CITY SANITATION PLAN FOR KANPUR

MINISTRY OF URBAN DEVELOPMENT
GOVERNMENT OF INDIA

KANPUR NAGAR NIGAM
KANPUR, INDIA

ADMINISTRATIVE STAFF COLLEGE OF INDIA
HYEDERABAD, INDIA

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FROM DIRECTOR'S DESK

"Water is Life and Sanitation is Dignity."

The above quote well impresses upon one the fact that sanitation is the most important aspect for a healthy and dignified living.

Often sanitation is considered to be synonymous to just the solid waste management, especially in the ULBs. To set right this flawed concept, sanitation ideally can be defined as a culmination of efforts to manage the access to toilets, safe management of human excreta, liquid and solid waste, including their safe confined treatment, disposal and associated hygiene-related practices. With increasing urbanization sanitation is becoming a severe problem in all cities in our country.

There arises a need for integrated solutions to take account of the various elements of environmental sanitation, fecal management and disposal, solid waste management; management of industrial and other specialized / hazardous wastes; drainage; as also the management of of the quality of the drinking water supply. This is the main aim and purpose underlying the preparation of City Sanitation Plan.

We take an opportunity to express our sincere gratitude to all the officials who have helped and supported us throughout the process which made the completion of the report possible. Extensive and rigorous discussions with ULB officials have well-defined the efforts and the resulting outcomes. The City Sanitation Plan for the city of Kanpur presents effective strategies for the greater access to sanitation for the city population coupled with safe disposal of solid and liquid waste generated throughout the city by suggesting environment friendly and sustainable technical options.

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On behalf of the entire ASCI team which has put forth dedicated efforts towards the development of this CSP report -

Prof. Srinivas Chary Vedala,
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ABBREVIATIONS

ASCI	Administrative Staff College of India
BOD	Biological Oxygen Demand
BOOT	Buy-Own-Operate and Transfer
BPL	Below Poverty Line
BSUP	Basic Services to the Urban Poor
CAA	Constitution Amendment Act
COD	Chemical Oxygen Demand
CSP	City Sanitation Plan
CT	Community Toilets
CSTF	City sanitation Task Force
DPR	Detailed Project Report
FGD	Focus Group Discussions
GoI	Government of India
HHs	Households
HSC	House Service Connections
IEC	Information, Education, Communication
ILCS	Integrated Low Cost Sanitation
MoUD	Ministry of Urban Development
MSL	Mean Sea Level
MSW	Municipal Solid Waste
NRW	Non-Revenue Water
NUSP	National Urban Sanitation Policy
OD	Open Defecation
O&M	Operation and Maintenance
PSP	Public Stand Posts
RWA	Residents Welfare Association
SI	Sanitary Inspector
SLB	Service Level Benchmarking
STP	Sewage Treatment Plant
SWM	Solid Waste Management
ULB	Urban Local Body
UGD	Under Ground Drainage
WC	Water Closet

Units of Measure

lpcd	liters per capita per day
m	meter
MLD	million liters per day
sq.m	square meter
TPD	tonnes per day

EXECUTIVE SUMMARY

This document presents City Sanitation Plan (CSP) of Kanpur City Municipal Corporation. Kanpur is one of the 10 cities whose CSPs have been prepared by ASCI in partnership with Government of UP and KNN.

The CSP process in Kanpur city endeavors to identify the various areas that are affected by various issues with different sectors of sanitation, (viz. sewerage, solid waste management, storm water drainage and water supply) and also to provide guidance towards the solutions of the identified issues.

This has been made possible through an extensive participatory approach including field visits, repeated discussions with various stakeholders, sample surveys, etc. Acquiring and assimilation of varied secondary information also formed an important part of the process.

The plan preparation process was carried out using methodology requiring wide range of data in various areas and population groups, to develop robust analysis and produce outputs. The data collection included both primary and secondary sources and detail analysis of them.

The analysis in turn has paved the way for the preparation of the proposal for various strategies to alleviate the sanitary conditions of the place, so that Kanpur city may well overcome the various plaguing issues and thereby a healthy sanitized environment prevails for the citizens.

CHAPTER 1. INTRODUCTION

Topics of Discussion

- NUSP: The Background
- Sanitation Related Policies and Laws
- Objectives of City Sanitation Plan
- City Sanitation Planning & Research Methodology

1.1 NUSP: The Background

The National Urban sanitation Policy launched during 2008 envisages ***"All Indian cities and towns become totally sanitized, healthy and livable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women."***

With this vision, the National Urban Sanitation Policy (NUSP) intends to facilitate provision of appropriate sanitation facilities in all cities and towns, through policy, institutional, technical and financial interventions. Some of the areas to address under NUSP include open defecation free towns, providing access to toilets for poor people, waste water and solid waste treatment and disposal and achieving public health outcomes and environmental standards.

The overall goal of National policy is to transform Urban India into community-driven, totally sanitized, healthy and livable cities and towns. Specific goals include – (1) Awareness Generation and Behavior Change; (2) Open Defecation Free Cities; (3) Integrated City-Wide Sanitation; (4) Sanitary and Safe Disposal, and (5) Proper Operation & Maintenance of all Sanitary Installations.

Against this background, and in recognition of its importance to national and state development, the Integrated City-Wide Sanitation Plan for Kanpur City is prepared to provide city-wide systematic approach and framework to achieve the goals contemplated under NUSP. Govt. of India shall support the following components under NUSP:

- ☐ Awareness Generation
- ☐ Institutional Roles
- ☐ Reaching the Un-Served and Poor Households
- ☐ Knowledge Development
- ☐ Capacity Building
- ☐ Financing
- ☐ National Monitoring & Evaluation
- ☐ Coordination at the National Level

1.1.1 Concept of Totally Sanitized Cities

A totally Sanitized City will be one that has achieved the outputs or milestones specified in the National Urban Sanitation policy, the salient features of which are as follows:

- ☐ Cities must be open defecation free
- ☐ Must eliminate the practice of manual scavenging and provide adequate personnel protection equipment that addresses the safety of sanitation workers.
- ☐ Municipal wastewater and storm water drainage must be safely managed
- ☐ Recycle and reuse of treated wastewater for non-potable applications should be implemented wherever possible.
- ☐ Solid Waste collected and disposed off fully and safely
- ☐ Services to the Poor and Systems for Sustaining Results
- ☐ Improved Public Health Outcomes and Environmental Standards

1.1.2 Rating and Categorization of Cities

The rating of cities in regard to their performance in sanitation improvements will be based on set of objective indicators of outputs, processes and outcomes.

Three Categories of Indicators

The rating exercise will involve three categories of indicators:

Output Related Indicators: pertain to the city having achieved certain results or outputs in different dimensions of sanitation ranging from behavioral aspects and provision, to safe collection, treatment and disposal without harm to the city's environment. *There are nine main output-indicators accounting for 50 points of the total of 100 points.*

Process Related Indicators: pertain to systems and procedures that exist and are practiced by the city agencies to ensure sustained sanitation. *There are seven main process-indicators accounting for 30 points of the total of 100 points.*

Outcome Related Indicators: include the quality of drinking water and that of water in water-bodies of city, as also the extent of reduction in sanitation-related and water-borne diseases in the city over a time period. *There are three main outcome-indicators accounting for 20 points of a total of 100 points1.*

Ideally, data for the above outputs, processes and outcomes are regularly collected by city authorities but at present, very few cities will have, at best, partial data available. This rating exercise will help in highlighting the need for regular data-collection and monitoring of indicators.

On the basis of the said rating scheme, cities will be placed in different categories as presented in Table 1-1 and the distribution of the 436 cities is also depicted. National rating survey data will utilize these categories for publication of results. On the basis of plans prepared and implemented, cities will be able to measure the results of their actions, and be able to clearly chart out their improvements over time compared to their baseline situation

TABLE 1-1: COLOR CODES: CATEGORIES OF CITIES

NO.	CATEGORY	POINTS	NO. OF CITIES	DESCRIPTION
1	Red	≤33	204	*Cities on the brink of public health and environmental "emergency"; needing immediate remedial action*
2	Black	34-66	228	*Needing considerable improvements*
3	Blue	67-90	4	*Recovering but still diseased*
4	Green	91-100	0	*Healthy and Clean city*

.On achievement of remarkable results, i.e. coming into the Green category (Healthy and Clean City), cities will typically become eligible for the national award. Other cities showing remarkable incremental performance or selective achievements may also be given special or honorary awards. Cities in different size-classes may also be considered for category-wise awards. Based on results of the Rating survey and selection of awardees, cities will be invited to participate in a National Urban Sanitation Award ceremony.

Findings of a survey commissioned by MoUD rated 423 Class-I (with a population of more than 100,000) Indian cities on safe sanitation practices. Kanpur has been ranked at 10 out of 423 Class I cities, scoring **55.34 marks out of 100 marks** and in Black category. This means performance of Kanpur in regard to safe sanitation is abysmal on various indicators. A complete profiling of Kanpur against 19 parameters has been presented below in a table, indicating the present status and identifying few targets which can be achieved in a phase wise manner – short-term, mid-term and long term

TABLE 1-2: METHODOLOGY AND NUSP RATING OF THE CITY OF KANPUR

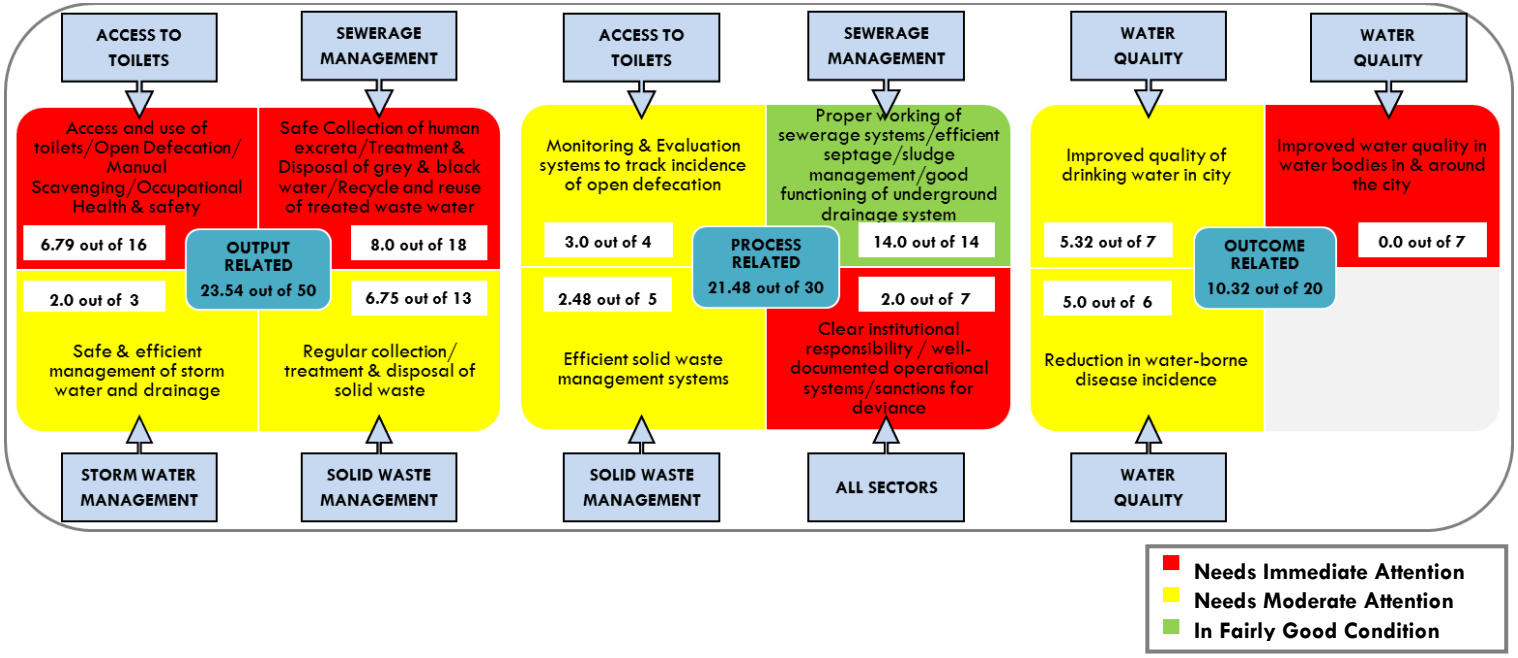
	INDICATORS	POINTS	POINTS SCORED BY KANPUR
1	**OUTPUT RELATED**	**50**	***23.54***
A	**No open defecation**		
i.	Access and use of toilets by urban poor and other un-served households (including slums) - individual and community sanitation facilities	*4*	*0.09*
ii.	Access and use of toilets for floating and institutional populations - adequate public sanitation facilities	*4*	*1.9*
iii.	No open defecation visible	*4*	*0.8*
iv.	Eliminate Manual Scavenging and provide personnel protection equipment to sanitary workers	*4*	*4*
B	Proportion of total human excreta generation that is safely collected (6 points for 100%)	6	*4*
C	Proportion of total black waste water generation that is treated and safely disposed off (6 points for 100%)	6	*3*
D	Proportion of total grey waste water generation that is treated and safely disposed off (3 points for 100%)	3	*0*
E	Proportion of treated water that is recycled and reused for non-potable applications	3	*1*
F	Proportion of total storm-water and drainage that is efficiently and safely managed (3 points for 100%)	3	*2*
G	Proportion of total solid waste generation that is regularly collected (4 points for 100%)	*4*	*3.75*
H	Proportion of total solid waste generation that is treated and safely disposed off (4 points for 100%)	*4*	*2*
I	City wastes cause no adverse impacts on surrounding areas outside city limits (5 points for 100%)	*5*	*1*
2	**PROCESS RELATED****	**30**	***21.48***
A	M&E systems are in place to track incidences of open defecation	*4*	*3*
B	All sewerage systems in the city are working properly and there is no ex-filtration (Not applicable for cities without sewerage systems)	*5*	*5*
C	Septage / sludge is regularly cleaned, safely transported and disposed after treatment, from on-site systems in the city (Maximum 10 marks for cities without sewerage systems)	*5*	*5*
D	Underground and surface drainage systems are functioning and are well maintained	*4*	*4*
E	Solid waste management (collection and treatment) systems are efficient (and are in conformity with the MSW Rules, 2003)	*5*	*2.48*
F	There is clear institutional responsibility assigned; and there are documented operational systems in practice for b/c) to e) above	*4*	*0*
G	Sanctions for deviance on part of polluters and institutions is clearly laid out and followed in practice	3	*2*

	INDICATORS	POINTS	POINTS SCORED BY KANPUR
3	**OUTCOME RELATED**	**20**	***10.32***
A	Improved quality of drinking water in city compared to baseline	7	5.32
B	Improved water quality in water bodies in and around city compared to baseline	7	0
C	Reduction in water-borne disease incidence amongst city population compared to baseline	6	5
	GRAND TOTAL	**100**	***55.34***

1.1.2.1 IDENTIFICATION OF PROBLEMS AREAS

Based on the survey conducted in the City of Kanpur to assess the sanitation situation against the defined nineteen (19) indicators grouped under the three categories related to output, process and outcome; it may be fairly inferred that there are areas under the three categories which require immediate attention in order to improve the condition of sanitation.

FIGURE 1-1: NUSP RATING OF KANPUR CITY: IDENTIFICATION OF PROBLEM AREAS



IDENTIFIED PROBLEM AREAS -

Output Related Category

- Access to Toilets -
  - ✓ *Access & Use – individual /community/public toilets*
  - ✓ *Open Defecation*
- Sewerage Management
  - ✓ *Safe collection of human excreta*
  - ✓ *Treatment & Disposal of black & grey water*
  - ✓ *Recycle & Reuse of treated water*

Process Related Category

- Institutional, Governance and Regulatory
  - ✓ *Clear role & responsibilities*
  - ✓ *Operational systems*
  - ✓ *Sanctions for non-compliance*

Outcome Related Category

- Water quality in water bodies, in and around the city

1.1.3 National Award Scheme for Sanitation for Indian Cities

In order to rapidly promote sanitation in urban areas of the country (as provided for in the National Urban Sanitation Policy and Goals 2008) and to recognize excellent performance in this area, Government of India has instituted an annual award scheme for cities. The award is based on the premise that improved public health and environmental standards are the two outcomes that cities must seek to ensure for urban citizens. In doing so, governments in states and urban areas will need to plan and implement holistic city-wide sanitation plans, thereby put in place processes that help reach outputs pertaining to safe collection, disposal and disposal (including conveyance, treatment, and/ or re-use without adverse impacts on the environment in and around the cities). It may be noted that the awards will not recognize mere inputs, hardware or expenditure incurred in urban sanitation but assess how these lead to achievements of intermediate milestones toward the final result of 100 % safe disposal of wastes from the city on a sustainable basis. Cities will need to raise the awareness of city stakeholders (households, establishments, industries, municipal functionaries, media, etc.) since improved sanitation can ensure improved public health and environmental outcomes only if considerable changes in behavior and practice take place across the spectrum of society.

1.2 Sanitation Related Policies and Laws

1.2.1 Municipal Solid Waste Rules, 2000

The Municipal Solid Wastes (Management and Handling) Rules, 1999 were published under the notification of the Government of India in the Ministry of Environment and Forests. In exercise of the powers conferred by section 3, 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby made the rules to regulate the management and handling of the municipal solid wastes, 2000.

Municipal Solid Waste (Management & Handling) Rules, 2000 (MSW Rules) are applicable to every municipal authority responsible for collection, segregation, storage, transportation, processing and disposal of municipal solids. The Rules contains four Schedules namely;

TABLE 1-3: SCHEDULE DETAILS OF MSW RULES, 2000

Schedule-I	Relates to implementation Schedule
Schedule-II	Specifications relating to collection, segregation, storage, transportation, processing and disposal of municipal solid waste (MSW).
Schedule-III	Specifications for land filling indicating; site selection, facilities at the site, specifications for and filling, Pollution prevention, water quality monitoring, ambient air quality monitoring, Plantation at landfill site, closure of landfill site and post care.
Schedule-IV	Indicate waste processing options including; standards for composting, treated l lakhtates and incinerations.

The MSW Rules -2000 categorically state the roles and responsibilities of ULBs, the State Govt., the Union Territory Administrations and the Pollution Control Boards. The roles of the ULBs as stated are as follows:

- ☐ Every municipal authority shall, within the territorial area of the municipality, be responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes.
- ☐ The municipal authority or an operator of a facility shall make an application in Form-I, for grant of authorization for setting up waste processing and disposal facility including landfills from the State Board or the Committee in order to comply with the implementation programme laid down in Schedule I.
- ☐ The municipal authority shall comply with these rules as per the implementation schedule laid down in Schedule I.
- ☐ The municipal authority shall furnish its annual report -

- To the Secretary-in-charge of the Department of Urban Development of the concerned State or as the case may be of the Union territory, in case of a metropolitan city; or
- To the District Magistrate or the Deputy Commissioner concerned in case of all other towns and cities, with a copy to the State Board or the Committee on or before the 30th day of June every year.

1.2.2 Integrated Low Cost Sanitation (ILCS)

The programme envisages construction of new sanitary latrines in households not having latrines by adopting the low-cost leach pit system, with an objective to eliminate dry latrines and manual scavenging. The scheme is being implemented with 63% HUDCO loan, 32% Government of India subsidy and 5% of contribution of beneficiary. Initially during the year 1992 the Integrated Low Cost Sanitation Scheme was taken up in 34 municipalities, subsequently extended the programme covering all the Urban Local Bodies in a phased programme. The scheme was implemented in all 113 Urban Local Bodies with HUDCO financial assistance.

TABLE 1-4: ILCS SCHEME DETAILS

	EARLIER PROVISION	REVISED PROVISION
1	The scheme has been taken on a 'whole town basis' and the towns having population less than 5 lakh are being covered	The earlier programme was town-wise for population upto 5 lakh as per 1981 census which need not be restricted any more as the whole country is to be declared as scavenger free. The new guidelines will cover all towns on "All Town" basis.
2	Pattern of Assistance: The HUDCO is providing loan and a mix of subsidy from the Central Government in a synchronized manner as per the following financing pattern. **Category/*Subsidy/Loan/Beneficiary Contribution*** ✓ EWS/***45%/50%/5%*** ✓ LIG/***25%/60%/15%*** ✓ MIG/HIG/***Nil/75%/25%***	75% subsidy for the EWS beneficiaries 15% of State's contribution and 10% of Beneficiaries contribution.
3	The present unit cost for different categories of sanitary latrines is as follows:- 5 user unit Rs4000.00, 10 user unit Rs6000.00, 15 user unit Rs7000.00 Super structure cost not included.	Provision of subsidy including the superstructure in case of individual toilets: An upper ceiling of Rs. 10,000/-for complete unit of pour flush units with superstructure.
4	No provision of IEC component.	It is proposed to include the Information, Education and Communication (IEC) component with 1% of the total central allocations under the scheme in each of the financial year with the Ministry. In case the funds retained are not utilized, these may be utilized in the projects.
5	No involvement/ participation of NGOs at implementation stage.	NGOs may be involved by the State Governments in the implementation of the scheme in various activities meant for the benefit of EWS population under the scheme with maximum charges upto 15% over and above the total project cost to be borne by the Centre and States in the ratio of 5:1 at different stages of implementation.
6	Technology used for construction and conversion of toilets was as per HUDCO's pattern/recommendation.	Options like septic tank, connecting to small bore or conventional sewer network etc. may also be permitted under the cost ceiling. Technology which can enable to tap local resources should be permitted to be adopted. State implementing agencies may decide the technology best suited for the site/ locality which may be adopted.

1.2.3 Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

The aim of JNNURM is to encourage reforms and fast track planned development of identified cities. The prime focus of JNNURM is stimulate efficiency in urban infrastructure and service delivery mechanisms, community participation, and accountability of ULBs/ parastatal agencies towards citizens.

Objectives of JNNURM:

- ☐ Focused attention to integrated development of infrastructure services in cities covered under the Mission;
- ☐ Establishment of linkages between asset-creation and asset-management through a slew of reforms for long-term project sustainability;
- ☐ Ensuring adequate funds to meet the deficiencies in urban infrastructural services;
- ☐ Planned development of identified cities including peri-urban areas, outgrowths and urban corridors leading to dispersed urbanization;
- ☐ Scale-up delivery of civic amenities and provision of utilities with emphasis on universal access to the urban poor;
- ☐ Special focus on urban renewal programme for the old city areas to reduce congestion; and
- ☐ Provision of basic services to the urban poor including security of tenure at affordable prices, improved housing, water supply and sanitation, and ensuring delivery of other existing universal services of the government for education, health and social security.

1.2.4 Rajiv Awas Yojana (RAY)

The Government has initiated a new scheme called Rajiv Awas Yojana (RAY) for the slum dwellers and the urban poor. This scheme aims at providing Central support to States that are willing to assign property rights to slum dwellers. The Government's effort would be to create a Slum-free India through the implementation of RAY.

The Ministry of Housing and Urban Poverty Alleviation (MoHUPA) has prepared *Guidelines for Slum Free City Planning* to assist the preparatory activities under RAY and this has been circulated to all States/UTs. RAY calls for a multi-pronged approach focusing on the following aspects:

- ☐ Bringing existing slums within the formal system and enabling them to avail the same level of basic amenities as the rest of the town/city.
- ☐ Redressing the failures of the formal system that lead to the creation of slums; and
- ☐ Tackling the shortages of urban land and housing that keep shelter out of reach of the urban poor and force them to resort to extra-legal solutions in a bid to retain their sources of livelihood and employment.

Under the Slum Free City Planning guidelines, there is a requirement for the Urban Local Bodies (ULBs) to build an inventory of existing spatial data available with various agencies. Often ULBs, other than metropolitan cities, do not have centralized spatial data. Under RAY, it is planned to have 'Technical Cell', which will have responsibilities to coordinate and collect data from state governments, NRSC/ISRO, Survey of India, National Informatics Centre (NIC) etc. If the city base map is not available, a base map of the city would be generated using standard guidelines set forth under the project.

As given in the Slum Free City Planning (SFCP) guidelines, the preparation of Slum-free City Plan will broadly involve survey of all slums – notified and non-notified; mapping of slums using the state-of-art technology; integration of geo-spatial and socio-economic data; and identification of development model proposed for each slum. To achieve these things, a systematic approach is essential which will be useful for various other developmental planning initiatives for the urban poor. The present technical manual details the steps to be followed for slum mapping using satellite data, GPS, Total Station Survey in preparing GIS database, MIS development of non-

spatial data collected and integration of GIS with MIS to enable generating Plan of Action (PoA) for slum free cities.

RAY envisages that each State would prepare a State Slum-free Plan of Action (POA). The preparation of legislation for assignment of property rights to slum dwellers would be the first step for State POA. The POA would need to be in two parts,

Part-1 regarding the upgradation of existing slums and Part-2 regarding the action to prevent new slums; In Part-1 the State would need to survey and map all exiting slums in selected cities proposed by the State for coverage under RAY. In Part-2 the Plan would need to assess the rate of growth of the city with a 20 year perspective, and based on the numbers specify the actions proposed to be taken to obtain commensurate lands or virtual lands and promote the construction of affordable EWS houses so as to stay abreast of the demand. This part would need also to make necessary legislative and administrative changes to enable urban land expansion, and in town planning regulations to legislate reservations for EWS/LIG housing in all new developments.

