta. It was called the ‘Manchester of India’[38] due to the existence of large number of cotton textile units. During British era, Kanpur was of strategic importance due to the important role which it has played during the great revolt of 1857. This led to the development of a large cantonment base at Kanpur. After independence, Kanpur continued to be an important city and large public sector companies made their existence in the city [45].

In Master plan Kanpur, 2021, TCPO Kanpur details that Kanpur has become an important centre during the great revolt of 1857. It was the time when Nana Saheb Peshwa succeeded in liberating the city from the British for a short period. Sati-Chauraha Ghat (Cantonment) from where the British were to leave Kanpur was a scene of a terrible conflict and consequently came to be known as Massacre Ghat; so was Bibi Ghar where some British families were taking shelter. Besides military importance, Kanpur has also made significant contribution in the literature and fine arts. The legendary Birbal, a minister in the court of Akbar and known for his wit and wisdom was born in a village, Takuapur, of Kanpur District. Various acclaimed writers and poets of Hindi literature belonged to this area. Kanpur had been the centre of patriotic Hindi magazines and newspapers such as Brahman, Saraswati, Vishwashmitra, Veer Arjun and Pratap [46].

Kanpur Nagar Nigam in A2Z Infra ink pact says that Kanpur Nagar Nigam today awarded the contract for door-to-door collection and transportation of municipal solid waste for the entire city of Kanpur to A2Z Infrastructure Ltd. for a period of 30 years. This contract is an extension (backward integration) to the processing and disposal of solid waste which A2Z infrastructure is currently handling for the city since May 2010 [47].

The regional urban solid waste management system: A modeling approach is written by C. Caruso, A. Colorin and M. Paruccini, CISE S.p.A., Milan, Italy, Dept of Electronics, Polytechnic of Milan, Milan, Italy CEC, Joint Research Centre, Ispra, Italy explain that the Urban Solid Waste Management System (USWMS) is intrinsically complex, because it involves different connected problems and must achieve objectives which are often in conflict. It is difficult to evaluate the various alternatives in planning and managing it. It is thus useful to use mathematical models to provide a tool describing and evaluating the
USWMS. This work concerns the development of a location-allocation model for planning USWMS and some heuristic techniques for solving it [48].

Infra Guide: Innovations and Best Practices, Developing a Water Distribution System is a National Guide to Sustainable Municipal Infrastructure Indrasini Devi (1989) describes that free Trade Unions, International Confederation for Kanpur - The Experience in Textile Industry. Infra Guide: Innovations and Best Practices, Developing a Water Distribution System (2003) is a guide that outlines potable water best practices which address various approaches to enhance a municipality’s or water utility’s ability to manage drinking water delivery in a way that ensures public health and safety at best value and on a sustainable basis. Published by the National Guide to Sustainable Municipal Infrastructure, the up-to-date technical approaches and practices set out on key priority issues will assist municipalities and utilities in both decision making and best-in-class engineering and operational techniques [49]

Evironmental Sanitation and Infrastructure: The Case of the Marginal Urban Areas of the Southern Cone of Lima written by the Authors: Kohatsu, Silvia Melendez, Fovida, Ana Granados Soledvilla, Cortez, Victor Carrasco explains Environmental Sanitation and Infrastructure as: The Case of the Marginal Urban Areas of the Southern Cone of Lima (1997) is a case study of an environmental sanitation and infrastructure project in Lima. The general objective of the project was to increase the health conditions of a sector of households in Metropolitan Lima, improving the sector's basic sanitation and the environment of its dwellings by means of effective, low-cost solutions and local concerted action. More specific objectives included improving the quality of water for human consumption and decreasing the risk of water and food contamination due to inadequate solid waste disposal. This document will be of interest to local government authorities seeking methods for improving environmental sanitation [50].

Community Participation – Solid Waste Management in Low Income Housing Projects: The Scope of Community Participation authored by the United Nations Human Settlements Programme, Singh, Surendra Nath (1999) explains that the Scope of Community Participation (1989) is a training module designed to promote community participation in waste management. The module discusses community participation in urban waste management and highlights the key factors in community waste management, such as collection options, transportation choices, storage requirements, recycling and financing.
Illustrative examples of community participation in waste management are drawn from Asia, the Netherlands and Kenya [51].