Slum-free City Cell in Urban Local Body headed by the Municipal Commissioner/Executive Officer will be primarily responsible for the preparation of Slum-free City Plans based on guidelines provided by the concerned State Government and support extended by the Nodal Agency for Rajiv Awas Yojana at the State level.

1.2.5 13th Central Finance Commission (CFC)

Importantly, the report of 13th CFC released in February 2010 recommended general performance grants and special area performance grants to be linked to performance of ULBs. Moreover, allocations to ULBs would now be linked to divisible pool replacing the previous ad-hoc allocation. Grants to the tune of Rs. 23,111 crores have been allocated to ULBs for the period 2010-15, a four-fold growth over the 12th CFC allocation.

The 13th CFC recommends state governments and ULBs to focus on improved property tax revenues, urban service standards, strengthened local body framework, improved municipal accounting, introduce system of independent ombudsmen, and put in place a system of electronic transfer of grants to ULBs among other things.

1.3 Objectives of Kanpur City Sanitation Plan

The City Sanitation Plan (CSP) is aimed at developing and maintaining a clean, safe and pleasant physical environment in Kanpur city to promote social, economic and physical well-being of all sections of the population. It encompasses plan of action for achieving 100% sanitation in the city of Kanpur through demand generation and awareness campaign, sustainable technology selection, construction and maintenance of sanitary infrastructure, provision of services, O&M issues, institutional roles and responsibilities, public education, community and individual action, regulation and legislation.

PRINCIPAL COMPONENTS OF CITY-WIDE APPROACH –

- ☐ Collection and sanitary disposal of wastes, including solid wastes, liquid wastes, excreta, industrial wastes, clinical and other hazardous wastes;
- ☐ Collection and management of storm water drainage;
- ☐ Cleansing of thoroughfares, markets and other public spaces;
- ☐ Environmental sanitation education;
- ☐ Inspection and enforcement of sanitary regulations;
- ☐ Monitoring the observance of environmental standards

1.4 City Sanitation Planning and Research Methodology

CSP tries to detail out how the city plan is to deliver the sanitary outcomes defined in NUSP and state strategy, in coordination with other line departments to ensure a well collaborated approach engaging all stakeholders including governmental and non-governmental civic service providers. The scope of CSPs broadly encompass following major tasks:

1.4.1 City Sanitation Task Force (CSTF)

The first step in making the cities 100% sanitized is to elevate the consciousness about sanitation in the mind of municipal agencies, government agencies and most importantly, amongst the people of the city. As per the requirement of CSP, major role is to be played by the members of institutions, organizations, individuals, NGOs, academics, journals, local councilors, industry owners, consultants, representatives of private sector, etc. Constitution of CSTF is facilitated by drawing members from these groups in consensus with KNN who will be constantly supporting the CSP preparation by analyzing the strengths and competencies required to overcome the current situation and for better sanitation facilities.

For this purpose, CSTF has to be constituted in the ULB and it has to organize a multi-stakeholder, multi-party meeting in the preparatory stage, and take a formal resolution to make the city 100% sanitized. CSTF has been constituted by Kanpur Nagar Nigam (KNN). (***Please refer to Annexure 1 for the policy paper on the formalization of CSTF for city of Kanpur***)

The roles and responsibilities of CSTF will include:

- ☐ Launching the City 100% Sanitation Campaign
- ☐ Generating awareness
- ☐ Approving materials and progress reports
- ☐ Approving the City Sanitation Plan
- ☐ Providing overall guidance
- ☐ Fixing of responsibilities on a permanent basis.

Task 1. CSTF MEMBERS

The City Sanitation Task Force (CSTF) plays a very important part in the formulation and implementation of the CSP in a city. The importance of CSTF and their functions were clearly portrayed to the KNN authorities. As per the guidelines of NUSP 2008, the KNN constituted the CSTF for the city of Kanpur. (***Please refer to Annexure 2 for the final list of CSTF members for Kanpur city***).

Task 2. CSTF Sensitization cum Orientation Workshop

With this background knowledge, a KNN level sensitization cum orientation workshop involving KNN officials and identified stakeholders was organised in the month of August, 2010. Dr Nanda Kishor, Mr Sumanth and Mr Anil Kumar represented the team from ASCI. It was attended by the Additional Municipal Commissioner, other KNN officials from various departments, and the other concerned stakeholders.

The purpose of the workshop was to highlight the need to engage with issues relating to sanitation access and arrangement especially in slums; awareness generation for changed behaviour and practices; community participation and mobilization to accord sanitation priority at all levels from policy to action on ground; and a number of technical, institutional and financial issues to be addressed in CSP and its various steps of preparation.

1.4.2 Collection of Secondary Data

Secondary data collection and review of available information from various sources has been conducted as per the underlying objectives of CSP. The officials of KNN, KDA, KJK, UP Jal Nigam, DUDA and other parastatal agencies shall be duly involved in the validation process. The following steps define the process of secondary data collection -

Task 1. Preparatory Work (Profiling Of KNN)

As a preparatory work, a preliminary profiling of KNN will be undertaken using SLB indicators and City Sanitation Rating to highlight the open defecation free (ODF) status, sanitation situation,

health indicators and current projects. This will also be strengthen the further investigation by transect walks, field visits and primary data collection.

Task 2. Review/Study of The Current Practices

This includes a review of sector strategies in water, sanitation and solid waste management at state and city level. DPRs prepared on these sectors will be studied in detail and analysed. Also regional and state urban strategies to know the dynamics of urbanisation pattern will be studied and examined in details.

Task 3. Condition Assessment

Choices of toilet in the city and their effectiveness along with pictures on super structure, below ground, design models and materials used for different uses like residential, industries, public spaces and new areas.

Task 4. Ward Profiling as Per City Sanitation Ranking Parameters

City as a number of spatial units will look at indicators pertaining to the practice of open defecation, access to sanitation (individual, community and public), collection, treatment and disposal of solid and liquid wastes, proper upkeep and maintenance of the sanitation infrastructure, clear institutional roles and responsibilities and improvements in health and environment as per the "City Sanitation Rating".

1.4.3 Primary Data Collection and Sampling

Data collection is facilitated to a limited extent through rapid field surveys, sample surveys, case studies, consultations, transect walks, FGDs, etc., to validate and supplement the secondary data. The data will be collected as per formats/templates and questionnaires after brief orientation to the stakeholders. Random stratified sampling in typical cases (slums, schools, wards commercial places, public latrines, surface drains, solid waste arrangements, industries, health and educational institutions etc.) evenly distributed all over the city to cover all representative types of situations.

Task 1. Sample survey results for the basic services

Purpose: The objective of conducting the sample field survey was to assess the services at the customer level / field level and validate the information given by the officials.

Methodology: Samples were taken across the different parts of the city to validate the information. The distribution of the samples is given in the table as follows.

Areas covered: The survey covered spatially all parts of the city, but the main focus was given to the following areas -

	ACTIVITIES	FOCUSED AREAS	TOOLS	SAMPLING	SAMPLE SIZE
1	Household survey of residential & slum areas	Household level	Questionnaire	Random Sampling	800 HHs
2	CNA through Focused Group Discussions	Slum areas, residential areas, elected representatives, and other potential areas	Check list	Random Sampling	12 – 15 FGDs
3	Institutions	Collector office, KNN office, Bus & Rail station	Questionnaire	Random Sampling	10 (in Nos)
4	Community Toilets	All potential areas	Questionnaire	Random Sampling	50 – 100%
5	Public Toilets	All potential areas	Questionnaire	Random Sampling	50 – 100%
6	Hospitals	All Hospitals with 100+ beds or 50 – 100 beds	Questionnaire	Random Sampling	10 – 15 (in Nos)
7	School Sanitation	Govt Primary, Secondary, High schools	Questionnaire	Random Sampling	50 – 100%; 10% (>10 lakh)

	ACTIVITIES	FOCUSED AREAS	TOOLS	SAMPLING	SAMPLE SIZE
8	Slaughter Houses	Potential areas	Questionnaire	Random Sampling	2 – 3 (in Nos)
9	Commercial/ market areas	Potential areas (target groups include both shopkeeper & customers)	Questionnaire	Random Sampling	10 – 15 (in Nos)
10	Industries	Potential areas	Questionnaire	Random Sampling	5 – 10 (in Nos)
11	Secondary Data	-	Check list	-	-
12	Water Bodies	Potential areas	Questionnaire	Random Sampling	50 – 100%

Task 2. Field Reconnaissance & Transact Walk

ASCI team oganized city wide field reconnaissance and tranacst walks along with KNN officials and other stakeholders to gauze and access the first hand sanitation situation of Kanpur city.

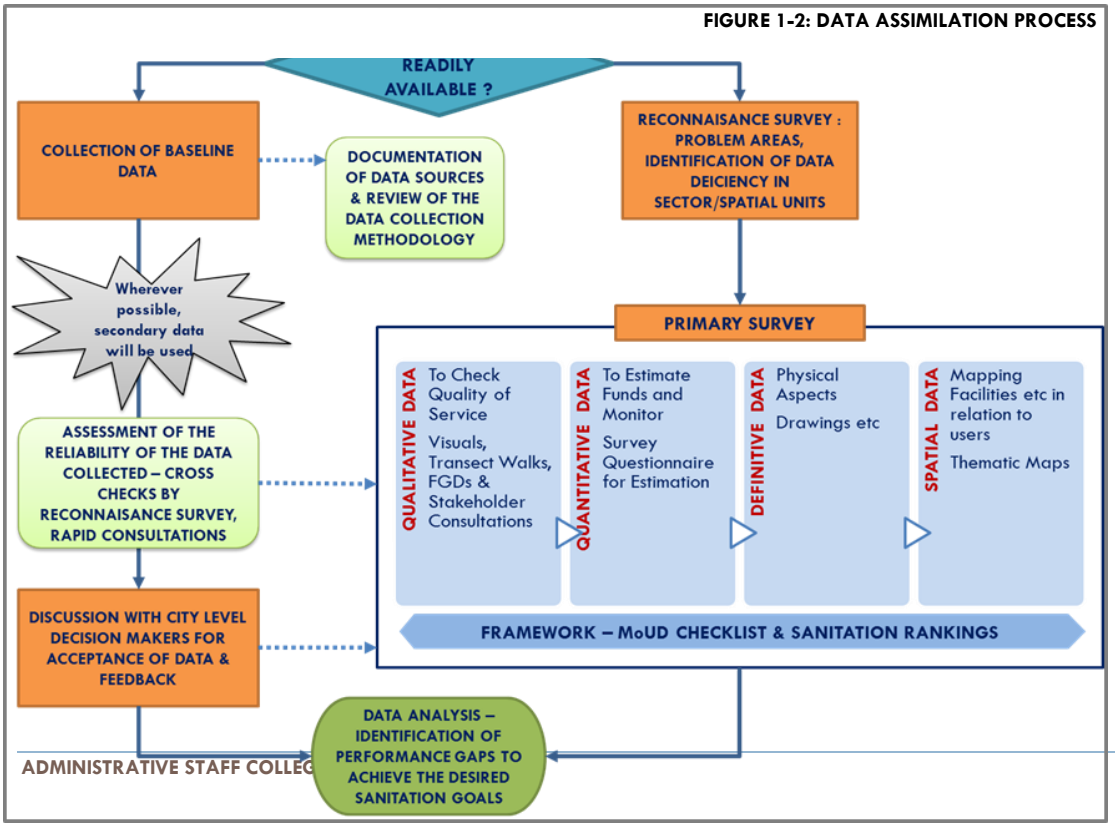
1.4.3.1 RESEARCH TECHNIQUES

TABLE 1-5: TASKS AND RELATED RESEARCH TOOLS

	TASKS	RESEARCH TOOLS
1	Social and environmental issues	✓ Literature Review ✓ Baseline Survey ✓ Case Studies ✓ Consultations/FGDs
2	Policies, acts, operational procedures to address, mitigate and manage the social and environmental issues	✓ Literature Review ✓ Survey/FGDs ✓ Case studies/Discussions ✓ Stakeholder Consultations
3	CAN: Perception on sanitation, its maintenance and investment (Analysis of data), mitigate adverse/negative impacts	✓ Literature Review ✓ Secondary Information Review ✓ Case Studies /Rapid survey data Analysis ✓ FGDs /Stakeholder Consultations
4	Existing institutional arrangements in managing and mitigating social and environmental issues	✓ Literature Review ✓ FGDs Stakeholder Consultations ✓ Survey Data Analysis

1.4.3.1.1 Process Followed for Data Assimilation:

FIGURE 1-2: DATA ASSIMILATION PROCESS



1.4.4 Situation Analysis and Mapping Current Status

The Situation Analysis, prepared by taking into consideration the ground realities, local conditions, and assessment of the present sanitation situation has been undertaken and broad framework is indicated below:

TABLE 1-6 : BROAD FRAMEWORK OF SITUATION ANALYSIS

SECTORS	SPATIAL UNTIS	FINANCIAL MECHANISM	INSTITUTIONAL SET-UP
Service levels and benchmarks for:	Household Sanitation Slums	Cost Recovery–Policy–Tariffs–Collections–	Institutional Arrangement – Policies, Plans, implementation, management.
Sewerage and sanitation	Public Sanitary Conveniences	Budget Transfers.	Staffing,
Solid Waste Management	School Sanitation	PPPs.	Organization & Competence
Water Supply	Institutional Sanitation Map spatially	Study of current programmes (SJSRY, ILCS, etc)	
Storm Water and	Any town specific areas.		
Drainage			
Health Situation – Statistics and Anecdotal Comment			
Environmental Situation – Local and Downstream and Groundwater.			

Tools Used: Data Templates, Survey Formats, Transect Walks along with schedules of interviews (Slum, industrial areas, water bodies), FGDs, Technical Analysis, Impact, Indicators, Stakeholder Consultations at City level, etc

Task 1. Problem Analysis and Assessment of Options

Followed by situational analysis, problem and challenges have been identified in coverage, access, treatment and disposal, institutional, financial, social and cultural aspects and capacity concerns. Comprehensive range of sanitation and wastewater management options have been reviewed including but not limited to industrial and municipal sewerage; the sewage treatment options considered have varied from conventional and low cost options to centralized and decentralized systems, with both separate and combined effluent disposal options, and separate programs for schools, public toilets, sanitation in slums, community-based NGO-supported programs etc. have also been given a special thrust.

The purpose of options analysis is to identify plausible and sustainable technical, financial and institutional solutions and will consider (i) unit cost per beneficiary, (ii) maximizing both human and environmental benefits, (iii) sustainability, (iv) a long term plan, (v) government policy including land use zoning, (vi) piloting new approaches, (vii) beneficiary participation, (viii) wastewater as a resource, (ix) lessons learned from the past and last but not the least (x) political commitment.

Task 2. Communication Gap and Needs Assessment

IEC needs assessment will be carried out and broad communication strategy is developed in consultation with the ULB officials and other stakeholders.

Task 3. Developing a Situation Analysis Report

The situation analysis, prepared by taking into consideration the ground realities, local conditions, and assessment of the present sanitation situation. It will include inputs from all the above activities with the details of existing household sanitation arrangements, public sanitary conveniences, wastewater disposal, solid waste management and water supply. The report will also include an analysis of the ULB legal framework and byelaws, financial analysis of the ULB, data on key public and environmental health, user charges, willingness to pay, etc.

1.4.5 Developing Kanpur CSP

Having completed above steps, CSP has been formulated to articulate Sanitation Goals, specific quantifications both in terms of technical, capacities and financials based on stakeholder consultations and the analysis of choices made depending on costs of capital investments, operation and maintenance, monitoring, and evaluation.

Project priorities for sanitation need to consider:

- ☐ Serving the Unserved Urban Poor
- ☐ Serving the Unserved Schools
- ☐ Serving the Unserved Public Areas
- ☐ Institutional capacity building for sustainability and environmental monitoring
- ☐ Grant elements for demonstration pilot projects for eco-sanitation (private
- ☐ developers)
- ☐ Rehabilitation of existing facilities.
- ☐ Improvement of existing sanitation (septic tank sludge and effluent treatment).
- ☐ Extension of existing sewerage and sewage treatment (as a last priority).

Task 1. Formulation of Vision

This involves understanding the major aspirations with respect to urban development in the State through consultations and building an overarching vision that may be appropriate to the articulations. This involves following:

- ☐ Secondary information, data analysis and report review
- ☐ Brainstorming with key stakeholders and focus groups
- ☐ Understanding visions of concerned sectors and other constituents e.g., cities and development agencies and concerned authorities.

Task 2. Development of Strategy

This involves understanding the major issues of the sector, priorities laid down and an assessment of how the current arrangements are working with respect to urban development in the city. Also, the key strengths, major weaknesses, potential opportunities as well as likely threats would also be analysed to move towards the identification of the action areas/intervention areas that form the strategy development. This involves:

- ☐ Completion of information analysis, even with quick estimates, and review of current policies and priorities
- ☐ Consultations with key stakeholders/ focus groups concerning
- ☐ Detailed discussion with departments/ agencies/ cities/ authorities

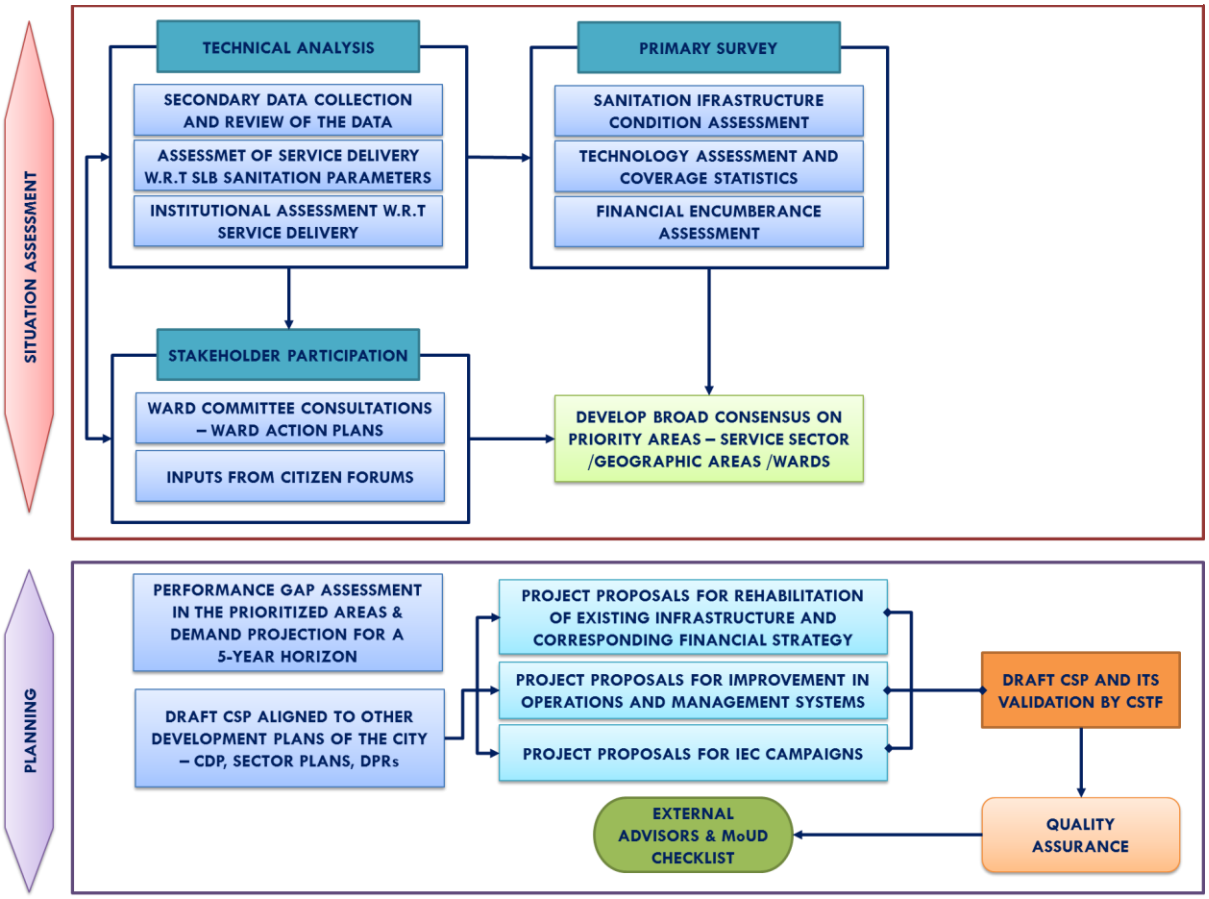
Task 3. Preparation of Draft CSP

Finalization of CSP along with recommendations based on the situation and solutions for making city open defecation free and totally sanitized, public toilet and community toilets models and operational models; proto - type design recommendation for all typical situations, waste disposal mechanisms, starters for sewerage layouts and estimation of requirement in terms of capacities, quantity and finances.

Task 4. Preparation of Implementation Road Map

This involves identifying and documenting interventions for the improvement of sanitation. The cost estimates of such interventions; the institutional responsibility as well as broad timelines for implementation will be indicated in the CSP

FIGURE 1-3: ESSENTIAL COMPONENTS OF CSP



1.5 .Contents of the Report

The report has two major sections –

I. The Situational Analysis (***Chapter 1 to Chapter 5***)
II. The Sanitation Strategies (***Chapter 6***)

The former section deals with depicting the city and its present status with regards to sanitation. The aim is to highlight the existing conditions regarding access and coverage of sanitary facilities, identify the gaps and striking issues, and understand the behavioral aspects of various sections of the society. This section is covered from Chapter 1 to Chapter 5.

The later section thereafter provides strategies and solutions to bridge the identified gaps, mitigate the existing issues, and provide ways and means to aid the sustenance of the existing and proposed strategies and projects. There have been presented in Chapter 6.

I. The Situational Analysis

Chapter 1 gives insight into the NUSP and the sanitation ranking of cities thereafter an introduction to CSP process, its background, and the objectives behind it. This is followed by the step-by-step methodology of the CSP process, as well as the status of the CSP for the particular city. The process of collection of baseline information both primary and secondary has been explained at length. Later half of Chapter presents a review of the policies & programmes that are prevalent and followed in the state for the improvement of access and coverage of sanitary facilities while developing the sanitation conditions in the urban areas.

Chapter 2 deals with the City Profile where the various aspects of the city are discussed in order to get a broad overview of the city itself. Aspects such as location, regional linkages, demography, economic, land use and housing profiles, the urban governance, the slums and squatter settlements are discussed.

Chapter 3 is presented in two sections - ***Section A*** highlights the prevailing sanitation conditions of the city in the sectors of water supply, sewerage system, solid waste management and storm water drainage system as part of the primary data, compiled from the various surveys conducted in the city. It contains zone wise analysis of the data. ***Section B*** highlights the service profile of the sectors of water supply, sewerage system, solid waste management and storm water drainage system based on the secondary sources of information. The performance of each of the sectors is evaluated through Service Level Benchmarking (SLB) indicators, and projections are also made for the future years.

Chapter 4 aims to evaluate the institutional capacity and the financial structure, to assess the capacity of KNN along with its associated organizations to cater to the sanitation needs of the city, with regards to both adequate qualified personnel and adequate financial resources.

Chapter 5 identifies the gaps and issues in access, coverage and service delivery within each sector, the problem areas are clearly demarcated.

Chapter 6 also brings out the need assessment for the IEC and awareness campaign in the city.

II. Sanitation Strategy

Chapter 7 presents the strategies – ***Section A*** presents the technological strategies and ***Section B*** demonstrates the respective financial strategies. The chapter provides the vision for the CSP and its goals, and the basic guiding principles on which the strategies are based. Thereafter, strategies have been provided to improve coverage and access to sanitation facilities, to implement effectively the various proposals, and options and mechanisms for effectively financing the strategies and proposals along with proper phasing mechanism.

CHAPTER 2. PROFILE OF KANPUR CITY

Topics of Discussion

- Location and Regional Linkages
- Physical Characteristics
- Demography

2.1 Location and Regional Linkages

2.1.1 Location

Kanpur is the tenth most populous city in India and the largest city within the state of Uttar Pradesh. It is situated on the southern bank of Ganga River and has been an important place in the history of modern India. It remains one of the oldest industrial townships of North India and is one of the fastest growing cities of India especially the industrial growth. It has a metropolitan area of over 1,640 square kilometers (630 sq km) and a city area of around 260 sq km with an approximate population of 5 million inhabitants. Kanpur is divided into two districts, namely, Kanpur Nagar and Kanpur Dehat. Kanpur comprises of3-tehsils, 2-Municipal Board, 2-Nagar Panchayats and 10-Statutory Towns. Kanpur is also divisional headquarters of Kanpur Commissionary consisting of Kanpur Nagar, Kanpur- Dehat, Etawah, Auraiya, Farrukhabad and Kannauj districts. It is also home to several globally recognized institutions such as IIT Kanpur, Harcourt Butler Technological Institute (HBTI), GSVM Medical College, and CSM University. Kanpur is the main center of commercial and industrial activities and is also called the commercial capital of the state. It is known for its cotton and woolen textile and leather industries. This resulted in attraction of more population and pressure on existing infrastructure services and facilities with an adverse impact on the existing water bodies and natural habitat.

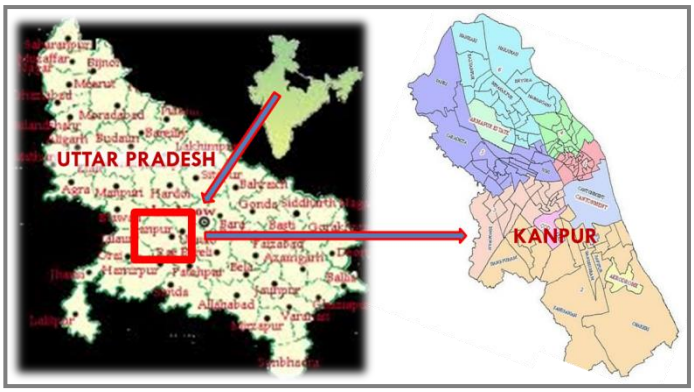


FIGURE 2-1: LOCATION MAP OF KANPUR CITY

TABLE 2-1: SUMMARY OF QUICK FACTS - KANPUR CITY

CATEGORY	YEAR 2001	YEAR 2011	REMARKS
POPULATION	2551337	2767031	*% of Population in Slum Areas – 18% - % of Population in Non-Slum Areas – 82% - (per ASCI Estimates- extrapolating from 2001 Census)*
HOUSEHOLDS	377150	554399	*No. of Households in Slum Areas – 1,16,215 No. of Households in Non-Slum Areas – 4,38,184 - (per ASCI Estimates)*
FAMILY SIZE (AVG.)	6.8	5	*ASCI Calculations*
NO. OF SLUM AREAS	n.a	356	*Source: KNN*
AREA	260 sq.km	260 sq.km	*Average Density – 11231 persons/ sq.km; More in case of slum areas*

2.1.2 Metropolitan Region Area

The metropolitan region defined under JNNURM by Kanpur Nagar Nigam, includes the Kanpur Nagar Nigam area, 8 kilometer around KNN boundary and newly included 47 villages of Unnao district on the north-eastern side, it spreads till Murtaza Nagar, in the west its limit is upto Akbarpur Nagar Panchayatraj limit, in the eastern side the limit has been expanded on the road leading to Fatehpur and is extended upto the metropolitan region area includes the area of

Shukla ganj nagar palika, Unnao Nagar Palika, Akbarpur Nagar panchayat, Bithur Nagar Panchayatraj area.

2.1.3 **Economy**

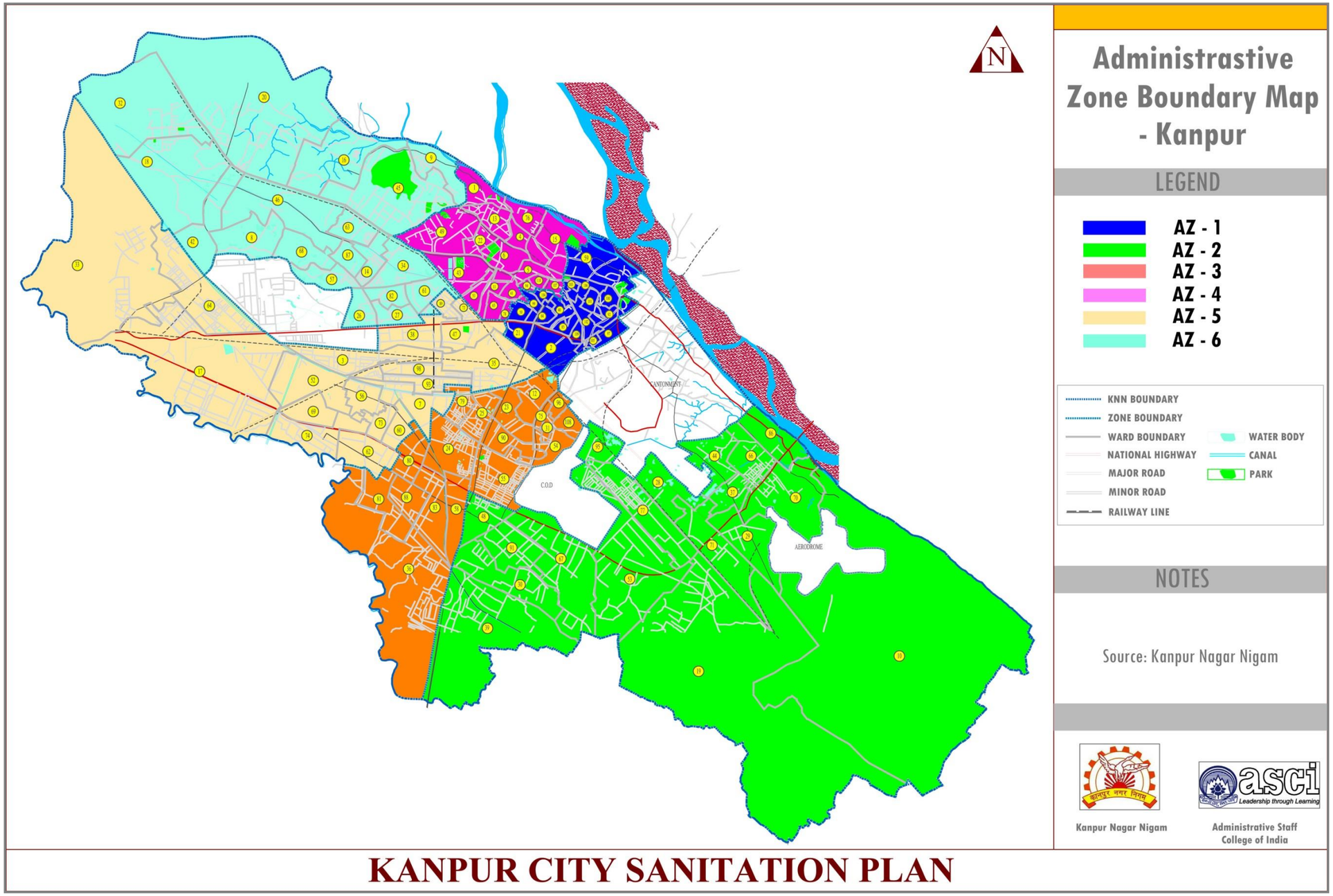
Kanpur has traditionally been an industrial city and on economic center. In the past, it was the second most industrialized city in India being second only to Calcutta. Due to large number of cotton textile units and a vibrant trade center for cotton it was also called the 'Manchester of India'.

Kanpur has several locational advantages i.e. location at a vantage point on two national highways i.e. NH2 and NH25; raw material availability for many industries viz. leather, food processing, plastics etc., proximity to large markets, availability of skilled manpower due to various institutes located within Kanpur (viz. Indian Institute of Technology, Chander Shekhar Azad Agricultural University, Central Pulse Research Institute, Leather Institute etc.) and existing traditional industrial base attracting skilled workers to the city. Therefore, industries received an impetus and the proximity to river Yamuna was also an added advantage. The traditional handicrafts flourished, patronized by the Mughal court.

During the British times, it was mainly the industries related to tanneries, cotton and woolen clothes production, sugar mills, flour mills, refineries which were established in Kanpur. During that time Kanpur was of strategic importance for movement of troops from one region of the country to another. This led to development of a large cantonment base at Kanpur and contributed to development of leather industry in the form of various saddle units catering to the requirement of British troupes.

Post-independence, Kanpur continued to be an important city and large public sector companies such as British India Corporation, National Textile Corporation, ordnance factories, etc were set up here. Private sector also set up large units such as many factories of JK Industries group, Lohia machines, Duncans, etc. At present, Kanpur has mostly industries relating to leather shoe making and cotton textiles. Other factories include manufacture silk, woolen and jute textiles, food products, fire-bricks, fertilizers, railway wagons, textile machinery, television sets, metal ware, leather goods, soap, tents, durries, fountain pens, hosiery, cutlery, television picture tubes, etc

MAP 1: ADMINISTRATIVE ZONE MAP



2.2 Physical Characteristics

2.2.1 Climate

The climate is of a tropical nature and shade temperature varies from 2°C to 48 °C.

Rainy season extends from June to September, with the period of maximum rainfall normally occurring during the months of July and August. About 89 percent of the annual rainfall is received during the monsoon months (June to September). The total rainfall in the district varies from between 450 mm to 750 mm. The annual rainfall in Kanpur Nagar was recorded 441 mm in actual in 2004 and 783 mm in general (Statistics Diary, 2005). On an average there are 40 rainy days i.e. days with rainfall of 2.5 mm or more in a year in the district. This number varies from 35 mm at Narwal to 45 mm at Kanpur.

The relative humidity varies from 15% to 85%. The relative humidity in Kanpur ranges from less than 30 percent in the summer season to 70 percent in monsoon season

2.2.2 Geology & Geography

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 are of saline earth from which salt petre and salt are derived and limestone conglomerates (U.P. District Gazetteers Kanpur).

2.3 Demography

2.3.1 Population Growth and Trends

The present population of Kanpur, in 2011, is about 27,67,031 (*Source: Census 2011*) with municipal area of about 261.50 Sq.km. In 1961, municipal area was 114.55 sq. miles which has increased to 261.51 Sq.km. Kanpur is the most important metropolis and biggest city of Uttar Pradesh. It is administratively divided into 6 administrative zones and 110 wards with an average ward population range of 19,000 to 26,000.

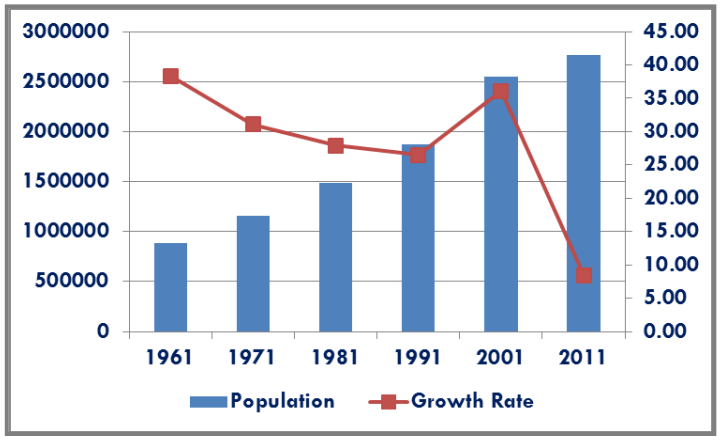


FIGURE 2-2: POPULATION AND GROWTH RATE TREND - KANPUR CITY

According to the *Census 2001*, the city had a population of 25, 51,337, as compared to the 18,74,409 people registered in 1991,.which made it the fifth most highly-populated city in India. In spite of a low percentage of irrigated area, the density is quite high which is mainly due to industrial concentration. This results in additional burden on the existing infrastructure facilities and services unless they are upgraded to the population growth and their demands.

It may be observed that the average annual growth in population has increased to 3.5 percent during the period 1991-2001 from the average annual growth rate of 2.6 percent in the previous decade (1981-91). One of the factors attributed for this kind of growth is the higher number of in-migration to Kanpur City from other areas. Figure2-2 illustrates the details of population and growth rates of the population.

There are about Six Administrative zones in the Kanpur City depicted in the above Map-1 and Administrative zone-wise population data is provided in table 2-2 below –

TABLE 2-2: ADMINISTRATIVE ZONE WISE DATA

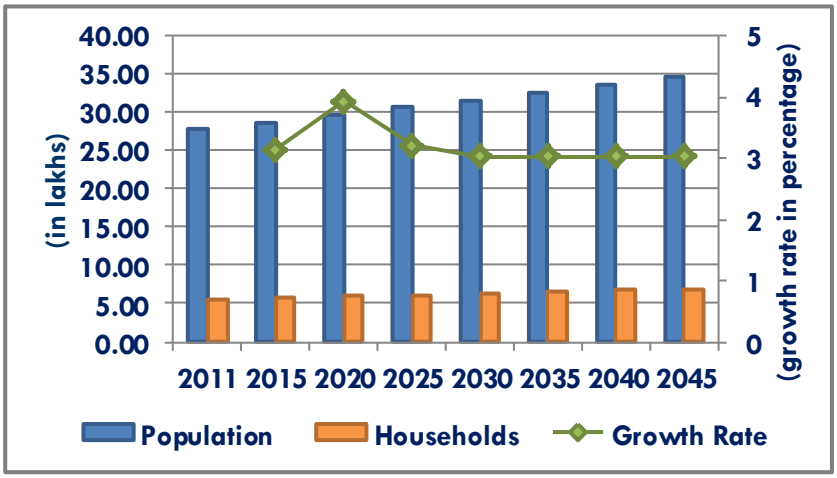
ADMINISTRATIVE ZONE	NO. OF WARDS	POPULATION AS PER CENSUS 2011 (PROVISIONAL)	NO OF HHS AS PER CENSUS 2011 (PROVISIONAL)
Zone -1	19	400065	80013
Zone-2	18	569310	113862
Zone-3	18	468315	93663
Zone-4	19	332555	66511
Zone-5	19	491679	98336
Zone-6	17	510068	102014
Total	**110**	**2774512**	**554399**

2.3.2 Population Projections

In the context of the City Sanitation Plan, population estimation and projection are being carried out with the following objectives: (1) to obtain a realistic estimate of the total current population in the city and the spatial distribution of the same through empirical methods; (2) to take informed strategic decisions on provision of sanitation infrastructure and services for the city as a whole and for different parts of the city; (3) In taking strategic decisions, to strive for a reasonable balance between the risks of adequacy and viability in the future.

Please refer to Annexure 6 for detailed population projections and the assumptions made in the process. The adopted methodology is also enunciated.

As an initial exercise, the population for 2011 is taken from the census data. The population projections are made for the years 2012 – 2045 based on the following assumptions - the decadal growth rate witnessed during 2001-2011 is 7.8% and the same decadal growth rate has been assumed for the years 2011-2021;



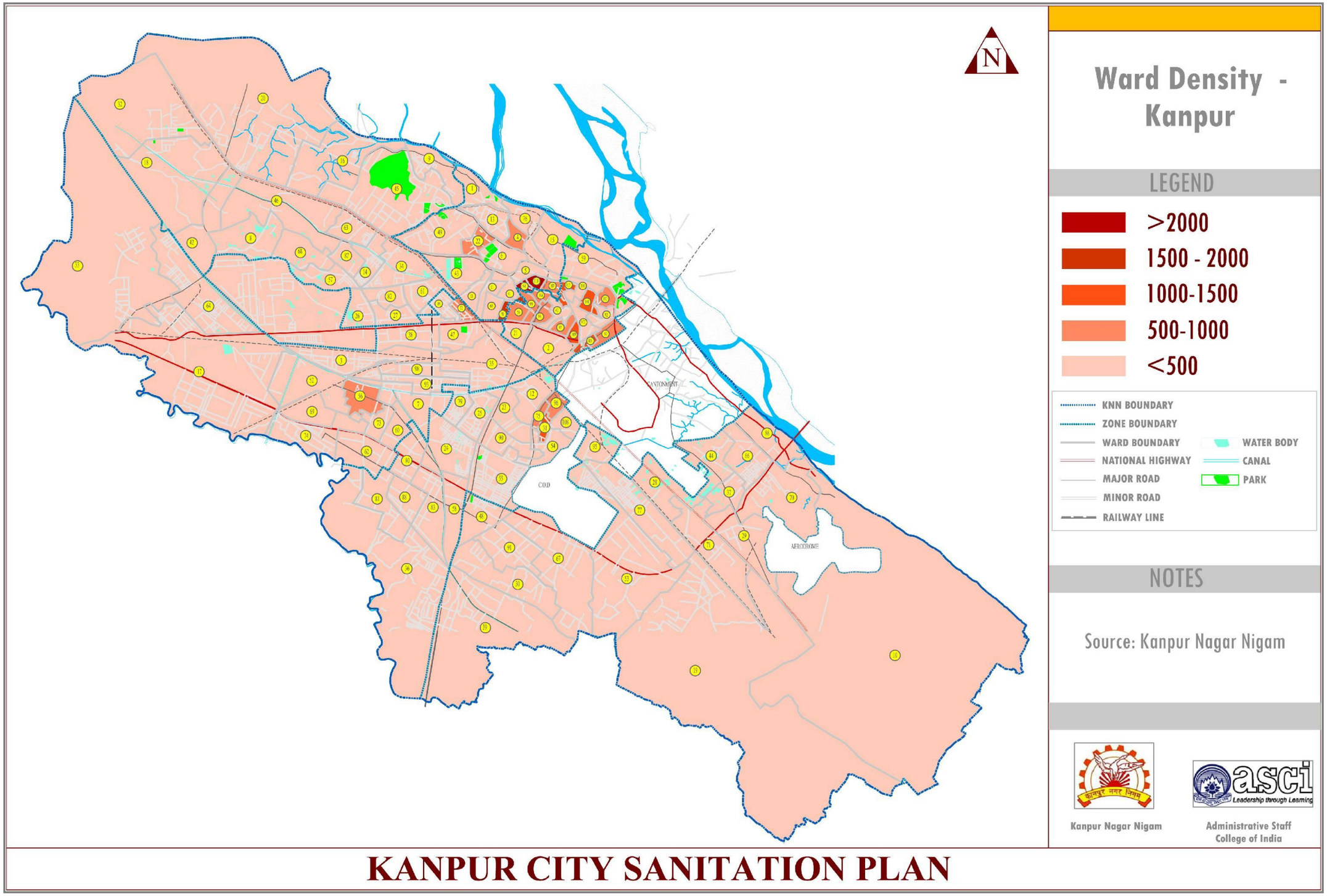
it is further assumed that efforts shall be made by the city administration to achieve a lower decadal growth rate for the years 2021-2045. The ultimate goal shall be to achieve a steady decadal growth rate of 2% with the underlying objective to stabilize and sustain the growth of the city. The results are tabulated below.

FIGURE 2-3: POPULATION PROJECTS - KANPUR CITY

TABLE 2-3: PROJECTED POPULATIONS AND CITY LEVEL INFRASTRUCTURE DEMAND

YEAR	2012	2017	2021	2025	2031	2035	2041	2045
PROJECTED POPULATION (IN LAKHS)	27.96	29.06	29.97	30.70	31.82	32.59	33.78	34.60
GROWTH RATE (IN PERCENTAGE)	0.78	3.93	3.13	2.42	3.65	2.42	3.65	2.42
WATER DEMAND AT CONSUMER END (MLD)	419.42	435.91	449.56	460.45	477.27	488.83	506.70	518.97
SEWAGE GENERATION (MLD)	335.54	348.73	359.65	368.36	381.82	391.07	405.36	415.17
SOLID WASTE GENERATION (METRIC TONNE)	1258.27	1307.72	1348.68	1381.34	1431.82	1466.50	1520.09	1556.90

MAP 2: WARD DENSITY MAP FOR KANPUR CITY



The infrastructure demand corresponding to the projected populations have also been computed at the city level. The per capita demand of water as per the recommendations in CPHEEO manual has been considered at 150 lpcd and the corresponding sewerage generation is estimated at 80% of the water consumption; while the per capita solid waste generation is assumed as 0.45 kg/per capita/per day. (*Please refer to Annexure 6 for the assumptions underlying the city level infrastructure demand*)

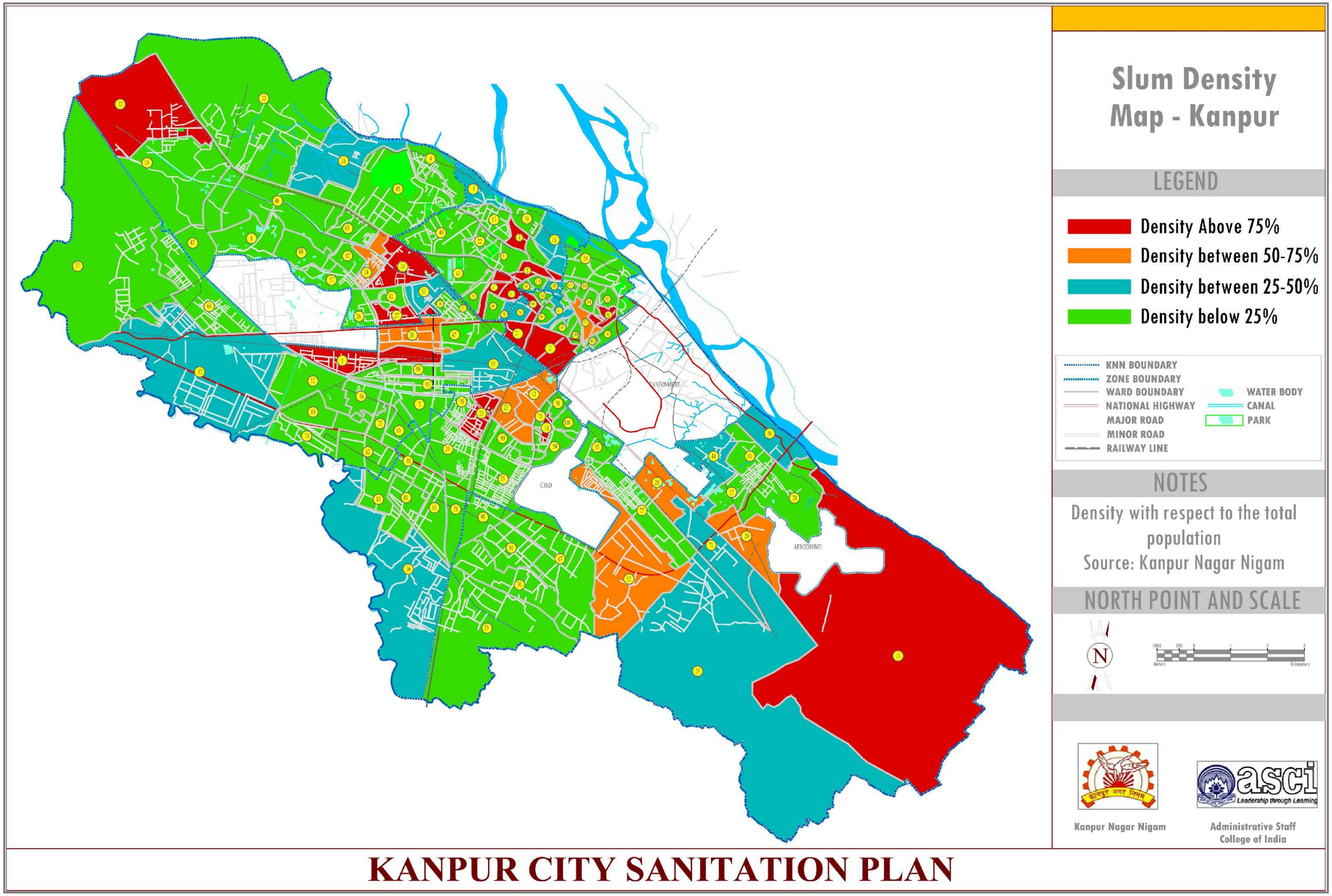
2.3.3 **Urban Poor**

The focused discussions with various stakeholders of the city reveal that poverty levels are quite high in Kanpur City; however, recent studies are unavailable to accurately assess the extent of poverty levels in Kanpur. According to Kanpur Nagar Nigam, there are 356 notified slums in the city.

The closing down of many industries in the city coupled with the status quo of several sick units has led to large unemployment and subsequent increase in urban poverty. In addition to this, approximately 18% (*ASCI estimates*) of the population in Kanpur stays in areas marred with unhygienic living conditions and lack of civic amenities. The urban infrastructure is not satisfactory enough to bring homogenous development in new areas. The growth of housing stock has not been commensurate with the population growth, resulting in an increase in the housing stock deficit ultimately leading to the origination and growth of slum dwellings.

As per the survey conducted by DUDA in 2003 and the documents from KNN, total number of slums in Kanpur is 390. According to census 2001, the slum population was 3.68 lakh i.e. 14.5% of total Population. As per KNN estimate in 2006, slum population was about 5.0 lakh which corresponds to 20% of total population. Extrapolating the 2001 census data and the KNN estimate of 2006 and the KNN estimate of slum areas in 2011, ASCI team estimates that 18% of the population resides in the slum areas and the remaining 82% resides in non-slum areas.

MAP 3: SLUM DENSITY MAP FOR KANPUR CITY



CHAPTER 3. SANITATION SITUATION ANALYSIS

Topics of Discussion

- Secondary Data Analysis
- Primary Data Analysis

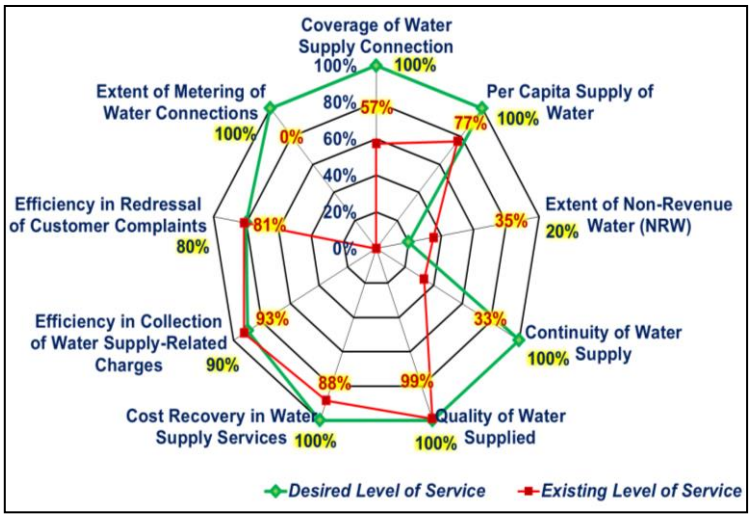
The primary and secondary surveys have indicated that like most of the other municipalities, there is a large gap between the level of infrastructure service requirement for the city to cater to the demands of the proliferating population and the actual service level prevailing in the city. Besides the accessibility deficiencies, there is also lack of operation and maintenance systems for the existing infrastructure facilities and services resulting in the deterioration of the existing services and facilities further worsening the sanitation conditions within the city limits. The city being a location to world's industrial center also adds to the burden to existing infrastructure; additionally, it also houses high population and high percentage share of slum population resulting in more unhygienic and unhealthy pockets of areas in and around the city limits.