Decentralization and Urban Infrastructure Management Capacity written by the authors: Wahba, Sameh, Serageldin, Mona, Kim, Suzanne details that the decentralization and Urban Infrastructure Management Capacity (2000), undertaken for UNCHS/Habitat, is a background paper reviewing infrastructure initiatives implemented since the early 1990s in a range of economic, social and cultural settings. The paper highlights achievements in the decentralized provision of services [52].

Adaptation to Climate Change in the Context of Sustainable Development and Equity detailed by the authors: Smit, B., Pilifosova, O., Huq, S., Challenger, B., Burton. I. highlights that the adaptation to Climate Change in the Context of Sustainable Development and Equity (2001) examines how planned anticipatory adaptation has the potential to reduce vulnerability and realize opportunities associated with climate change, regardless of autonomous adaptation. The report concludes that inclusion of climatic risks in the design and implementation of development initiatives is necessary to reduce vulnerability and enhance sustainability. Policy makers in the public and private sector, as well as community groups will find this resource helpful [53].

Environment and Health Improvement in Jamnagar Area, Kanpur: Lessons and Experiences for Wider Replication which was authored by the Ministry of Environment and Forests, Bhargava, Gopal K. (Ed.); Shankarlal C. Bhatt (2005) explains that Environment and Health Improvement in Jamnagar Area, Kanpur: Lessons and Experiences for Wider Replication (1997) is a study designed to identify best practice for situations involving industrial water pollution and its effects on the hygiene and health status of low-income communities. Published by the Institute for Housing and Urban Development Studies, this document discusses the Indo-Dutch Environmental and Sanitary Engineering Project, part of the Ganga Action Plan to clean river water in Jamnagar Kanpur. This document will be useful for NGOs and local government authorities dealing with issues of water quality in developing countries [54].

“What should a local area plan be?” detailed by Bharatsingh, Spatio-economic development recorded in vol. 17 no. 5, september-october 2010 explains the economic growth in the past couple of years and the emphasis on infrastructure improvements for the Commonwealth
Games, have seen a flurry of urban development management ideas and reforms in Delhi. The push from its residents, business, community and political leaders has pressured National Capital Territory (NCT) government to overhaul the traditional methods of managing urban development. The initiation of the LAP process is truly a generational shift in the planning process of the NCT. It is clear that any new effort of this kind will have growing pains that MCD is facing at present. It is laudable that they are moving forward with LAPs despite all the structural short comings in their organizational structure and the overall governance systems. After-all a step taken is better than taking no step at all [55].

Home based economic activities and their Impact on microenvironment a case study of Aligarh done by Mayank mathur Spatio-economic development recorded in Vol. 17, no. 6, November-December 2010 mentions that Mahatma Gandhi wrote. 'I do not remember to have seen a handloom or a spinning wheel when in 1908 I described it in Hind Swaraj as the panacea for the growing pauperism in India' (quoted from Anand:1991). This study of home-based economic, activities indicates that such activities result in air pollution which effects microenvironment of houses and health of workers. It also shows relationship of housing with that of home-based income generation [56].

Urban transportation issues: need for brts in india written by Ranndil sher jatinder singh, Spatio economic development recorded in Vol. 17 no. 4, July-August 2010 explains that the conventional bus service has a negative image and has been considered unreliable, lumbering, inconvenient, crowded, dirty and unsafe. There is need to provide tangibility and further distinguish its image from that of regular bus service. Integrated system approach is required for planning and designing of BRTS. Running ways, stations, land uses, ride quality, exclusive ROW, signal priorities must be appropriately planned to improve its reliability [57].

A tale of two schemes: Jnnurm and Nuis written by Mahavir, d. Maqbool ahmed Spatio economic development explains that it is informally learnt that instead of an altogether new scheme, the Rajiv Awas Yojna will be a new, avatar of the JNNURM with more focused scope and vigor. The towns and cities will again be selected for implementation of the RAY. In the meanwhile the NUIS as well as the JnNURM would have entered into the next phases and would be adding towns and cities to their existing list [58].