The following sections present the qualitative and quantitative aspects of the sanitation in the city within the sectors of – (a) ***water supply*** with prime focus on the quality of water supply at the consumer end, (b) ***access to toilets***, (c) ***sewerage management***, (d) ***storm water management***, and (e) ***solid waste management***.

SECTION A: SECONDARY DATA ANALYSIS

3.1 Water Supply Management Assessment

The Service Level Benchmarks (SLB) established by the Ministry of Urban Development, Government of India, for the sector of Water Supply attempts to compare the service levels against the nine (9) key parameters as indicated in the spider chart. The spider chart demonstrates the desired level of service in the water supply sector against the nine (9) key parameters vis-à-vis the existing level of service.



The spider chart denotes that the city administration needs to beef up efforts to improve the coverage and continuity of water supply while ensuring the metering of water connections to the desired level. It is however encouraging to note that the extent of non-revenue water is at tolerable levels and the quality of water supplied measures up to the required standards; additionally the ULB has been successful in its attempts of cost-recovery owing to its well-efficient systems for collection of water supply related charges. However, the redressal of customer complaints is still an area of concern.

3.1.1 Quantitative Statistics - Water Supply and Demand

Section 2.2.8.3 of the CPHEEO Manual recommends a water consumption requirement of 135 lpcd for residential and non-residential users (non-residential includes retail non-domestic consumption such as commercial development, but does not include non-residential bulk consumers like large-scale industries, industrial estates, large institutions, etc.). Considering the population in

2011 for the city of Kanpur and the CPHEEO recommendation, the water demand for the city of Kanpur is estimated at 415.05 MLD, while the supply of water at the consumer end is 331 MLD (*Source: Kanpur Nagar Nigam*) corresponding to a consumption rate of 78 lpcd.

TABLE 3-1: WATER SUPPLY-DEMAND STATISTICS - KANPUR CITY

WATER DEMAND (MLD)	WATER SUPPLY (MLD)	REMARKS
415.05	331	*Source for water supply figures is Jal Kal Vibhag, Kanpur*

3.1.1.1 SOURCES OF WATER SUPPLY

The main source of surface water in the city is from the catchment of Ganga river and Pandu river. The water flow in the Ganga varies between a mean minimum of 72.6 m^3/s and a mean maximum of 8.860 m^3/s. After tapping water from upper and lower Ganga canals, minimum water flow of 6m3/s is maintained in the river Ganga near Kanpur. After construction of Ganga Barrage, a permanent and reliable source for the water supply is available to provide 1600 MLD raw water. This is sufficient to cater to the needs of the city till the year 2031.

The total amount of water available to the distribution system from these two surface water sources is 300 MLD while 120 MLD is drawn from groundwater, comprising of tube wells and hand pumps. In addition, there are large numbers of private bore wells in residential and industrial areas which are unaccounted for.

TABLE 3-2: SOURCES OF RAW WATER - KANPUR CITY

SOURCE OF WATER	VOLUME OF WATER SOURCED (MLD)	REMARKS
Surface Water	***300***	
Ganga Channel at Bhaironghat	230	
Lower Ganga Canal	60	
Ground Water	***120***	
Tube Wells	80	*135 tube wells are accounted for*
Hand Pumps	50	*9830 hand-pumps are accounted for*
Total	**420**	*Source: Jal Kal Vibhag*

3.1.1.2 COVERAGE OF WATER SUPPLY SERVICES

The total water supply installed capacity is 508 MLD but only 420 MLD of potable water is being supplied. The total supply from treatment plants is about 300 MLD and approximately 120 MLD water is drawn from groundwater.

The distribution network covers about 80% of the city area (*Source: Kanpur Nagar Nigam*), nevertheless the distribution system need improvement. The water supply system in inner core area is very old and needs to be rehabilitated. This has resulted in water scarcity in core areas such as Chamanganj, Baeongamjek etc. from where KJK is facing complaints quite often.

There are 5,54,399 properties in Kanpur (*Source: Census data 2011*) and out of them only 2,05,910 HHs have domestic connections (*Source: Kanpur Nagar Nigam*), however, they are unmetered and information about the Bulk water supply to apartments, societies, commercial connections and public tap is not available. This translates to an extent of coverage of water supply connections to about 57%. It is also relevant to highlight the statistic that the continuity of water supply is a mere 6 hours per day.

The non-revenue water is estimated at about 35%, while the leakage (UFW - unaccounted-for water) from Benajhaber works is estimated to be 30 percent due to old and leaky pipelines.

3.1.2 Qualitative Statistics – Water Supply

Kanpur Nagar Nigam reveals that the quality of water at intake point has been satisfactory with dissolved oxygen values ranging from 4.5 mg/l to 7 mg/l. Conventional methods of water purification, viz, coagulation, filtration and, disinfection are used to treat surface water from the River Ganga and Lower Ganga Canal.

The supply of surface water from different intakes is being treated at the Benajhabar Treatment Works from where it is supplied to 28 zonal pumping stations. Thus there is an installed treatment capacity/ storage capacity (OHT) of 538 MLD of surface water, however, presently only 420 MLD of water is treated and supplied to the distribution system.

The quality of treated water at distribution end (at the outlet point of the treatment plant) is confirming to the Bureau of India Standards. Several samples are taken at the distribution end for the following tests – (a) residual chlorine, (b) physical and chemical tests, and (c) bacteriological tests and the tests confirm the satisfactory quality of the treated water. Table 3-3 presents the test results; *please refer to Annexure 9 for water quality test reports provided by KNN.*

TABLE 3-3: WATER QUALITY ANALYSIS RESULTS- KANPUR CITY

SAMPLE LOCATION	NO. OF SAMPLES/YEAR	TEST CONDUCTED	TEST RESULT
Outlet of Water Treatment Plant	32040	Residual Chlorine	31776 samples passed the test (99.2%)
Outlet of Water Treatment Plant	2568	Physical/Chemical	2568 samples passed the test (100%)
Outlet of Water Treatment Plant	192	Bacteriological	192 samples passed the test (100%)

The quality of water at the consumer end however varies at different locations and is unusable for potable purposes at few points (Source: Kanpur Nagar Nigam) due to contamination of drinking water in the distribution network. The contamination is often attributed to the old and deteriorated condition of the water supply pipes.

3.1.3 Ongoing Interventions in Water Supply Sector

PHASE	PHYSICAL PROVISION	OVERALL PROGRESS
PHASE I (JNNURM Programme)	***Raw Water Intake cum Sump - 02 units***	**80%**
	Rising Main - 300m	
	Water Treatment Plant - 200 MLD - 1 No	
	Clear Water Feeder Main - 48 km	
	RCC Zonal Reservoirs cum Pump Houses - 38 No.s	
	RCC Overhead Tanks - 14 Nos	
	Distribution System - 700 km	
	E&M Works	
PHASE II (JNNURM Programme)	***Raw Water Pump House - 1 No***	**75%**
	Rising Main - 800m	
	Water Treatment Plant - 200 MLD - 1 No & 28.5 MLD - 1 No	
	Clear Water Feeder Main - 65 km	
	RCC Zonal Reservoirs cum Pump Houses - 38 No.s	
	RCC Overhead Tanks - 32 Nos	
	Distribution System - 1045 km	
	E&M Works	

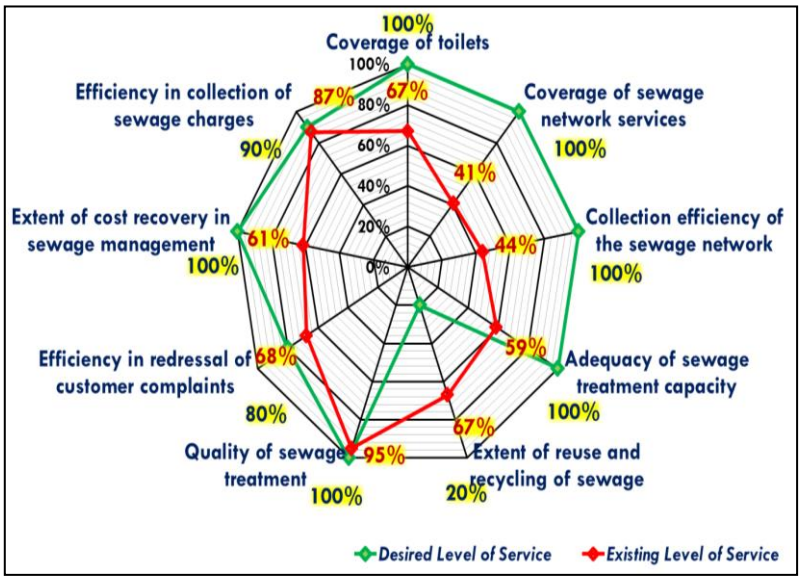
Source: UP Jal Nigam

On completion of above proposed works of both phases, all the 110 wards will be benefited from drinking water supply and would be augmented as per CPHEEO norms.

It is proposed to provide the water supply to almost entire city from river source through newly constructed barrage at the up Stream of Ganga River. So all the proposed works will come to public utility only after the completion of water treatment plant and corresponding feeder mains

3.2 Sewerage Management and Access to Toilets Assessment

The Service Level Benchmarks (SLB) established by the Ministry of Urban Development, Government of India, for the sector of Sewerage and Access to Toilets attempts to compare the service levels against the nine (9) key parameters as indicated in the spider chart. The spider charts demonstrates the desired level of service in the sewerage sector and access to toilets against the nine (9) key parameters vis-à-vis the existing level of service.



The spider chart denotes that the coverage of the sewerage network is a mere one-third of the required level and requires a remarkable augmentation in order to serve the city to the desired standards; however the existing extent of sewerage network in the city has exhibited an optimum collection efficiency (44%) of total waste water generated. The major issue for the KNN is the inadequacy of the current treatment capacity as well as the deficient quality of the sewage treatment. It is however reassuring to note that the KNN has been successful in its attempts of cost-recovery owing to its well- efficient systems for collection of sewage charges. Notwithstanding, the redressal of customer complaints is still an area of major concern.

The coverage of toilets in the city is 67% of the total coverage and yet resulting in a greater percentage of the households (64%) resorting to open defecation. Stringent measures are solicited to address the grave concern of prevalent open defecation.

3.2.1 **Existing Sewerage System**

The length of existing sewers / trunk sewers of Kanpur city is around 1100 km, out of which around 800 km. long sewers exist in core area. Brick sewers laid 60 to 100 years earlier have been encountering the incidences of collapsing of old brick sewers. At present around 426 mld sewage is being generated and facility for treating only 162 mld is available, rest of the sewage is finding its way to river Ganga through open drains. Today the tannery waste water generated is to the tune of 50 mld (as per CLRI study), which makes the existing facility insufficient. Excess tannery waste water flows into the river Ganga without treatment.

To abate the pollution of River Ganga, ***Ganga Action Plan (GAP-I)*** was launched by Govt. of India in the year 1985-86. In GAP-I, facilities for interception, diversion and treatment of domestic wastewater and tannery wastewater were created. In GAP- I, 18 schemes were sanctioned by NRCD and all schemes were completed by making an expenditure of Rs. 73.05 Cr.

Government of India and National River Conservation Directorate (NRCD) have recognized that the benefits of Ganga Action Plan (GAP) will be short lived as the GAP projects and proposals have focused on reducing pollution loads by diverting sewage at the tail end of drains during dry weather only. GAP does not address the need for removing sewage from the drains to prevent pollution during wet weather. Nor does it address issues of public health and sanitation within the city. Diversion of drains, as proposed under GAP is an important initial step for improving water quality but in the absence of a sewerage master plan urban development continues without adequate infrastructure for public health and sanitation. Therefore a sewerage

master plan with a more holistic approach to the development of sewerage infrastructure is needed.

To improve the sanitary condition of the town, a sewerage Master Plan for Kanpur city was prepared by Japan International Corporation Agency (JICA) from Feb 2003 to Mar-2005. The Master Plan of Kanpur was approved by National Conservation Directorate, New Delhi in the year 2005. Adopting a decentralized approach, Kanpur city was divided into four sewerage districts I, II, III, & IV as per topography, to minimize cost and for easy O&M.

As per the Sewerage Master Plan, the distribution of area of Kanpur city, projection of population and anticipated generation of sewage in the coming years has been tabulated as below:

TABLE 3-4: SEWAGE MASTER PLAN - KANPUR CITY

Area of City	**25,810 hectare (Divided into four sewerage district)**		
District	**Area (ha)**	**Sewered area (ha)**	**Un sewered area (ha)**
District I -City Central	1,961	1569	392
District I -City East	3,664	1099	2,565
District II - City Central	2,706	2165	541
District II –South	4,254	1276	2,978
District III-West	7,243	1449	5,794
District IV-East	5,982	0	5,982
Total Area of City	25,810	7,558	18,252
Projected Population of Kanpur City			
District	**Population 2010**	**Population 2025**	**Population 2040**
District I -City Central	874,357	1,034,788	1,333,889
District I -City East	390,712	595,486	897,335
Sub-total	**1265069**	**1630274**	**2231224**
District II - City Central	1,061,879	1,383,586	1,798,232
District II –South	689,612	1,205,023	1,798,312
Sub-total	**1751491**	**2588609**	**3596544**
District III-West	422,740	1,033,890	1,968,178
District IV-East	110,700	347,226	836,054
Total	**3,550,000**	**5,600,000**	**8,632,000**
Sewage Contribution Rate	120 lpcd		
District wise Sewage Generation			

District	Sewage Generation (MLD) 2010	Sewage Generation (MLD) 2025	Sewage Generation (MLD) 2040
District I -City Central	104.92	124.17	160.07
District I -City East)	46.89	71.46	107.68
Sub-total	151.81	**195.63**	**267.75**
District II - City Central	127.43	166.03	215.79
District II –South	82.75	144.60	215.80
Sub-total	**210.18**	**310.63**	**431.59**
District III-West	50.73	124.07	236.18
District IV-East	13.28	41.67	100.33
Total	**426.00**	**672.00**	**1035.85**

Requirement of additional STPs

STP's (Capacity in MLD)

	2010		2025		2040	
	Required	**Existing**	**Required**	**Proposed**	**Required**	**Addl. requ-ired**
District I	152	162	196	43*	268	63
TANNERY	50	9	Deficit of 41 mld. refer coming para			
District II	210	0.00	311	210*	432	121
				(JNNURM)		
District –III	51	0.00	124	15*	236	112
				JNNURM		
District IV	13	0.00	42	42*	100	59
				JNNURM		

** Proposed at present.*

Source: Kanpur Nagar Nigam

3.2.2 Sewerage Generation

Sewage generation depends on the water supplied and it is generally considered as eighty percent (80%) of the water supply. It is essential to look at the water supply situation within Kanpur Nagar Nigam to assess sewage generation. In Kanpur City, the waste generated from industries also flow into sewers as the present arrangements do not segregate industrial effluents from domestic sewerage.

Table 3-4 presents the sewage generated in the city considering the water supply/consumption situation at various levels –

TABLE 3-5: SEWAGE GENERATION ESTIMATION - KANPUR CITY

	VOLUME OF WATER CONSUMED (MLD)	VOLUME OF SEWAGE GENERATED (MLD)
Domestic Connections	253	202.4
Non Domestic Connections	*7*	*5.6*

Public Taps	24	19.2
Other Connections	47	37.6
Total	**323**	**264.8**

Source: Kanpur Nagar Nigam

3.2.3 Sewerage Collection and Conveyance

Kanpur City has a total length of main and trunk sewer network measuring upto 74 km whereas branch sewer network in the city adds upto 875 Km. The sewer network covers only about 58% of the city. In several new colonies, the sewer branch lines are not connected to the trunk sewer lines resulting in the flow of sewer into open fields or into open drains. This condition leads to serious health hazard.

The old sewers are choked and broken and are a cause of contamination of ground water as well as the water supply distribution system. These are a serious health hazard and urgent repairs are required. At several locations in the city, the choked or overflowing sewers are broken and connected to the storm water drains resulting in serious contamination.

Kanpur City has 554399 properties (as per Census 2011) and according to Kanpur Nagar Nigam only 176182 of the total properties are connected to the sewer network corresponding to 32% of coverage; while statistics on the properties with onsite sanitary disposal is not available. The total amount of waste water measured in drains and at the STPs was about 360 MLD of which 160 MLD was intercepted under GAP-1. At present inflow of treatment plants is 74 MLD and it is only 17 percent of the total waste water generated. .

TABLE 3-6: ZONE-WISE DISTRIBUTION OF SEWER CONNECTIONS - KANPUR CITY

ADMINISTRATIVE ZONE	TOTAL NO. OF PROPERTIES	TOTAL NO. OF PROPERTIES WITH SEWER CONNECTIONS
AZ 1	80,013	26,985
AZ 2	113,862	32,284
AZ 3	93,663	24,242
AZ 4	66,511	22,768
AZ 5	98,336	37,987
AZ 6	102,014	31,916
Total	**554,399**	**176,182**

Source: Kanpur Nagar Nigam

The major zone i.e. City Drainage District with its underground sewerage system covers around 15 lakh population and generates 260 MLD of waste water with its outfall into river Ganga at Jajmau. In the 'South Drainage District' only some pockets are covered under the sewerage system and rest is disposed into open drains. The industrial effluent from Panki area meets the river Pandu separately through industrial drains. The West Drainage District has no sewerage facilities and the waste water flows in to Pandu River through open drains. The 'East Drainage District' which is primarily comprises of developing areas has no sewerage network

The waste water generated from different types of industries is left into sewer without any primary treatment at industries itself

3.2.4 Sewerage Treatment and Disposal

Three sewerage treatments (STP) are in operation in Kanpur City with total treatment capacity of 171 MLD. All the three plants are located in Jajmau, on the eastern side of the city. The details of treatment plants at Jajmau are as below:-

- ☐ 5 MLD UASB Sewerage Treatment Plant (STP)
- ☐ 36 MILD UASB Sewerage Treatment Plant (STP)
- ☐ 130 MLD ASP Sewerage Treatment Plant (STP)

The total waste water collected at STP is about 171 MLD, however, the treated sewage is approximately 74 MLD. It is reported that there is more than 60 MLD of waste water generated

within the city that is drained into River Ganga and River Pandu via the flow through open areas or open drains, without any prior treatment

Improper outfall arrangements and lack of treatment of all effluents results in high levels of pollutants in River Pandu due to the disposal of the untreated sewage into the river. According to SLB data total installed capacity of secondary treatment plant is 171 MLD whereas total waste generated is 332 MLD and adequacy of sewage treatment capacity is 52 %.

TABLE 3-7: DETAILS OF TREATMENT PLANTS - KANPUR CITY

	YEAR OF COMMISSIONING	TREATMENT CAPACITY (MLD)	TECHNOLOGY	SOURCE OF WASTE WATER	PLANT EFFICIENCY	DISPOSAL MECHANISM	REMARKS
1	1989	5	Upflow Anaerobic Sludge Blanket	Domestic Waste Water	Full Capacity	Treated Effluent flows into Nallas and eventually into Ganga. Dried sludge is sold to Farmers	Effluent from tanneries was also diverted to this plant but discontinued due to its adverse effect on the plant appurtenances and its operations.
2	1994	36	Upflow Anaerobic Sludge Blanket	Tanneries and Domestic Waste Water	Data Unavailable	The treated effluent is pumped into a channel that transports water to the sewerage farm with a total area of about 2,200 hectare. From the channel, irrigation water is fed to the farm lands	Designed for 175 tanneries however 354 tanneries are in operation, hence the capacity is insufficient.
3	1999	130	Activated Sludge Process	Domestic Waste Water	One-thirds of the capacity	The treated effluent is pumped into a channel that transports water to the sewerage farm with a total area of about 2,200 hectare. From the channel, irrigation water is fed to the farm lands	Illegal discharge from tanneries and industrial wastewater from various industries situated in city areas is being discharged regularly to 90 outfall sewers reaching the main pumping station from where sewerage is pumped to this plant

Source: Kanpur Nagar Nigam

3.2.4.1 ONGOING INTERVENTIONS IN SEWERAGE SECTOR

AREA OF INTERVENTION	NAME OF SCHEME	PHYSICAL PROVISION	PROGRESS	OVERALL PROGRESS
Sewerage District 1 (Inner Old Area of Kanpur)	Sewerage Works	Sewer Line - 69 km	58 Km	**84.0%**
		Rising Main - 4.6 Km	91%	
		Renovation of old STPs - *(5MLD, 36 MLD, 130 MLD)*	93%	
		Renovation of old S.P.S - 11 items	91%	
		New STP 43 MLD	35%	
		New STP 15 MLD	20%	
Sewerage District 3 (Bingawa)	STP Works	New STP 210 MLD	65%	**65.0%**
Sewrage District 4	Sewerage Works	New STP 42 MLD	42%	**49.5%**
		Sewer Line - 130.9 Km	96 km	

		I.P.S. (40MLD +14 MLD)	32%	
		M. P. S. (42 MLD)	32%	

The total capacity of the new STPs being developed in all the different sewerage sectors shall cater to the demand of population until year 2025.

3.2.4.2 SEWERAGE PROJECTS SANCTIONED UNDER JNNURM

To improve the sanitary condition of the town and for improvement of sewerage infrastructure of the Kanpur city, following three projects have been sanctioned under JNNURM. Projects have been prepared as per sewerage master plan adopting de centralized approach, thereby projecting population for different sewerage districts and proposing separate STPs for different districts.

1. **Sewerage works in inner old area of Kanpur (Part-I)**

   Approved cost is Rs.190.88 crore. Major works sanctioned are as follows:

   - Renovation/Rehabilitation of existing Common Sewage Pumping Station (CSPS)
   - Renovation/Rehabilitation of existing 5 mld & 130 mld Sewage Treatment Plants and 36 mld Tannery Waste water Treatment Plant.
   - Renovation/Rehabilitation of existing 7 Nos. Intermediate Sewage Pumping Stations.
   - Renovation/Rehabilitation of existing 4 Nos. Tannery Sewage Pumping Stations.
   - Renovation/Rehabilitation of existing rising mains of 4 Nos. Tannery waste water Pumping Stations.
   - Laying of 350 mm to 2000 mm diameter trunk sewers in 69.00 Km length in core area of the city.
   - Augmentation of 130 mld capacity Jajmau STP by constructing another unit of 43 mld based on ASP technology.
   - 15 mld capacity MPS and **STP at Baniyapurwa** in Sewerage District III based on the topography of this sewerage district. Execution of the project is in progress and is likely to be completed by the end of March-2014.

2 **Construction of 210 mld STP at Bingawan (Part-II)**

   Sanctioned original/revised cost Rs. 101.0045/141.96 crores. Sewage treatment plant of 210 mld capacity has been sanctioned under JNNURM (Part II) for part of sewerage district – II based on the available sewerage infrastructure created under Ganga Action Plan Phase II. This STP of 210 mld capacity is under construction at **Bingawan, Kanpur**. Execution of the project is in progress and is likely to be completed by the end of March-2014.

3 **Sewerage works in inner old area of Kanpur (Part-III)**

   Approved cost Rs. 207.36 Crore. Comprehensive proposals have been made in this project to provide sewerage facilities in sewerage district IV of Kanpur for 4 wards namely Chakeri (10), Sanigawan (19) Delhi Sujanpur (53) and Shyam Nagar Sujanpur (77). The work includes 2 Nos. Intermediate Sewage Pumping Station of 14 MLD, 42 MLD

Main Pumping Station, 42 MLD STP and Laying of 131 km sewer line and allied works inhabitated developed area. 42 mld STP is under construction at **Sajari, Kanpur**. Execution of the project is in progress and is likely to be completed by the end of March-2014.

Tannery Waste Water Treatment

To treat tannery waste water, there exists a STP of 36 MLD capacity constructed under GAP-I with Indo-Dutch collaboration in the year 1989, in which 9 mld of tannery waste water is mixed with 27 mld of domestic waste water. Waste water from tanneries is brought through 4 Nos pumping stations via 12.6 km long conveyance channel. Writ petition no. 4003/2006 regarding the relocation of tanneries was filed in Hon'ble High Court of Allahabad and the Hon'ble Court directed the Govt. of U.P. to consult C.L.R.I. Chennai, in turn of which Govt. of U.P. solicited CLRI to undertake a study in tannery area of Jajmau Kanpur. CLRI Chennai did the study in the area and concluded that the tannery waste water generated at present is about 50 MLD. This conclusion was made in the light of existing number of tanneries and their processing methods & capacity. Tannery waste water will not go beyond 50 MLD as it has recommended the capping on the no. of tanneries. Therefore capacity of CETP will remain same for the year 2025 & 2040. CLRI recommendations are as follows:

- Redesigning and up gradation of Primary Treatment System and Chrome Recovery System for individual tanneries.
- Redesigning and up gradation of Common Chrome Recovery System.
- Up gradation of collection system in Jajmau area and up gradation of existing pumping stations
- Construction of Common Effluent Treatment Plant (CETP) for 50 mld capacity
- Construction of Secured Land fill Facility (SLF) : 10 years

NGRBA PROPOSALS

Government of India (GoI) constituted the National Ganga River Basin Authority (NGRBA), on 20th February 2009, for the comprehensive management of the river. The NGRBA has resolved that by year 2020, no untreated municipal sewage or industrial effluents will be discharged into River Ganga. In order to achieve that objective, the whole city is required to cover with sewer network so that all the domestic and industrial sewage could be stopped from flowing into the nalas and receive at existing/proposed STPs. In the light of above projects are being prepared to cover whole of Kanpur city with sewer network.

Sewerage works in District-I

Project for sewerage district-I has been prepared to provide sewerage facilities. This district comprises of 34 wards and covers an area of around 56 hectares. In this project 425 km. sewer line and 6 no. pumping station have been proposed. Since there exists three STPs and one under construction in this district, which is sufficient to treat the sewage load upto year 2025, therefore no treatment plant is proposed.

Sewerage works in District-II

Project for sewerage district-II is being prepared to provide sewerage facilities. This district comprises of 58 wards and covers an area of around 70 hectares. In this project 1200 km. sewer line, one STP of 105 mld capacity at village Bingawan and 5 no. pumping station will be proposed.

Sewerage works in District-III

Project for sewerage district-III is being prepared to provide sewerage facilities. This district comprises of 14 wards and covers an area of around 72 hectares. In this project 700 km. sewer line, one STP of 109 mld capacity at village Kapli and 4 no. pumping station will be proposed.

Up-gradation of existing 130 mld & 5 mld STPs

Project for up-gradation of existing 130 mld & 5 mld STP is being prepared. The up-gradation of STPs is proposed to meet the revised treated effluent parameters circulated by NRCD, Govt. of India, as the existing STPs are designed on old parameters.

Construction of 50 mld CETP

Project for construction of 50 mld CETP is being prepared by CLRI Chennai to treat current volume of tannery waste water generated, which is to the tune of 50 mld, while the existing system is capable of treat only 9 mld.

After execution and commissioning of above projects, no untreated waste water will reach river Ganga which will reduce the pollution load to river Ganga and people of Kanpur city will be benefitted with hygienic, healthy and clean environment to live in and 100% coverage with sewer network will be achieved.

3.2.5 Access to Toilets Assessment

3.2.5.1 INDIVIDUAL TOILETS

Kanpur Nagar Nigam has revealed that the total number of individual toilets in Kanpur City is 4, 40,962 whereas the total number of households is 5, 54,399. It translates to 79.54% coverage of individual toilets within the city.

It has also been reported that access to individual toilets in slum areas is very poor. The different types of individual toilets in slum areas that are most prevalent are – (a) pour flush toilets, (b) Kuddi, and (c) Gaddewali/soak pit. The total number of individual toilets provided by ILCS, IHSDP, BSUP, Vambey and Kanshiram Yojana in the slum areas is 14,415 which are the pour-flush model toilets. The list of individual toilets provided by each agency at slum household level is presented below – (a) ILCS – 913; (b) BSUP – 7812; (c) Vambey – 2450; (d) Kanchiraman – 3000; and (e) IHSDP – 240

3.2.5.2 COMMUNITY TOILETS[1]

[1] There is no distinction between community and public toilets in the city of Kanpur. Community toilets are the toilet facilities provided in residential areas intended for exclusive access to the residents in the area, whereas, public toilets are the toilet facilities provided in non-residential areas to cater to the demand of transient population in the area.

It has been observed that there is more access to community toilets than the individual/ private toilets and the usage of community toilets is very prevalent in the slum areas. According to KNN, there are 366 community/public toilets in the city across the 6 administrative zones for use within the 356 slums in the city. Table 3-7 provides the administrative zone-wise distribution of the community toilets –

TABLE 3-8: ADMINISTRATIVE ZONE-WISE DISTRIBUTION OF COMMUNITY PUBLIC TOILETS - KANPUR CITY

ADMINISTRATIVE ZONE	*AZ 1*	*AZ 2*	*AZ 3*	*AZ 4*	*AZ 5*	*AZ 6*	Total
AREA (sq.km)	10.27	112.81	20.55	13.64	62.97	39.6	**259.84**
POPULATION	400,065	569,310	468,315	332,555	491,679	510,068	**2771992**
POPULATION DENSITY (person/sq.km)	38,955	5,047	22,789	24,381	7,808	12,881	**111861**
NO. OF COMMUNITY /PUBLIC TOILETS	85	42	53	60	81	45	**366**

Source: Kanpur Nagar Nigam

3.3 Storm Water Management Assessment

According to the service level benchmarking results reported by KNN as on June 2013, the coverage of storm water drainage network in Kanpur City is 63.66 % over its road network and 16 numbers of incidents of water logging /flooding is observed during the year. Detailed information on road length network and length of drainage network is however not available. Table 3-8 presents administrative zone-wise distribution of the storm water drainage network –

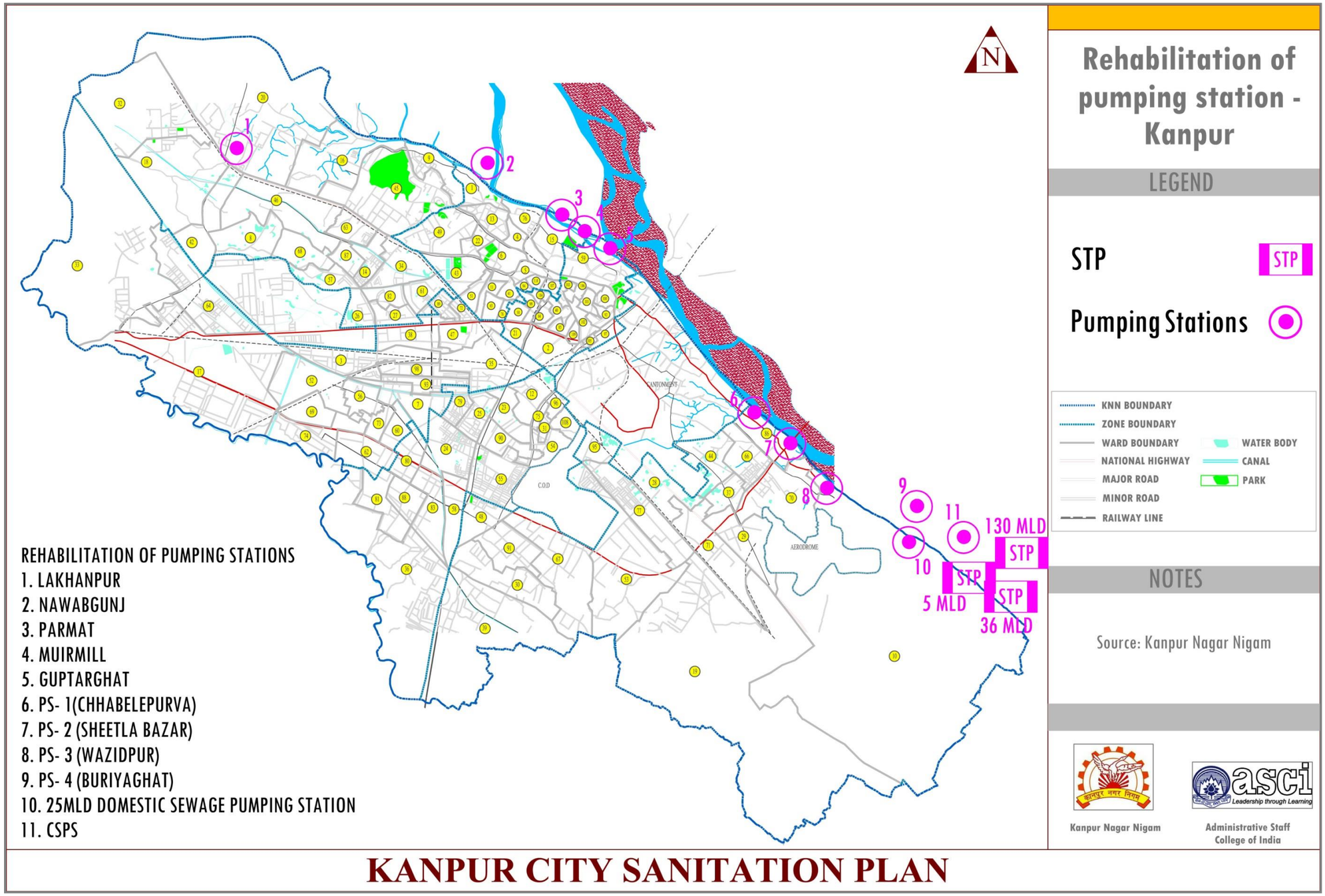
TABLE 3-9: ADMINISTRATIVE ZONE-WISE DISTRIBUTION OF STORM WATER DRAINAGE NETWORK - KANPUR CITY

ADMINISTRATIVE ZONE	*AZ 1*	*AZ 2*	*AZ 3*	*AZ 4*	*AZ 5*	*AZ 6*	Total
AREA (sq.km)	10.27	112.81	20.55	13.64	62.97	39.6	**259.84**
COVERAGE OF STORM WATER DRAINAGE (IN KM)	347	228	257	93	247	293	**1465**

Source: Kanpur Nagar Nigam

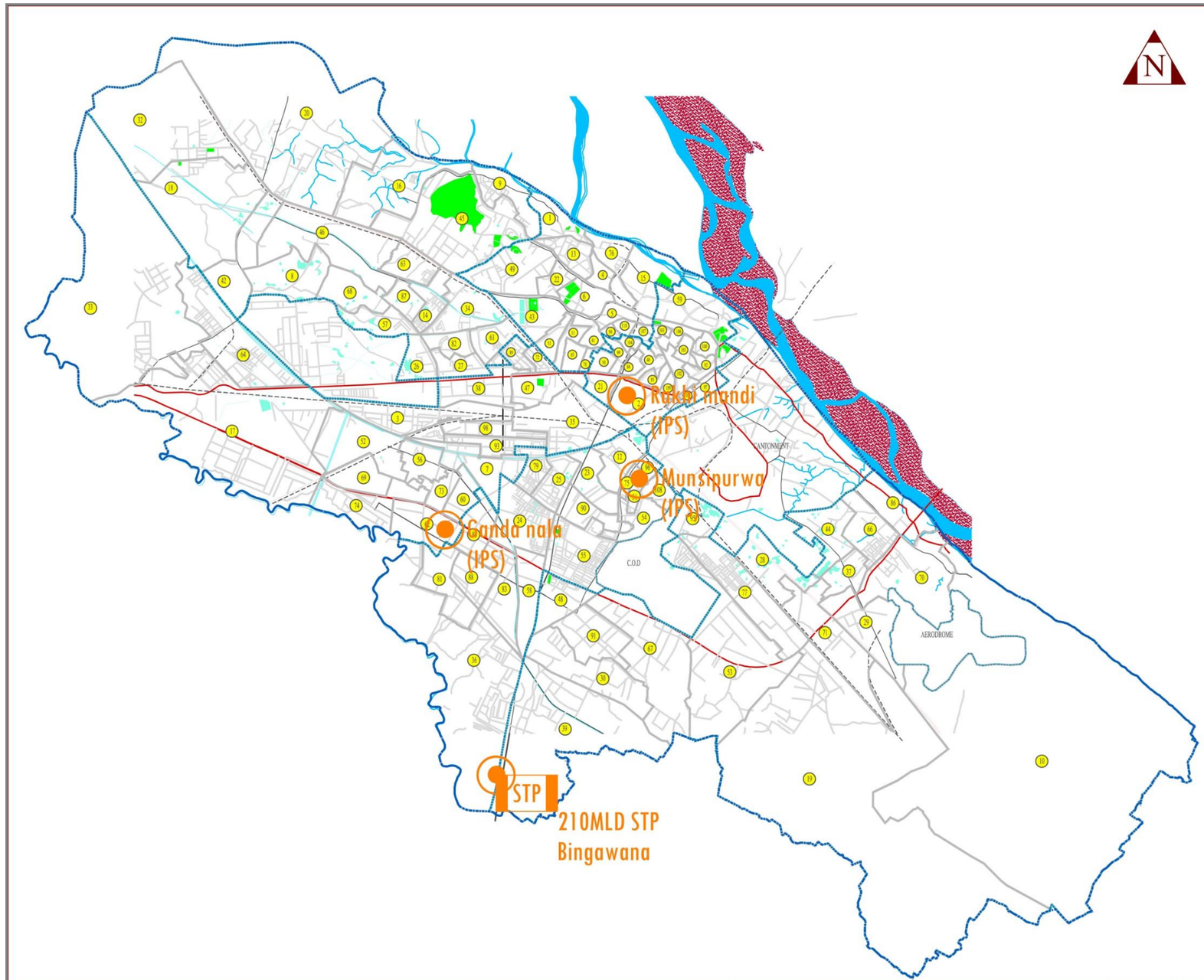
The storm water drains are choked due to indiscrimate dumping of solid waste and are also the predominant carriers of sewage generated in the city. This results in the deterioration of the condition of the drains and its capacity to carry the storm water is also impeded due to the sewage and the solid waste filling the storm water drains in several location of the city.

MAP 4: EXISTING SEWERAGE MANAGEMENT SYSTEM – KANPUR CITY



KANPUR CITY SANITATION PLAN

MAP 5: ONGOING INTERVENTIONS – PROPOSED SEWERAGE MANAGEMENT SYSTEM – KANPUR CITY



Sewerage works sactioned by JnNURM - Kanpur

LEGEND

STP

Pumping Stations

- KNN BOUNDARY
- ZONE BOUNDARY
- WARD BOUNDARY
- NATIONAL HIGHWAY
- MAJOR ROAD
- MINOR ROAD
- RAILWAY LINE
- WATER BODY
- CANAL
- PARK

NOTES

Map represents the percentage of slum population to the total ward population

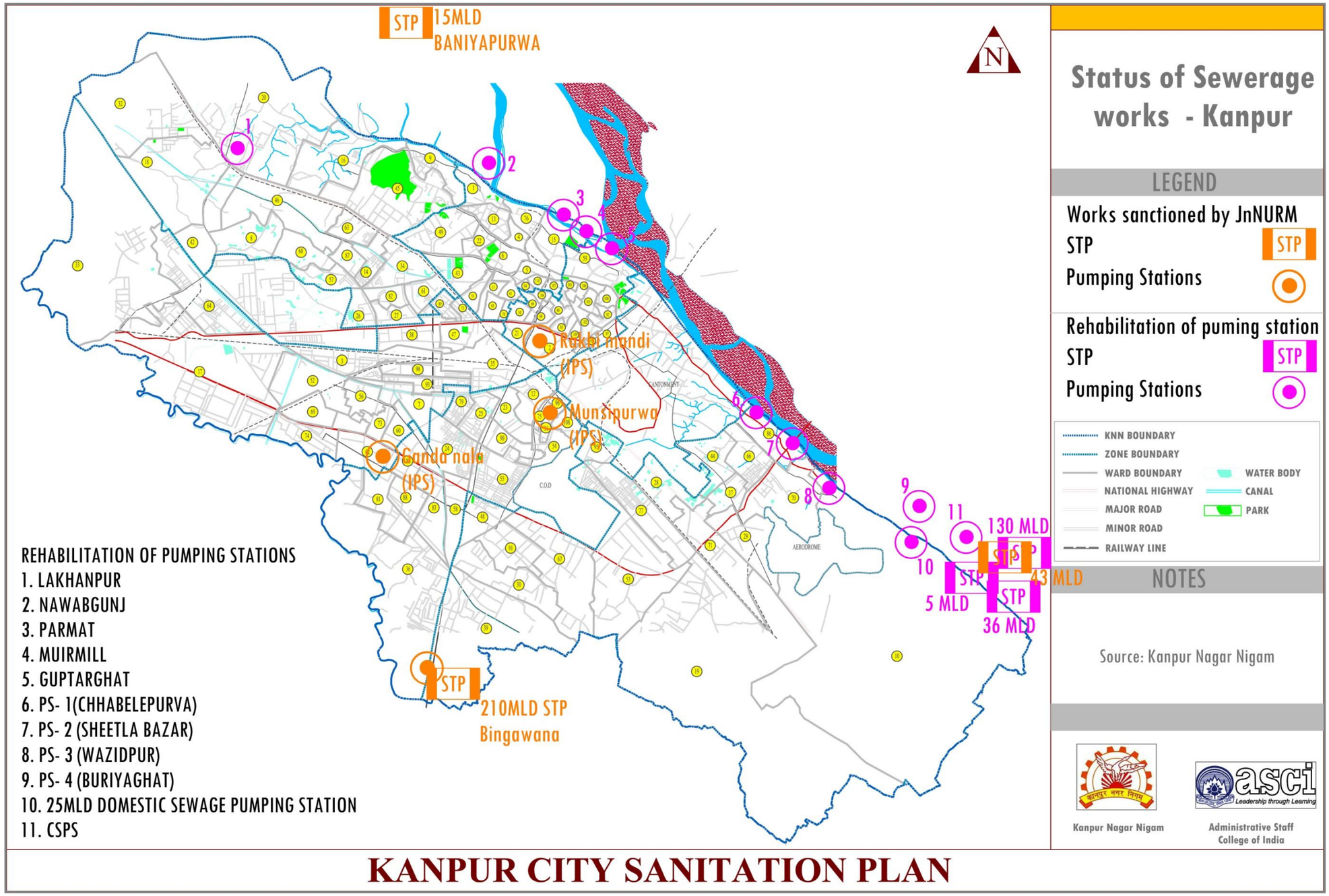
Source: Kanpur Nagar Nigam

Kanpur Nagar Nigam

Administrative Staff College of India

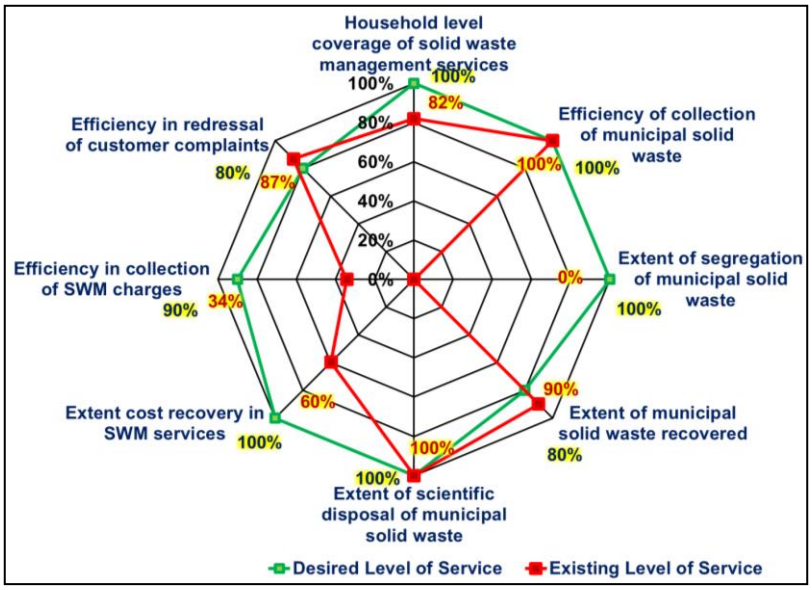
KANPUR CITY SANITATION PLAN

MAP 6: LOCATION OF EXISTING & PROPOSED SEWAGE INFRASTRUCTURE SANCTIONED BY JNNURM



3.4 Solid Waste Management Assessment

The Service Level Benchmarks (SLB) established by the Ministry of Urban Development, Government of India, for the sector of Solid Waste attempts to compare the service levels against the eight (8) key parameters as indicated in the spider chart. The spider charts demonstrates the desired level of service in the solid waste sector against the eight (8) key parameters vis-à-vis the existing level of service.

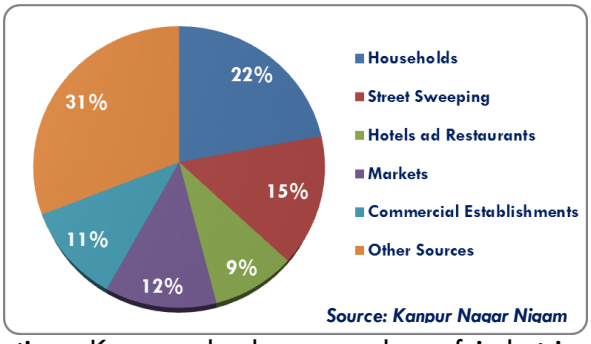


The spider chart denotes that while the household and establishments level coverage of the solid waste management services and extent of segregation of waste at source needs commendable improvement, the collection efficiency is at par with the desired level of service. The major areas of concern for the city administration are the cost recovery and efficiency in collection of solid waste management charges.

3.4.1 Solid Waste Generation

The total solid waste generated in the city per KNN is 919 tonnes per day. The main sources of waste generation include residential, commercial, industrial establishments, hospital & nursing homes, hotels & restaurants, slaughter houses, street sweeping, sanitary drains and construction and demolition sites.

FIGURE 3-1: GENERATION OF MUNICIPAL SOLID WASTE



Apart from solid waste generated by Households, commercial establishments and institutions, Kanpur also has a number of industries and other businesses that generate different type of waste–(a) bio-medical waste generated by hospitals and nursing homes, (b) sludge, buffing and other waste produced by tanneries in jajmau area, (c) industrial waste produced by textile, rubber and other industries operating in the city (d) dung, waste straw and other waste from dairies (parag), (e) silt from nallas and drains and (f) coal ash and fly ash from panki thermal power station.

TABLE 3-10: GENERATION OF MUNICIPAL SOLID WASTE - KANPUR CITY

SOURCE OF SOLID WASTE	SOLID WASTE GENERATED (TPD)
Households	200
Street Sweepings	140
Hotels and Restaurants	83
Markets (vegetable markets, mandis etc)	107
Commercial Establishments (Institutions etc)	103
Other Sources (Construction Debris, Horticulture Waste etc)	286
Source: Kanpur Nagar Nigam **Total**	**919**

In the city of Kanpur, organic waste constitutes the largest component followed by inert material such as building material and debris etc. in the overall composition of municipal solid waste.

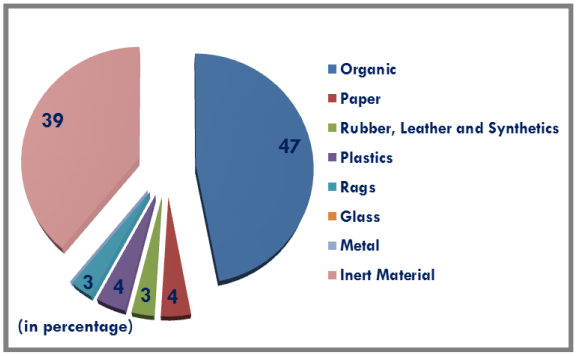


FIGURE 3-2: COMPOSITION OF MUNICIPAL SOLID WASTE

3.4.1.1 SLAUGHTER HOUSE WASTE[2]

The total waste generation in the slaughter houses is approximately **4-5 MT/day**

3.4.2 Solid Waste Segregation

Segregation of waste at source is not practiced in Kanpur city as per the records of KNN. As per the secondary survey, there are no transfer stations in Kanpur city wherein waste is segregated before dumping at the final disposal site.

3.4.3 Solid Waste Collection and Transportation

The successful private concessionaire was awarded the contract for a concession period of 30 years effective September 2010, to collect and transport the municipal solid waste generated in the City of Kanpur, as part of the Integrated Solid Waste Management services.

3.4.3.1 PRIMARY COLLECTION

MSW in Kanpur City is collected by private workers as part of the efforts of the private concessionaire. The private concessionaire had commenced the door-to-door collection service in September 2010; however, all the wards in the city are not covered yet. Out of the total 554399 households in Kanpur City, only 217827 households are covered by door to door collection (As per SLB 2011), covering only 39% of the total households in the city. (As per latest SLB 2013 indicates that about 81.97% households covering Door to Door collection)

Efforts are being strengthened by the private concessionaire to increase the coverage of door-to-door collection to the desired target of 90%. In most part of Kanpur city where lower income group and middle income group families are living, the waste collection systems are not very effective. Table 3-10 provides information on the coverage of door to door collection amongst various property categories.

TABLE 3-11: COVERAGE OF DOOR-TO-DOOR COLLECTION SERVICES

PROPERTY CATEGORY	NUMBER
Households	217827
Hotels and Restaurants	1215
Commercial Establishments (institutions, offices)	4568
Any other establishments (incl. markets)	414
Total	**224024**

Source: Kanpur Nagar Nigam

The collected waste is dumped in dustbins at secondary collection points. The common practice reported is that the residents throw the waste on the streets and this is piled and collected while road sweeping. Due to this practice most of the waste goes into the drains causing chocking and overflow problems during monsoon. Street sweeping/waste collection and cleaning of drains starts from 6 am till 12 noon.

[2] The solid waste of slaughter houses can be broadly classified into two categories i.e., vegetable matter such as rumen, stomach and intestine contents, dung, agriculture residues etc., and animal matter like inedible offals, tissues, meat trimmings, waste and condemned meat, bones etc.,. Slaughter house waste contains mostly biodegradable matter

3.4.3.2 SECONDARY COLLECTION

Secondary collection process is streamlined in the city of Kanpur. The city is divided into four vehicle depot areas and there are approximately 478 secondary waste collection points amongst the depot areas. The four vehicle depots are – **(1)** Bhagwat Das depot; **(2)** Jajmau depot; **(3)** Panki depot; and **(4)** Fazal Ganj depot.

The waste collection and transportation activity is executed between 10AM and 3PM. Each depot area houses several categories of vehicles which are directed to the different secondary collection points for waste collection and transportation to the composting site. The total fleet of vehicles engaged in transportation activity is 113 and each vehicle makes at least 3-4 trips to the final dumpsite. Table 3-11 illustrates the details of the fleet of vehicles.

TABLE 3-12: DETAILS OF WASTE COLLECTION DEPOTS AND VEHICLES

VEHICLE DEPOTS	NUMBER OF VEHICLES	CATEGORY OF VEHICLES	ADMINISTRATIVE ZONES SERVED
Bhagwat Das	**42**	Bulldozer - 1, Dozer-1, JCB-2, Bobcats-2, Loaders-6, Leyland Trucks-22, DCM-1, Dumper Placers (big)-2, Dumper Placers (small)-2, Tractors-3	**1,3,6**
Jajmau	**18**	Bobcat-1, Loader-3; Leyland Trucks-3; DCM-5; Dumper Placers (big)-1; Dumper Placers (small)-4; RC (mini)-1	
Panki	**18**	Bobcat-1, Loader-3; Leyland Trucks-7; DCM-4; Dumper Placers (big)-1; Dumper Placers (small)-2	**5,6,4**
Fazal ganj	**35**	JCB-1, Bobcat-1, Loaders-6, Leyland Trucks-13, DCM-1, Dumper Placers (big)-2, Dumper Placers (small)-8, RC Mini-3	**5,3**
			Source: Kanpur Nagar Nigam

All vehicles used by the private concessionaire are tracked with Global Positioning System (GPS), that is a satellite based navigation system. The total amount of waste collected and transported by the entire fleet of vehicles to the final disposal site is 6723 MT/month. Table 3-12 presents the waste transportation statistics -

TABLE 3-13: WASTE TRANSPORTATION STATISTICS

VEHICLES	NUMBER OF VEHICLES	CAPACITY OF VEHICLE (MT)	TOTALNUMBER OF TRIPS BY VEHICLE TO DISPOSAL SITE	TOTAL QUANTITY OF WASTE COLLECTED (MT/MONTH)
Dumper Placer	9	2	3	1620
Mini Lorries	21	0.6	6	2268
Tipper Trucks	21	1.5	3	2835
Total Quantity of Waste Collected and Transported to Disposal Site				**6723**
				Source: Kanpur Nagar Nigam

3.4.3.3 SLAUGHTER HOUSE COLLECTION[3]

The waste generated at the slaughter houses is thrown into dustbins and eventually transported to the dumpsites along with other MSW. During the survey the RCUES, Lucknow team also found that in Bakarmandi, most of the slaughtered waste is thrown into the Bakarmandi Nallas.

3.4.4 Solid Waste Treatment and Disposal

The private concessionaire has been handling the processing and disposal of solid waste in Kanpur City since October 2009, however, the extension of contract in September 2010 with a concession period of 30 years, has witnessed an increase in its scope with the inclusion of the design, construction and operation & maintenance of a 1500 TPD integrated solid waste management facility generating electricity from the waste. The operations of the plant include composting, RDF and electricity generation (15 MW capacity). Majority of the fuel used in the plant is RDF derived from the waste and the private concessionaire plans to sell the electricity to the State as well as on commercial basis.

[3] Currently there is no organized system for the disposal of solid wastes in most of the slaughter houses in the country. The entire solid waste is collected and dumped along with MSW or disposed off at landfill

SECTION B: PRIMARY DATA ANALYSIS

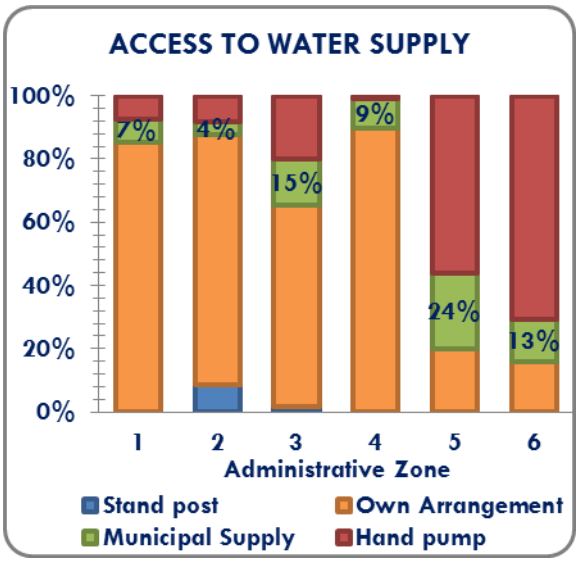
An extensive survey has been conducted, which included primary household surveys, focused group discussions and field visit surveys that are primarily conducted to understand the existing situation of sanitation at household levels both in slum and non-slum areas and identify the key issues and gaps in the sanitary facilities at this level. Surveys have been conducted in the commercial / market areas /schools /institutional areas as well with respect to sanitation services.

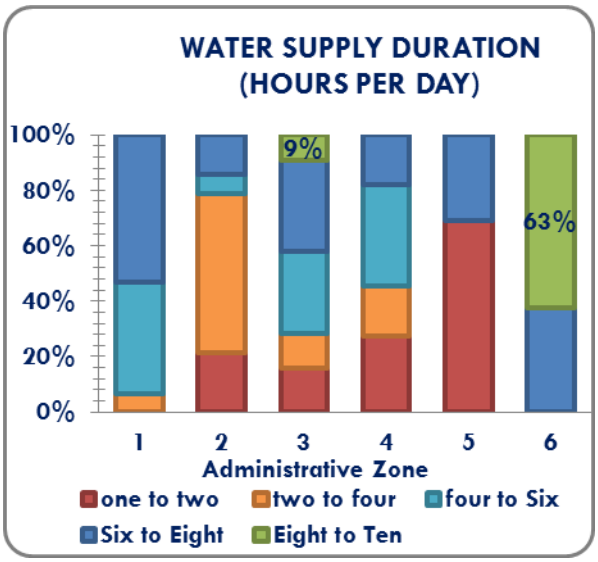
3.5 Water Supply Management Assessment

3.5.1 Quantitative Assessment

Primary Survey reveals that households in the slum areas have very limited access to municipal water supply. It is reported that administrative zones 3 and 5 have comparatively better access to municipal water supply than the other zones. It is interesting to note that in the administrative zones 1, 2, 3 and 4, majority of the residents have made their own arrangements for water and within zones 5 and 6 many residents fetch water from nearby hand pumps.

FIGURE 3-3: RESIDENTS RESPONSE ON ACCESS TO WATER SUPPLY





Situation of continuity of water supply is not satisfactory either. The survey and focused group discussions have indicated that 63% of the residents in zone 6 receive more than six hours of water supply; however, in all the other zones supply hours range from one hour to four hours and zone 5 is the most affected by the adverse continuity of water supply.

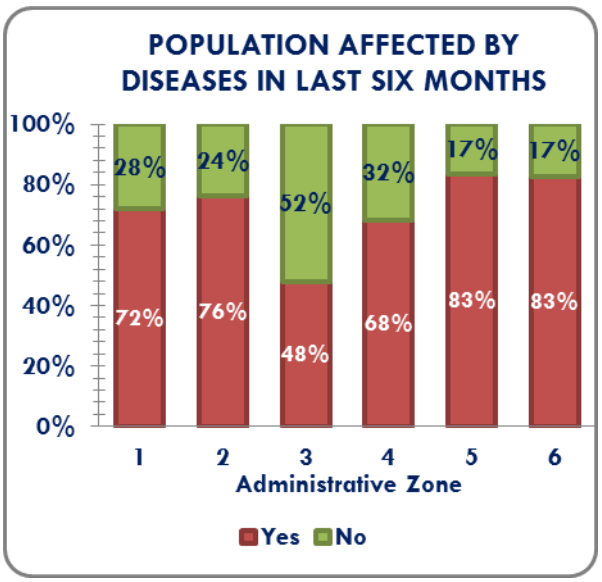
3.5.2 Qualitative Assessment

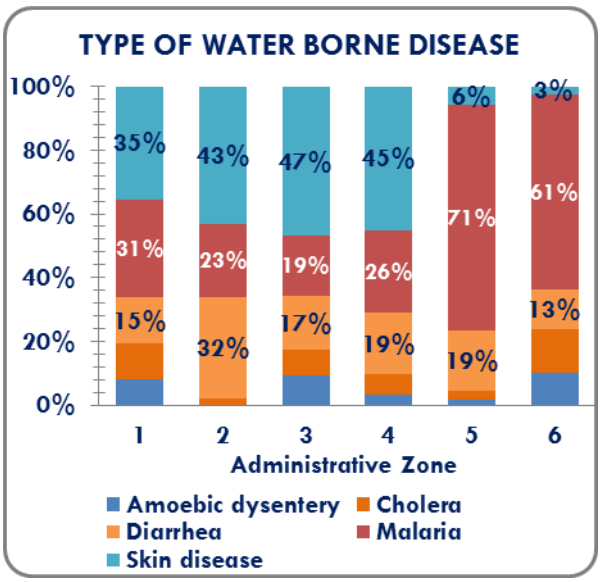
The primary survey in the slum areas and few non-slum areas in the Kanpur City, where the sewer lines are in close proximity to the water supply lines in non-compliance to the prescribed standards per CPHEEO Manual, have revealed that quality of water supply has been adversely affected resulting in high-incidences of water borne diseases.

In majority of the slum areas in the city, the water supply lines run very close or adjacent to the drains carrying waste water; the stand-posts and hand pumps are also in close proximity to the drains carrying waste water. Furthermore, unsanitary conditions prevalent of unscientific waste disposal arrangements have resulted in the

contamination of the groundwater resources and ultimately resulting in the grater incidences of diseases in Kanpur.

FIGURE 3-4: RESIDENTS RESPONSE ON WATER-BORNE DISEASES





In the administrative zones 1, 2, 4, 5 and 6 incidences of water borne-diseases in last six month has been very high. The population has been affected by malaria, cholera pre-dominantly in all the zones and skin diseases have also been very prevalent.

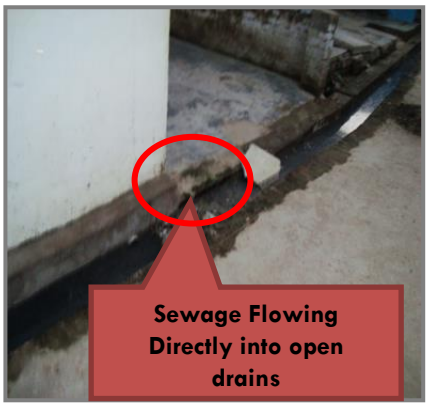
3.6 Sewerage Management and Access to Toilets Assessment

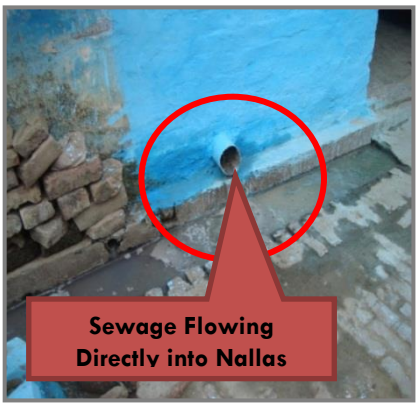
3.6.1 Sewerage Management

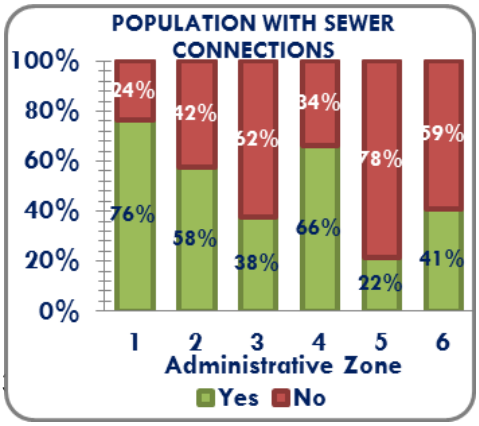
The primary survey analysis shows that about 90 % of households in administrative zones 1, 2, 3, and 4 dispose their household waste water directly into river, pond/nallah and in administrative zones 5 and 6, the prevalent practice is to directly dispose in the public drains or open areas.

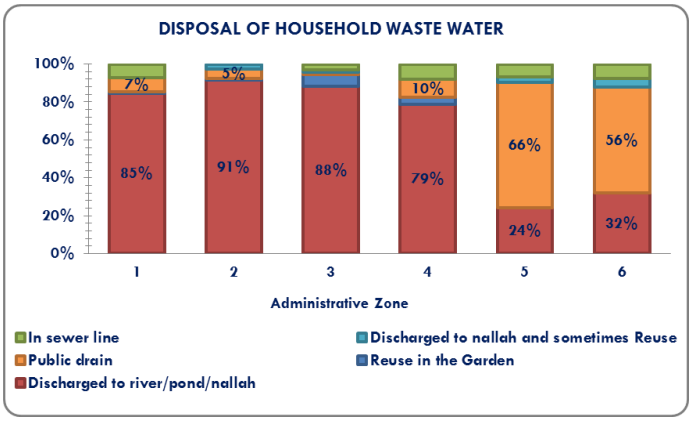
The coverage of sewer connections is better-in administrative zones 1, 2 and 4 when compared to the other zones.

However, the sewer connections coverage in administrative zones 5 and 6 is very low.









The primary surveys have revealed that approximately 55,000 households are connected to septic tanks as a waste water disposal mechanism, out of which 10,000 households are connected to septic tanks with soak pits and the remaining households are connected to the septic tanks without soak pits.

There is no established system to govern or regulate the design of septic tanks that would enable efficient septage management vide appropriate retention times. Furthermore, the institutionalized arrangements for the timely cleaning of septic tanks and transportation and disposal of the septage are lacking in the city. There is no planning and provision for the treatment of the septage; and all the septage is discharged into either the open drains or open areas post emptying of the septic tanks. It has also been observed that the average frequency of cleaning the septic tanks is about 1 year.

3.6.2 Access to Toilets

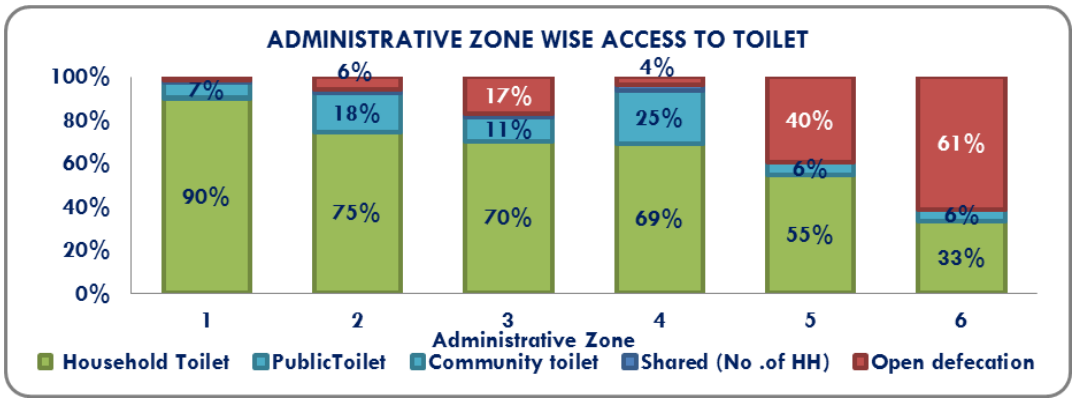
3.6.2.1 INDIVIDUAL TOILETS

3.6.2.1.1 Access to Toilets

From the primary analysis, focused group discussion and stakeholder meetings it is known that about 90% of the households in Zone 1, 75 % HHs in Zone 2 and 70 % HHs in Zone 3 have access to individual toilets.

In Zone 5 there is 55 % of population having access to individual toilets and also 40 % population defecate in open, similarly almost 61 % population in Zone 6 practice open defecation and in both of the Zones (5 and 6) only 6 % population access community toilets. Analysis from above graph shows the need to concentrate on zone 5 and 6 to address rampant open defecation. Providing them with community toilets could be short term strategy but provision of individual HHs toilets should be facilitated making use of schemes like ILCS.

FIGURE 3-5: RESIDENTS' RESPONSE ON ACCESS RO TOILETS



The discussions with residents in administrative zones 5 and 6 have revealed that non-affordability is a major reason for the non- construction of a toiled by the issues of lack of water supply for the operation and maintenance of the facility. Data reveals that lack of awareness of hygiene importance is not a major problem across the spectrum

3.6.2.1.2 Types of Individual Toilets and the Fecal Sludge Disposal

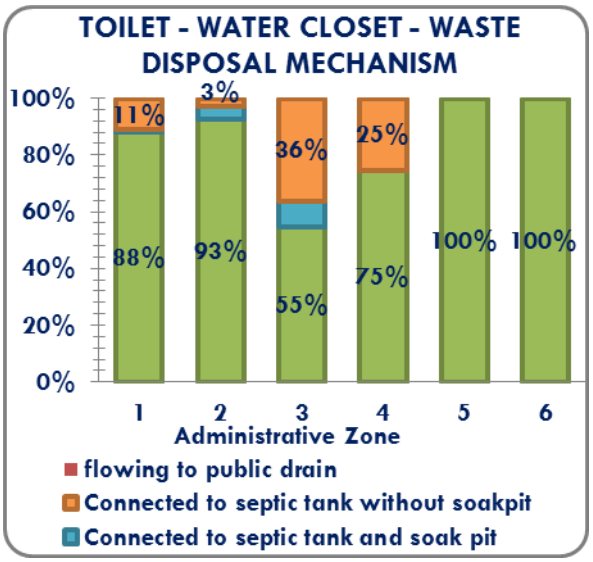
The primary survey and the focused group discussions disclose that the different types of individual toilet facilities are – (a) soak pit toilets, (b) pour flush toilets, (c) Kuddi and (d) Gaddewali.

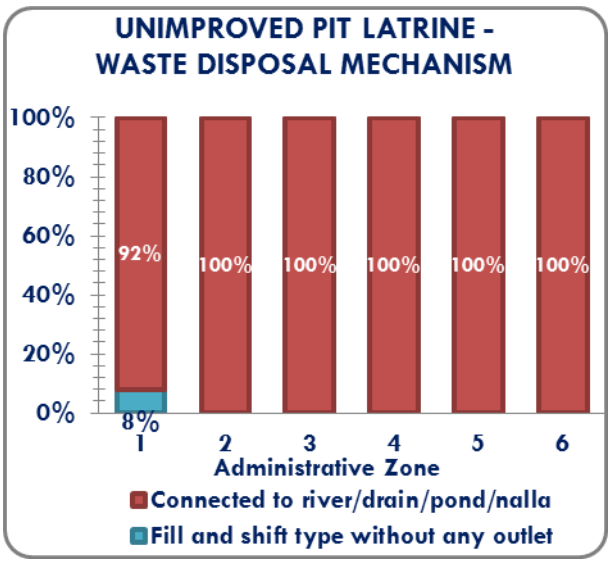
Kuddi is a small structure built on bricks and is directly connected to an open nalla. This is very prevalent in slum areas. The residents dispose/discharge the waste directly into drains which has adverse impact on the health.

Gaddewali is also prevalent in Places where there is availability of adequate space. It is a pit like structure built with a 4X4 or 4X6 feet structure closed by a slab. This gets filled generally by a year or two and is cleaned by the municipal/private vehicle (sludge sucking machine) or manually and thrown into a bigger nallas on the payment basis.

Those HHs with individual toilet majority of them also have sewer connection except in Zone 3 and Zone 4 where 36 % and 25 % HHs are connected to septic tank without soak pit. The HHs with unimproved pit latrine almost all are connected to river / drain/ pond / nalla

FIGURE 3-6: RESIDENTS RESPONSE ON WASTE DISPOSAL MECHANISM

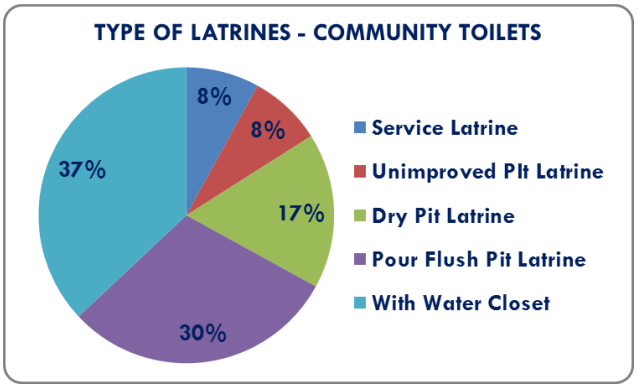




3.6.2.2 COMMUNITY TOILETS

3.6.2.2.1 Access to Toilets

The primary survey and field verification reveal that the total number of seats available in any community toilet, on an average, is about 10-15 seats and the total number of users per day per seat is about 40 persons. It may be inferred that the total numbers of persons using the community toilets is about 1.56 lakh, approximately, 23000 households which is about 5 to 7% of the total population.



In addition to the above mentioned analysis, the primary survey results also focused on type of latrine available in these community toilets. It is alarming to note that 33% of the

community toilets in Kanpur city are still in the categories of service latrines, unimproved pit latrines and the dry-pit latrines. These coventional types of latrines pose issues of fecal sludge and effluent waste management, creating unhygienic conditions.

3.6.2.2.2 Condition of Toilets

The discussions with residents and the care takers of the community toilets revealed that that most of the community toilets available in slum areas are in bad condition. It is established that across five (5) administrative zones (zones 1-5) the condition is average and zone 6 has 86% of the community toilets which are not in use and abandoned and about 13% are unusable in zone-2.

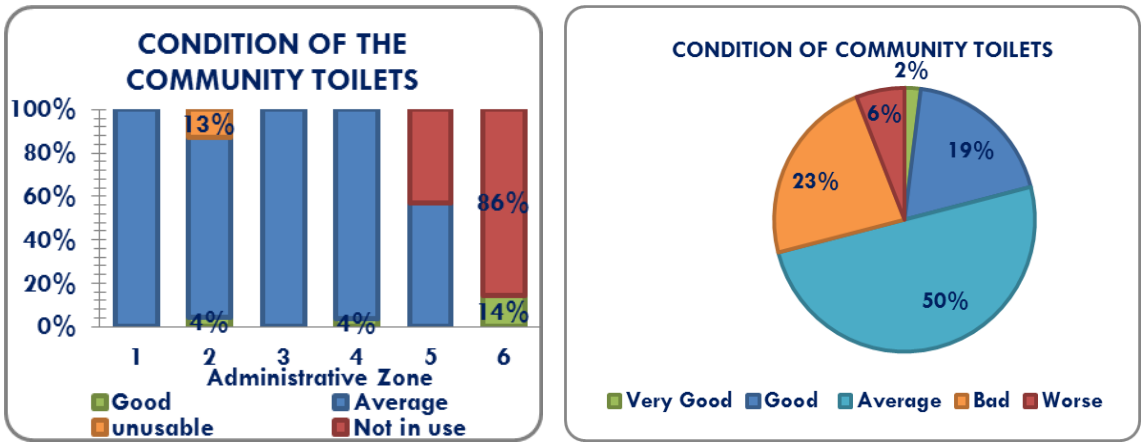


FIGURE 3-7: RESIDENTS RESPONSE ON CONDITION OF COMMUNITY TOILETS

The analysis of primary survey data at the city level shows that only a mere 2% of the total community toilets are in very good condition while 19% are in good condition. Majority of the community toilets (nearly 50%) are in average condition while 23% of the available community toilets are in bad state and 6% of the toilets are in unusable state. The infrastructure facilities in these toilets are broken; despite the dilapidated conditions the residents are still dependent upon these community toilets. The condition of these community toilets is related to their operation and maintenance.

3.6.2.2.3 Operation & Maintenance of Toilets

The operation and maintenance (O&M) of the community toilets is an adhoc process and is not institutionalized in the city of Kanpur. Moreover, the responsibility of O&M is dispensed amongst several government bodies, private agencies and NGOs – KNN, Jal Nigam, NEDA, Nagla Teja etc.

The primary surveys have indicated that one of the major constraints adversely affecting the operation and maintenance is the intermittent and deficient water supply. The duration of water supply in a day varies between 1 hour and 6 hours.

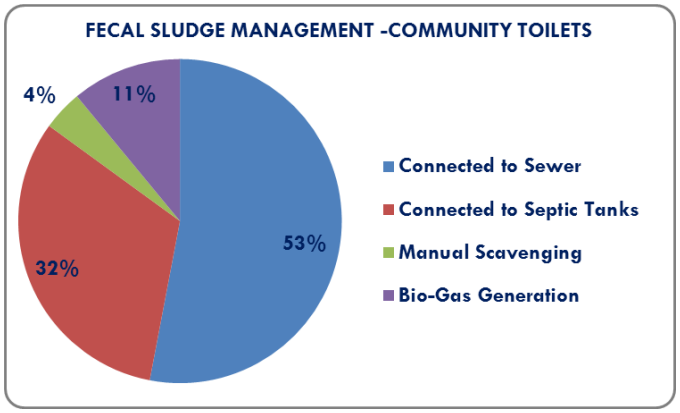
3.6.2.2.3.1 Cleaning of the Toilets

The primary survey indicates that about 60% of the community toilets are cleaned regularly i.e. more than once a day. Further, about 20% of them are cleaned at least once a day, however, 15% of them are cleaned only once in a week while 5% of them are not at all cleaned.

Owing to heavy traffic of users due to limited number of community toilets in certain areas, even the frequent cleaning does not ensure the desired standards of hygiene.

3.6.2.2.3.2 Fecal Sludge and Effluent Management

The analysis on the access to a system for the collection of the fecal sludge and effluent reveals that about 32% of the community toilet facilities are connected to septic tanks and about 50% of them are connected to sewer lines. Manual Scavenging is still practiced in the city and approximately 5% of the community toilets are managed through it. The surveys also indicate the bad condition of the septic tanks; approximately 80% of the septic tanks are broken and they are overflowing creating unhygienic conditions.



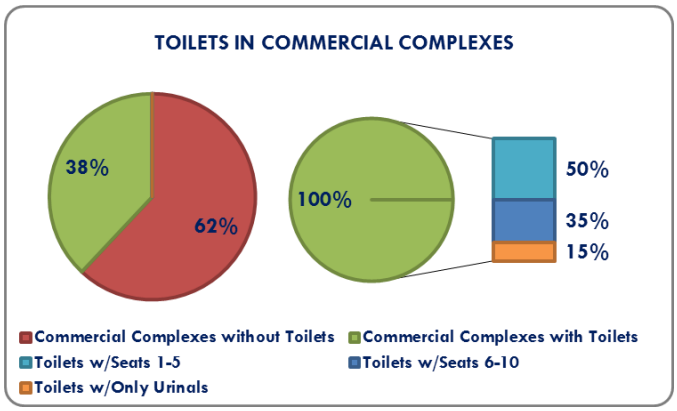
In about 80% of the community toilets with septic tanks, the fecal sludge collected from these septic tanks by the municipalities or private sludge sucking machine and they dispose it into nearby nallas which ultimately lead to Ganga River. This shows that there is a serious problem of fecal sludge management of the community toilets. In addition to the disposal of sludge produced at community toilets there are also about 10% of the community toilets using the sludge for bio gas plant.

In addition to the above mentioned sludge management, there is also effluent waste that is generated from the community toilets which also require proper disposal mechanisms. The analysis shows that about 98% of the community toilets have no proper effluent waste management. The effluent is discharged into open drains. There is only about 2% of the number of community toilets effluent waste disposed/ connected to sewer lines.

3.6.2.3 TOILETS AT COMMERCIAL AND MARKET PLACES

3.6.2.3.1 Access to Toilets

The primary survey analysis shows that only 38% of the commercial/ market places provide some kind of toilet facilities within the complex and 62% of them do not maintain any toilet facilities. However, 37% of the commercial complexes that provide toilets do not allow their workers to use the toilets, forcing them to either use the public/community toilets or defecate in the open. It was also observed that only 20% of the workers used the toilets in the complexes and the rest either used public toilets or defecated in the open. A greater percentage of the male workers engaged in open defecation or use of public toilets.



The surveys indicate that the numbers of seats in 50% of the commercial toilets range from 1-5 and in 35% of the commercial toilets the numbers of seats range from 6-10 while there are only urinals in the remaining 15% of the commercial toilets. The total number of seats available in the toilets is inadequate when compared to the total number of workers and customers in these commercial and market places driving the workers/customers to use public/community toilets as well as defecate in the open.

It can be inferred that there is certain dependency on public toilets/community toilets while there is observance of open defecation practices as well in these areas.

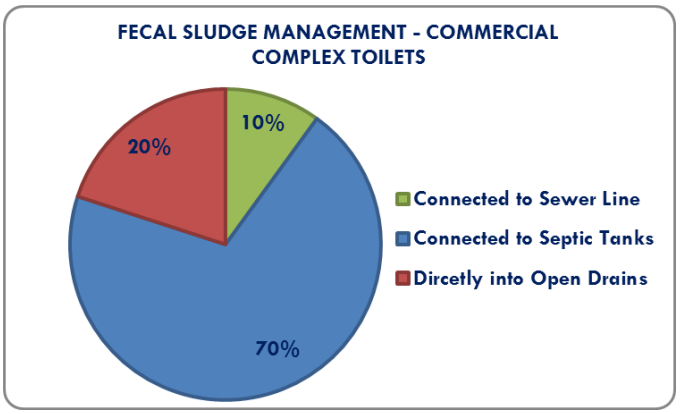
3.6.2.3.2 Condition of Toilets

The surveys established the bad condition of toilets which force the workers to utilize the public toilets or defecate in the open. Even the customers prefer to use the public toilets than use the complex toilets owing to the bad condition of toilets.

3.6.2.3.3 Operation and Maintenance of Toilets

3.6.2.3.3.1 Fecal Sludge Management

The survey analysis indicates that 70% of the commercial complex toilets are connected to septic tanks for their sludge management. The sludge that is accumulated in these tanks is cleared once in every 9 months by the municipality or private vehicle and the waste is disposed off. into the open nallas. Further to this, it was noticed that there are very few toilets connected to sewer lines and the remaining toilets discharged the effluent and disposed the sludge directly into the open drains. Hence, there is an urgent need for the provision of proper disposal system in these commercial areas and market places..



3.6.2.3.3.2 Payment Arrangements

The surveys show that only a fewer amount of shopkeepers/workers who are willing to pay any amount for the use of toilets. Further, it is also analyzed in case of willingness to pay, the respondents preferred monthly passes to pay-per-use i.e. about 65% of the respondents are willing to take monthly passes for using the public toilets (who do not have any access to toilets). 70% of them have indicated that the acceptable charges for the monthly passes would be INR 20–30 per month and about 20% have expressed their willingness to pay only less than INR 20 per month and the remaining 10% of the shopkeepers/workers are willing to take monthly passes ranging in between INR 30–40 per month.

The survey analysis further shows that only a mere 39% of the customers and visitors are willing to pay for the usage of toilets and the indicative amounts are INR 2–3 per usage.

3.6.2.4 TOILETS IN THE INSTITUTIONS

The other critical area where the provision of toilets is a must is the area housing the institution buildings. The floating population in areas/buildings such as Collectorate Office, Central Bus Stand, Income Tax Building, District Court, RTO Office, Chatrapati Shahuji Maharaja University, Vikas Bhawan, Central Railway Station, Sanchar Bhawan, Kanpur Development Authority, Kanpur Nagar Nigam and so on; is very high, wherein the provision of toilets is a must for general public and employees of respective buildings.

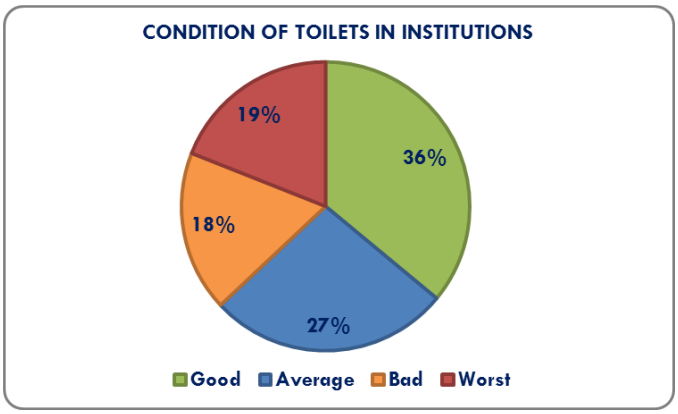
3.6.2.4.1 Access to Toilets

There is some provision of toilets to general public in all these public institution buildings; In addition to provision of sanitary facilities to general public, toilets are also provided to

employees in all these institutional buildings. The provision of toilets are provided both to male and female category separately with sufficient number of seats i.e. on an average, ranging from 10 – 15 seats for male category and 5 – 10 for seats for female category

3.6.2.4.2 Condition of Toilets

The analysis results show that the toilets in 53% of the institutional buildings are in fairly good condition. However, the toilets in the remaining 47% are in bad condition while in 19% of the institutions, the toilets are in unusable condition even though the usages of these toilets are very high. In spite of the bad conditions of these toilets, public still use them in case of emergency due to lack of alternate toilet facilities in nearby premises.



3.6.2.4.3 Operation and Maintenance of Toilets

3.6.2.4.3.1 Supporting Infrastructure

The analysis shows that all the toilets are facilitated with water supply, doors and buckets; but, there are only 70% of the institutional toilets with electricity connections. The source of water facilities in these toilets are mainly overhead tanks i.e. municipal water and ground water.

3.6.2.4.3.2 Cleaning of the Toilets

The field studies and discussions revealed that only 70% of the toilets are maintained well with good and frequent cleaning practices while 30% of the toilets are not maintained as per the desired standards.

FIGURE 3-8: TOILETS IN INSTITUTIONS - IN FAIRLY GOOD CONDITION

MAP 7: LOCATION OF LCS IN KANPUR CITY

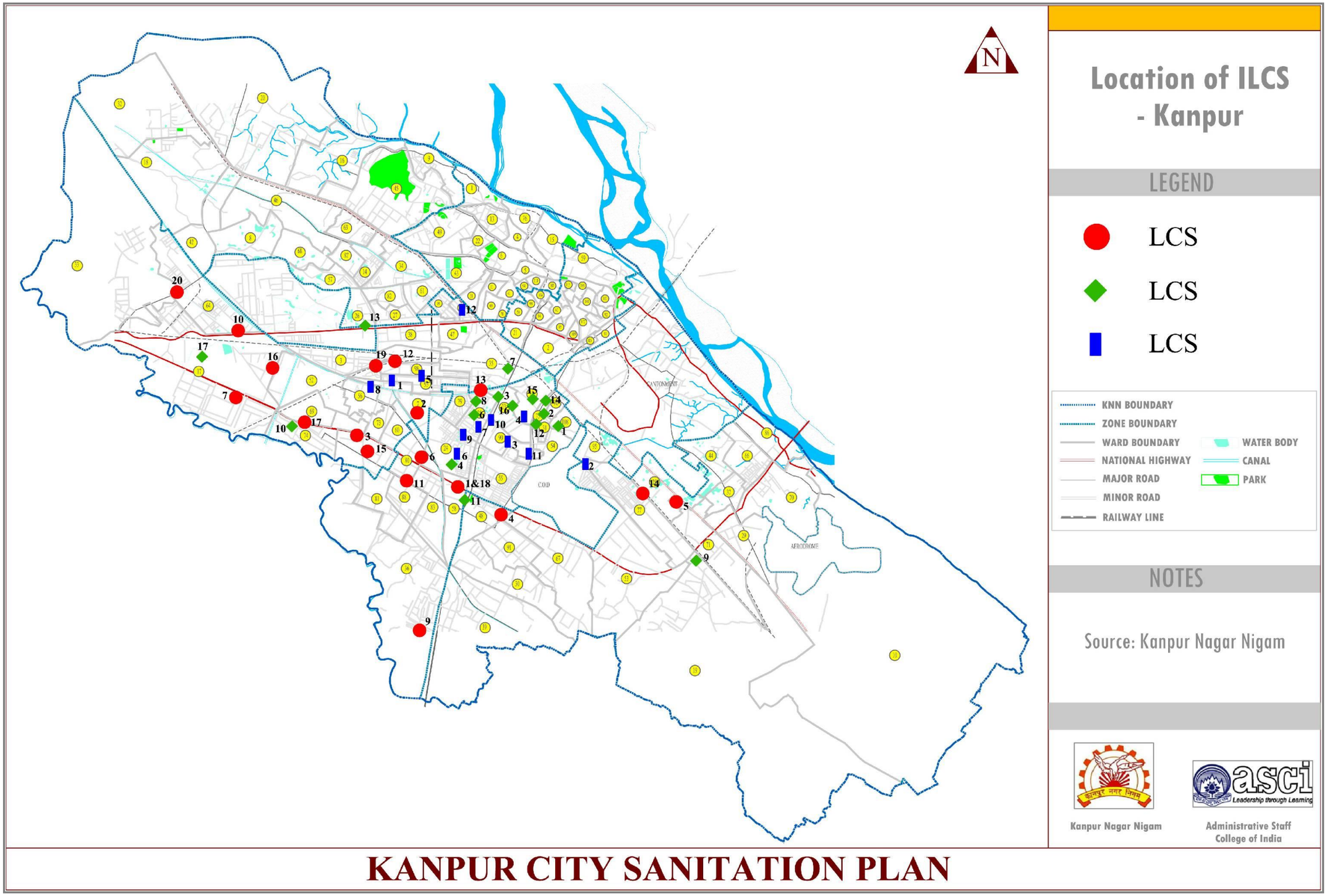


FIGURE 3-9: TOILETS IN INSTITUTIONS - IN BAD CONDITION

3.6.2.5 TOILETS AT SCHOOLS

Assessment of school sanitation should be sectors where the considered a priority activity. The primary survey has been conducted at school level to understand the sanitary conditions of schools. It is interesting to note that the student population is dominated by the majority strength of boys when compared to girls, while the teacher's population witnesses a greater strength of female teachers than male teachers, so is the case of working population at schools which is dominated by female workers. The provision of separate toilets and the seat availability should be proportionate to the male and female populations.

3.6.2.5.1 Access to Toilets

The analysis shows that 85% of the schools provide separate toilet facilities for the girl students/female teachers and 80% of the schools have provision for the boy students/male teachers. The student/teacher population of the remaining 15% of the schools that do not have any kind of toilet facilities resort to open defecation.

3.6.2.5.2 Condition of Toilets

The primary survey analysis shows that there are about 90% of the schools with toilets are in working conditions. The field analysis and survey results show that the non-functionality of the school's toilet can be categorized as damaged doors, no ventilation and the toilet itself is in dilapidated state. These are the observed problems that make the available toilets unusable.

3.6.2.5.3 Operation and Maintenance of Toilets

3.6.2.5.3.1 Supporting Infrastructure

Field studies have indicated that toilets in 40% of the schools with toilets have electricity connections and 70% of the schools with toilets have functional water connections. 38% of the schools have wash basin facilities in the toilets.

The sources of water supply that cater to the needs in the school are bore wells, tankers and municipal water. The analysis shows that about 55% of the schools depend upon bore well as the prime source of water supply and about 28% on municipal water. There are about 16% of schools who do have any kind of source of water supply. Alternatively, all the school students generally bring water from home and about 80% of them go to neighbors in case of emergency. 90% of them do have some kind of storage facilities in the schools; however, 10% of the schools have no water storage facilities. The different types of water storage facilities in schools are overhead tanks, underground sumps and filling of barrels/drums.

3.6.2.5.3.2 Cleaning of Toilets

The survey analysis and field verifications show that 84% of the functional school toilets are cleaned at regular intervals and it is ensured that they are cleaned at least once in a day. There is lack of regular cleaning practice in the remaining 16% of the toilets.

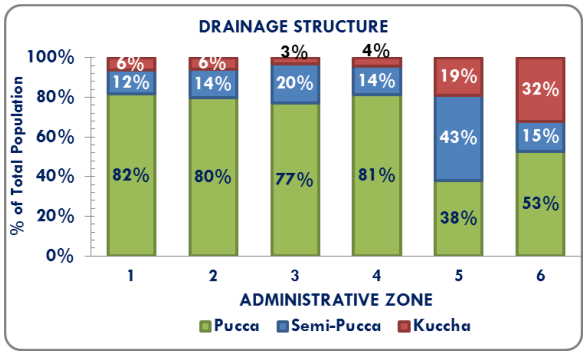
3.6.2.5.3.3 Budget Allocation

The field survey analysis has revealed that nearly 80% of the school's O&M is carried out by the school employees themselves and the rest is taken care by the government. Further, the amount allocated for the O&M of school by government is in the range of INR 3500 – 5000 per annum. However, the budget allocation is not exclusive for the toilets maintenance, rather includes the overall school maintenance which barely meets the requirements for any kind of developments or improvements of toilet facilities in these schools.

Based on the above mentioned budget allocation and responsible agents for O&M, there are about 85% of the schools who could facilitate few improvements to the toilets during the last 3 years. The improvements executed have been related to fixing up the doors, fixing up the water connection, painting of walls and doors, flooring, and cleaning at regular intervals. The field investigations have established that majority of schools with toilets have further improvements to be executed to avoid further damage.

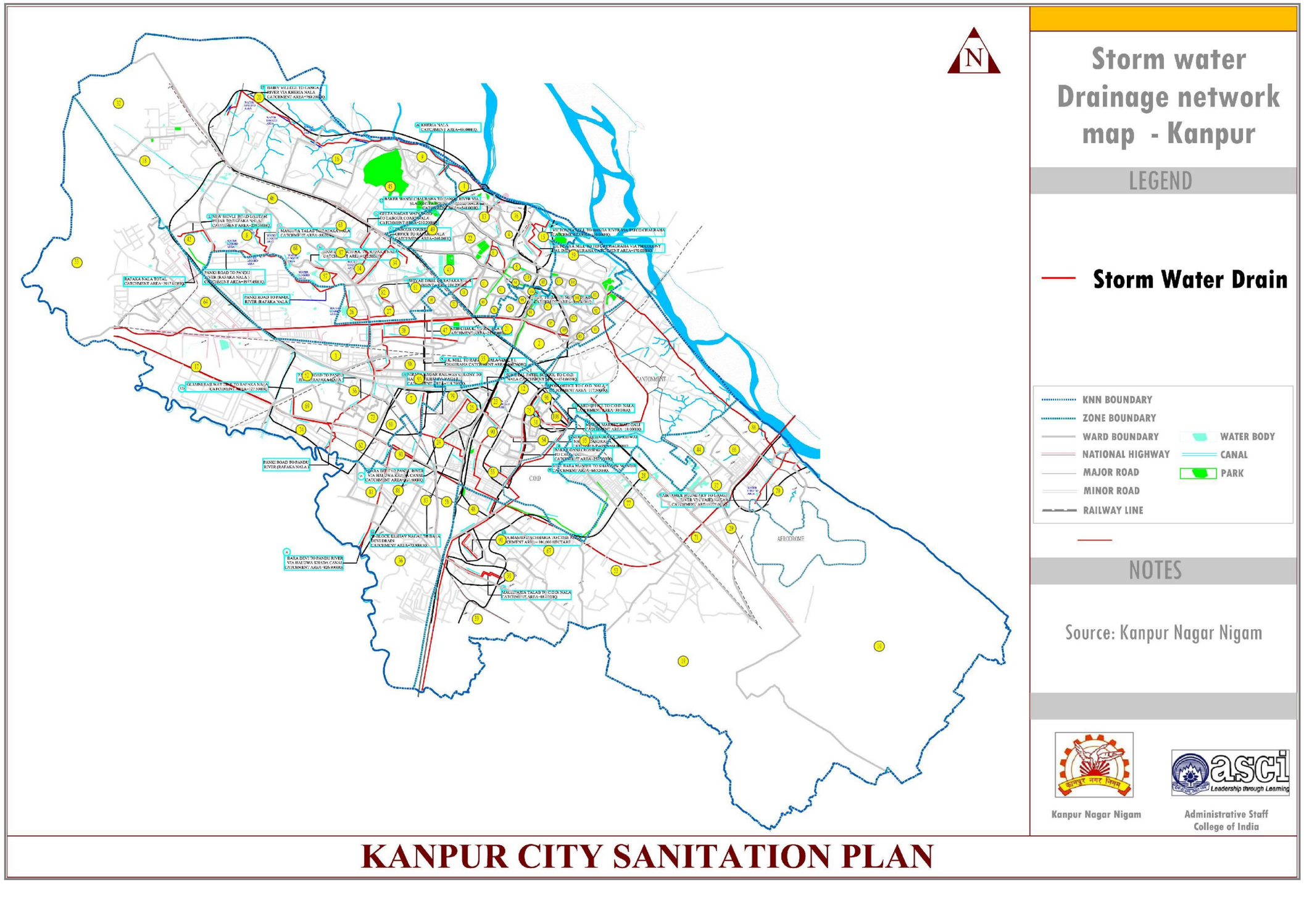
3.7 Storm Water Management Assessment

ASCI primary survey has revealed that the coverage of drainage is satisfactory in administrative zones 1, 2, 3 and 4 wherein, all these zones have nearly 80 % of pucca drains. Zones 5 and 6 are with comparative lower coverage of pucca drains and therefore require attention in improving the structure of the drains. Zone 6 has greater percentage of kuccha drains.



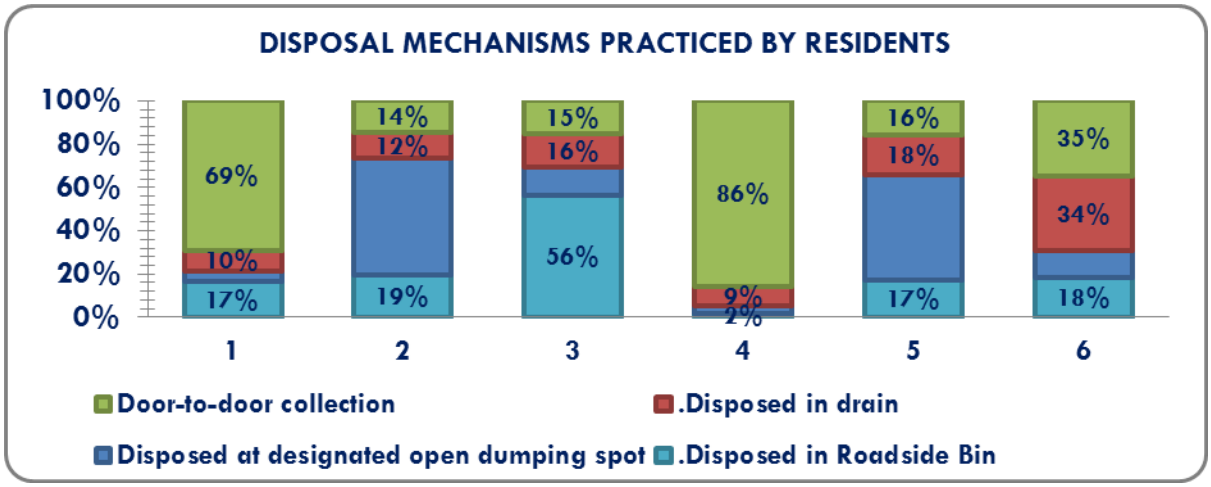
On the parameter of water logging / flooding Zone 5 and 6 are at higher risk in rainy season and frequency of water logging is greater in both of these Zones. Situation of storm water management need to be strengthened in both these Zones.

MAP 8: MAP FOR STORM WATER DRAINS IN KANPUR CITY



3.8 Solid Waste Management (SWM) Assessment

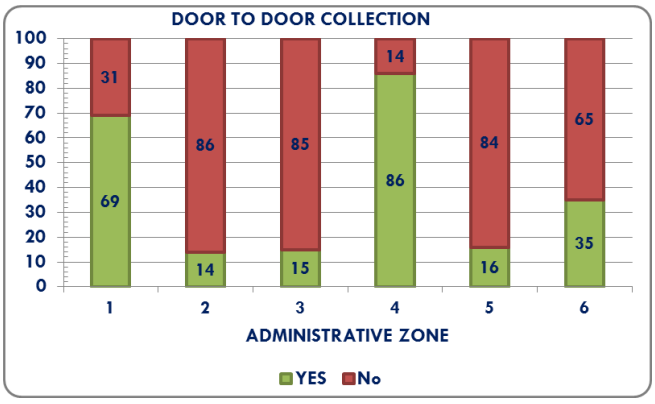
The primary surveys have disclosed that the residents do not practice sound disposal of solid waste. The rampant practices observed in the city are disposal at the road sides, disposal at designated open dump spots, and disposal into drains/open nallas.



IEC campaign bringing out behavioral changes to discourage citizens from malpractices in SWM that lead to unhygienic conditions should be the priority on strategy.

3.8.1 Collection and Transportation of Solid Waste

3.8.1.1 PRIMARY COLLECTION



The extent of door to door collection (D2D) of household waste is highest in administrative zone-4 and considerably good in administrative zone-1. In all other administrative zones-2, 3, 5 and 6, the coverage of D2D collection is very low.

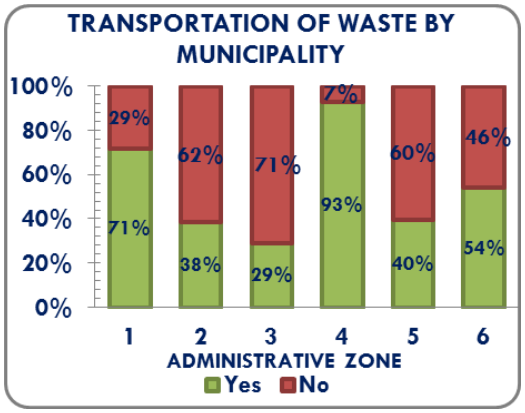
The D2D collection service of solid waste is functional in all the administrative zones of Kanpur but with large variations in the coverage; zone-1 and zone-4 have reflected coverage of D2D collection at 73% and 88% respectively. Except these two zones, coverage of D2D collection of solid waste is not up to satisfactory level in the remaining zones – 2, 3, 5 and 6; and is is reported at an average of 20%.

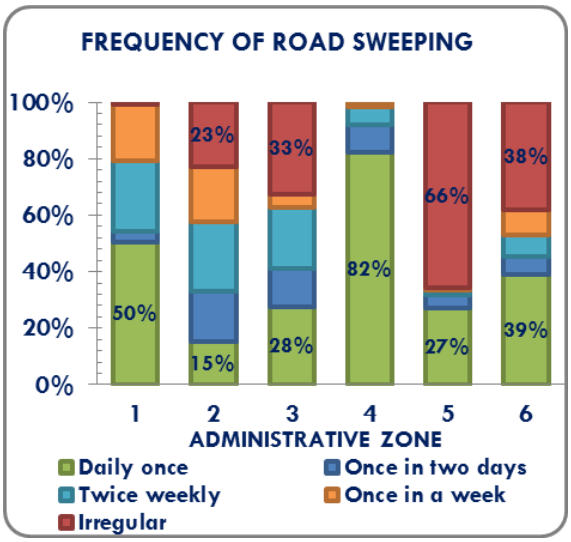
3.8.1.2 SECONDARY COLLECTION AND TRANSPORTATION

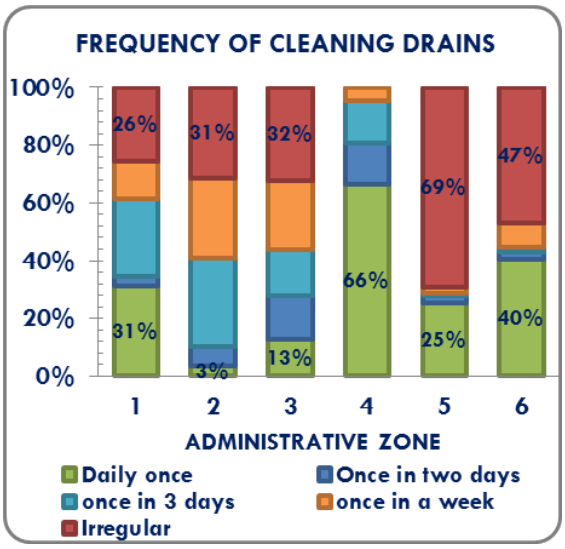
Primary Survey Analysis has broadly indicated that the secondary collection and transportation of municipal solid waste is well-established in zones-1&4; however zones - 2 and 3 lack adequate services, while zones – 5 and 6 have considerably good service levels.

The primary surveys revealed that the frequency of both road sweeping and drain cleaning is good in zone-4, while zones-1, 2 and 3 exhibit average services. The services in zone-5 and 6 have been unsatisfactory per the residents.

The primary surveys have revealed that the satisfaction level of citizens on the situation of SWM services is very low in zones-5 and 6. While citizens of zone-4 have rated the SWM services as fairly good, 50% of the residents of zones-1, 2 and 3 opine the SWM services are average.





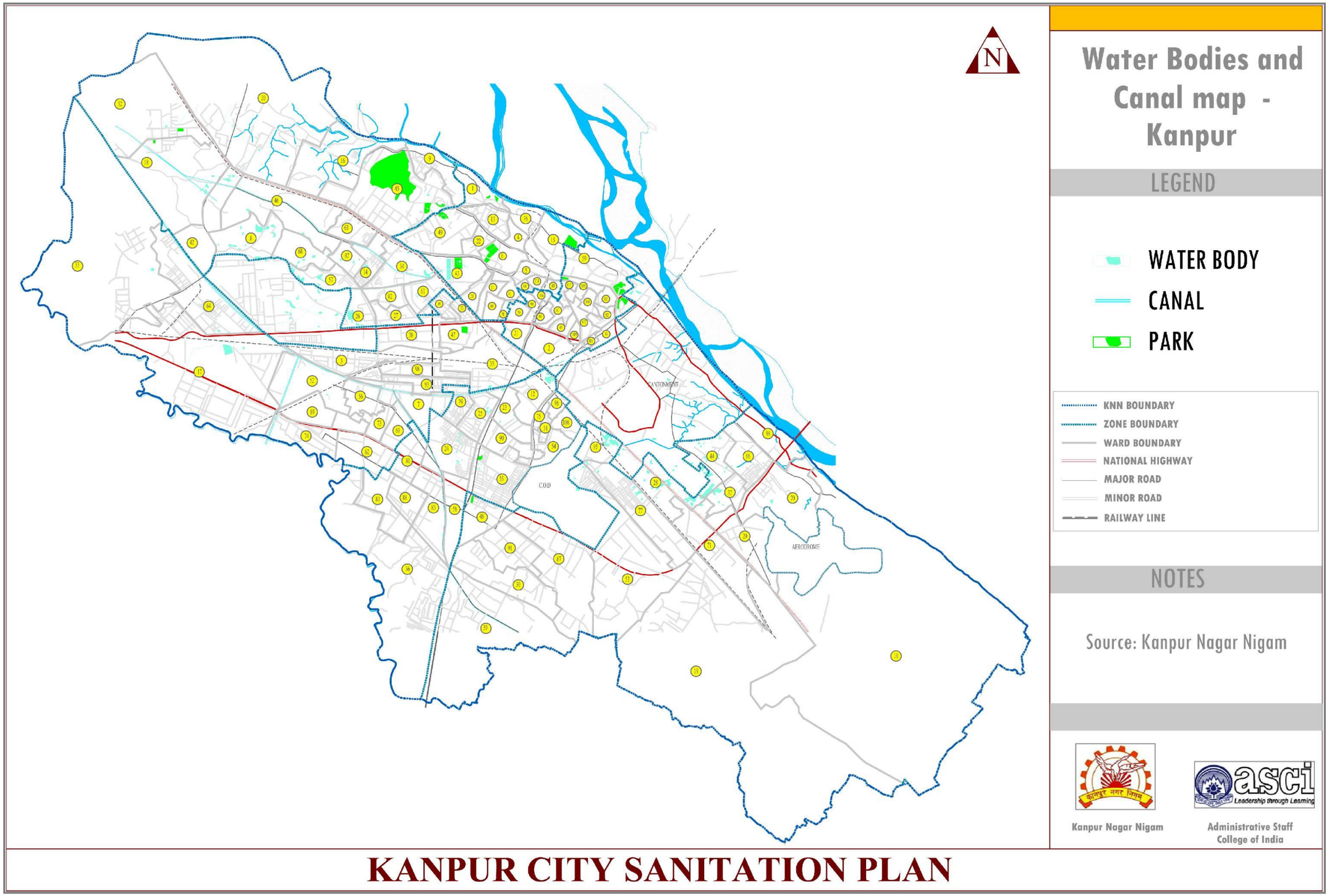


3.9 Assessment of Water Bodies

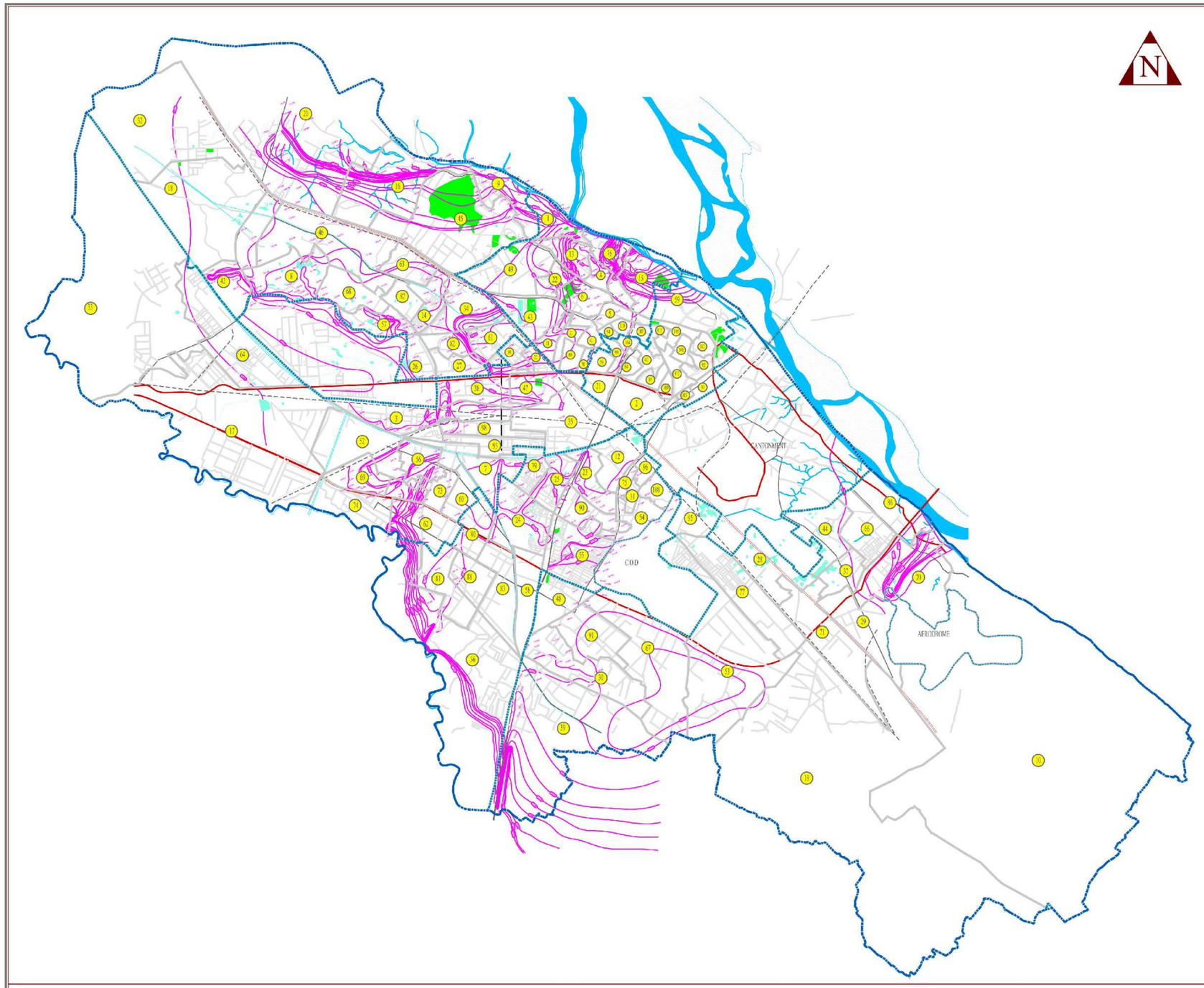
This section discusses the impact of urbanization on the natural environment with special focus on water bodies and the resulting deterioration in urban environment quality perceived in the city.

Sixty percent (60%) of the water requirements of the city are met from river Ganga, which is critically polluted from various point and non-point pollution sources. Kanpur generates approximately 400 million liters per day (MLD) of sewage and a major portion of the same is discharged through several drains eventually draining into the river. The stretch of Ganga near Kanpur is especially vulnerable owing to inadequate discharge and flow. The belt of Ganga in Kanpur is always strewn with human corpses and animal carcasses in addition to the non-biodegradable polybags. Further a number of Dhobi Ghats (5) operating permanently in the river bank contributes substantially to water pollution.

MAP 9: MAP OF WATER BODIES IN KANPUR



MAP 10 : MAP OF CONTOUR LINES



Contour Map - Kanpur

LEGEND

Contour lines

- KNN BOUNDARY
- ZONE BOUNDARY
- WARD BOUNDARY
- NATIONAL HIGHWAY
- MAJOR ROAD
- MINOR ROAD
- RAILWAY LINE
- WATER BODY
- CANAL
- PARK

NOTES

Source: Kanpur Nagar Nigam

Kanpur Nagar Nigam

Administrative Staff College of India

KANPUR CITY SANITATION PLAN

Kanpur has roughly 5500 industries with 75 medium and large industries such as those of fertilizers, detergents, chemicals and paint industries. 367 strong leather industries located in Jajmau area along the River Ganga (70 of them are reportedly closed (PCB 2006)) pose potential threat as major polluters; they present a major threat to water quality, ecology of the river, particularly to aquatic life (fish and turtles). The population of fishes and turtles has declined dramatically and even those survive are not fit for human consumption as they carry toxic elements. This in turn has adverse health impacts in the form of incurable diseases.

The State Pollution Control Board which periodically monitors the water quality of the city at various points studied the water quality at designated sites in March 2006 with specific parameters as indicated in the table. Water temperature and pH in all the sampling stations were within the tolerance limit, whereas Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Chloride content exceeded the prescribed standards at sites marked with asterisk. However, the presence of coliform bacteria is alarmingly high at all sampling station, which clearly indicates that the water is not potable. The following table illustrates the pollution levels of River Ganga:

TABLE 3-14: PRIMARY WATER QUALITY CRITERIA FOR VARIOUS USES OF FRESH WATER - CPCB NORMS

DESIGNATED BEST USE	CLASS	CRITERIA
DRINKING WATER SOURCE WITHOUT CONVENTIONAL TREATMENT BUT AFTER DISINFECTIONS	A	*Total coliform organisms MPN/100mL shall be 50 or less *pH between 6.5 and 8.5 *Dissolved oxygen 6 mg/l or more *Biochemical oxygen demand 2 mg/l or Less
OUTDOOR BATHING (ORGANIZED)	B	*Total coliform organisms MPN/100mL shall be 500 or less *pH between 6.5 and 8.5 *Dissolved oxygen 5 mg/l or more *Biochemical oxygen demand 3 mg/l or Less
DRINKING WATER SOURCE WITH CONVENTIONAL TREATMENT FOLLOWED BY DISINFECTION	C	*Total coliform organisms MPN/100mL shall be 5000 or less *pH between 6 and 9 *Dissolved oxygen 4 mg/l or more *Biochemical oxygen demand 3 mg/l or Less
PROPAGATION OF WILD LIFE, FISHERIES	D	*pH between 6.5 and 8.5 *Dissolved oxygen 4 mg/l or more *Free Ammonia (as N) 1.2 mg/l or less
IRRIGATION, INDUSTRIAL COOLING, CONTROLLED WASTE DISPOSAL	E	*pH between 6 and 8.5 *Electrical Conductivity less than 2250 micro mhos/cm *Sodium absorption ratio less than 26 *Boron less than 2 mg/l

TABLE 3-15: WATER QUALITY PARAMETERS AT SAMPLE POINTS ON GANGA RIVER

RIVER	SAMPLE POINT	DO (mg/l)	BOD (mg/l)	TOTAL COLIFORM (MPN/ 100ml)	YEAR
GANGA RIVER	GANGA RIVER, D/S KANPUR	5.8	7.3	94251	2008
GANGA RIVER	GANGA RIVER, U/S KANPUR	7.6	3.5	13050	2008

TABLE 3-16: POLLUTION LEVELS FOR THE RIVERINE LENGTH BETWEEN KANNAUJ D/S TO KANPUR D/S AT JAJMAU PUMPING STATION

	POLLUTED STRETCH	SOURCE/ TOWN	MONITORING LOCATION	BOD (mg/l)
GANGA RIVER	KANNAUJ D/S TO KANPUR D/S (JAJMAU PUMPING STATION)	Industrial effluent from Kanpur	1.Kanpur D/S (Jajmau Pumping Station	21
			2. Kannauj D/s, U.P.	6
			3.Kanpur U/S (Ranighat),	6.4

TABLE 3-17: SAMPLE LOCATIONS ON GANGA RIVER WITH MAXIMUM BOD LEVELS

	pH			BOD (mg/l)			FECAL COLIFORM (MPN/100ml)			TOTAL COLIFORM (MPN/100ml)		
WATER QUALITY CRITERIA	6.5-8.5			< 3 mg/l			< 2500 MPN/100ml			< 500 MPN/100ml		
SAMPLE POINT	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN
GANGA AT KANPUR U/S (RANI GHAT)	7	8.8	8.1	2.4	5.2	3.4	400	23000	3190	2100	93000	13555
GANGA AT KANPUR D/S (JAJMAU PUMPING STATION)	7.4	8.6	8	3.8	21	8.3	1500	46000	16818	15000	240000	94250

TABLE 3-18: OBJECTIONABLE COLIFORM LEVELS AT DIFFERENT SAMPLING LOCATIONS ON GANGA RIVER

SAMPLING LOCATION ON GANGA RIVER	DESIRED CATEGORY	EXISTING CATEGORY	POLLUTION CHARACTERISTICS
1- GANGA RAJGHAT D/S NARORA	B	C	T. Coliform
2- GANGA D/S GARHMUKTESWAR	B	D	T. Coliform
3- KANPUR BITHOOR	B	C	T. Coliform
4- KANPUR U/S	B	C	T. Coliform
5- KANPUR D/S	B	E	T. Coliform
6- KANNAUJ U/S	B	C	T. Coliform
7- KANNAUJ D/S	B	D	T. Coliform

TABLE 3-19: WATER QUALITY PARAMETERS AT DIFFERENT SAMPLE POINTS ON GANGA RIVER

CHARACTERISTICS	UNIT	GHATIYA GHAT	KANNAUJ U/S (NEAR MARRIAM BRIDGE)	KANNAUJ D/S (AT MARRIAM BRIDGE)	BITHOOR GHAT	GANGA BARRAGE (KANPUR U/S)	RANI GHAT (INTAKE POINT)	SARSIA GHAT	BURIA GHAT	KANPUR (JANA VILLAGE)
TEMPERATURE	◦ C	24.5	25.5	26	25.5	25	25.5	26	26	26
PH	Scale	8.1	7.5	7.9	8.4	8.2	8.2	7.8	7.8	8.4
TOTAL ALKALINITY	mg/l	138	172	186	194	200	192	212	188	210
CONDUCTIVITY	Scale	33.7	53.6	50.7	47.2	51.3	51.1	58.4	54.6	56.8
DISSOLVED OXYGEN	mg/l	7.7	7	8.9	8.2	7.1	6.9	4.1	4.1	3.5
BIOCHEMICAL OXYGEN DEMAND	mg/l	1.5	2.7	2.8	2.2	2.3	3.1	5.4	3.8	4.7
CHLORIDE	mg/l	16	24	22	24	24	20	30	26	30
TOTAL COLIFORM	MPN/ 100ml	**4300**	**9300**	**9300**	**7500**	**4300**	**9300**	**46000**	**21000**	**46000**

From the table it is evident that although the situation is not alarming at all sites, however, it also cannot be denied that the quality of water in the riverine length of Ganga passing along Kanpur is not fit for consumption.

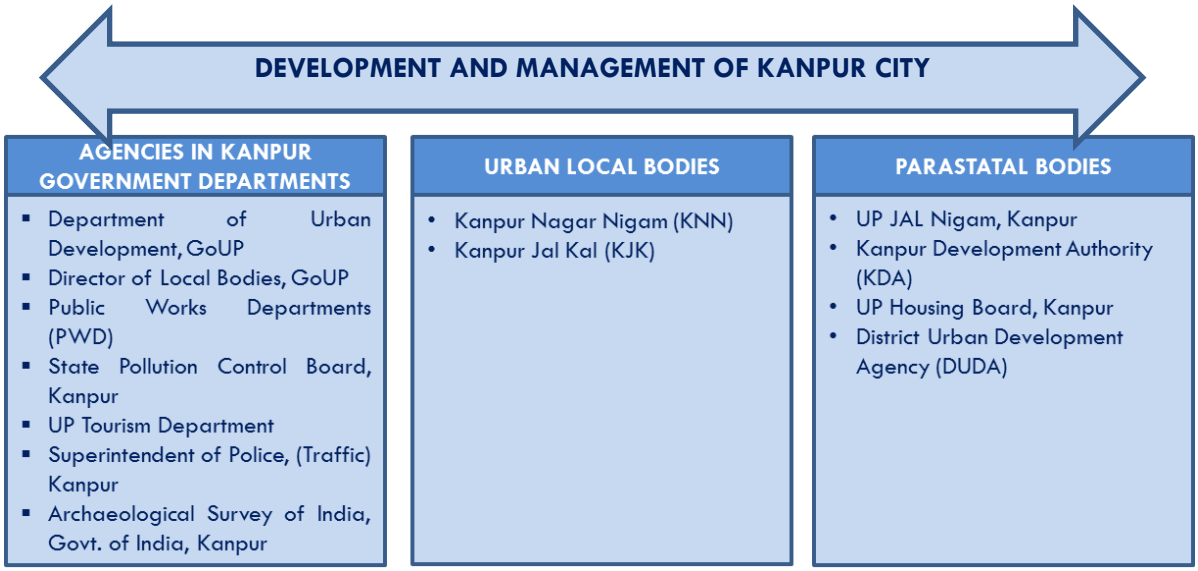
CHAPTER 4. INSTITUTIONAL AND FINANCIAL ANALYSIS

Topics of Discussion

- Institutional Capacity Assessment
- Financial Assessment

4.1 Institutional Capacity Assessment

In Kanpur, steep growth (35 percent) in population from 1991-2011 has put tremendous pressure on urban infrastructure demand such as water supply, sewerage and access to toilets, storm water, solid waste etc. Urban areas are the engines of economic growth. The quality of civic infrastructure and civic services has a critical bearing on economic development of the city and the state as a whole. The 74th amendment to the constitution devolved the role of management and development of the city to the elected representatives of the city through the city's Urban Local Body (ULBs). Hence the ULBs are both the custodians of civil infrastructure and providers of civic services. Thus, ULBs are catalysts of economic growth of a city. However, the management of a large city like Kanpur is a complex task and several institutions are involved in it, as shown below.



The primary responsibility of providing water supply and sanitation rests with state government and more specifically with municipal government. Kanpur Jal Sansthan (KJK) deals with water supply and sewerage system while Kanpur Nagar Nigam (KNN) deals with social infrastructure such as education, public health and medical services.

4.1.1 Functions of Local and Parastatal Bodies

The UP Municipal Corporation Adhiniyam, 1959 as amended from time to time provides for majority of the function listed in the 12th schedule of the constitution. Few major functions are listed below -

- Urban planning including town Planning
- Regulation of land-use and construction of buildings
- Planning for economic and social development
- Water Supply for domestic, industrial and commercial purposes
- Public health, sanitation, conservancy and solid waste management
- Urban forestry, protection of the environment and promotion of ecological aspects
- Safeguarding the interests of weaker sections of the society, Slum improvement and up gradation
- Provision of Urban amenities and facilities such as parks, gardens, playgrounds
- Promotion of cultural, educational and aesthetics aspects

- Public amenities including street lighting, parking lots, bus stops and Public Conveniences
- Regulation of slaughter houses and tanneries
- Roads and Bridges

4.1.1.1 KANPUR NAGAR NIGAM (KNN)

KNN is administered under the Uttar Pradesh Municipal Corporation Adhiniyam, 1959. The Act has been amended in 1994 by UP Act 12 of 1994, UP Act 26 of 1995 and incorporates the amendments made in 74th CAA, 1992 including the functions given in 12th schedule of the constitution.

4.1.1.1.1 Organizational Structure

KNN is divided into two wings, viz. elected wing and the administrative wing. KNN has an elected Mayor-in-Council System. The strength of the council is 110 in addition to the Mayor. The inner core area of Kanpur comprises of 67 wards out of total of 110 wards.

The administrative wing of KNN is headed by a Nagar Ayukt appointed by state government and supported by two Additional Nagar Ayukt also appointed by the state government. KNN is divided into six zones and each zone is headed by an Assistant Nagar Ayukt.

FIGURE 4-1; ORGANIZATION STRUCTURE - KANPUR NAGAR NIGAM

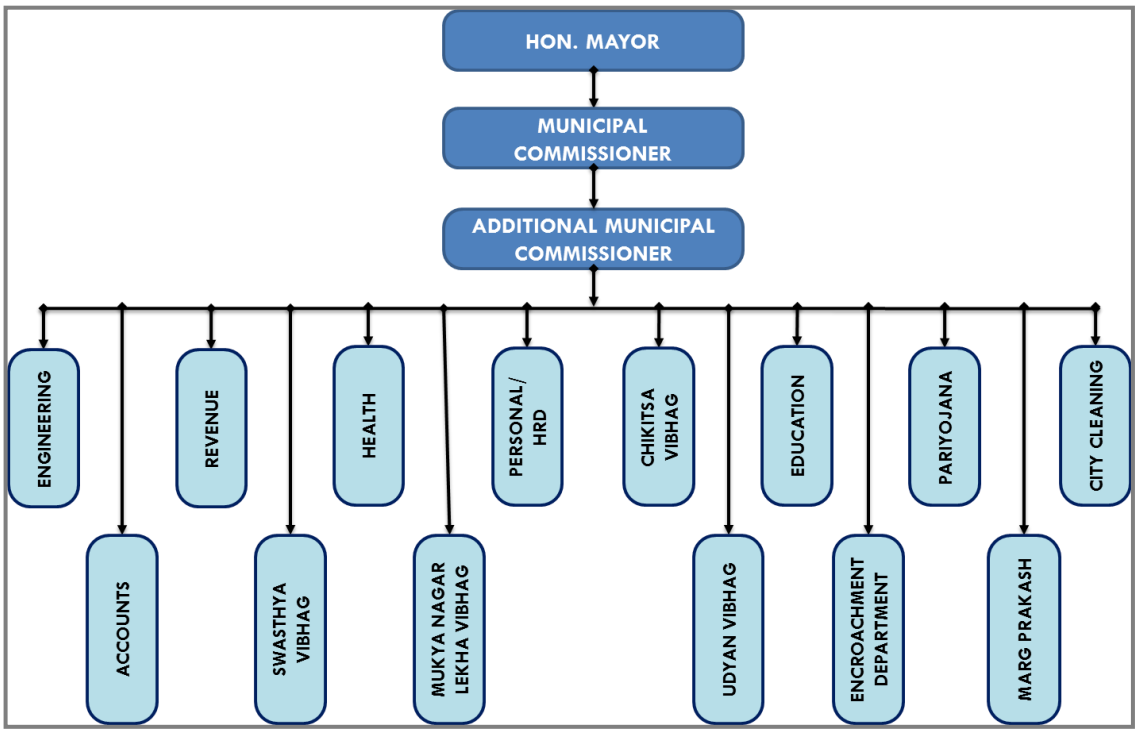
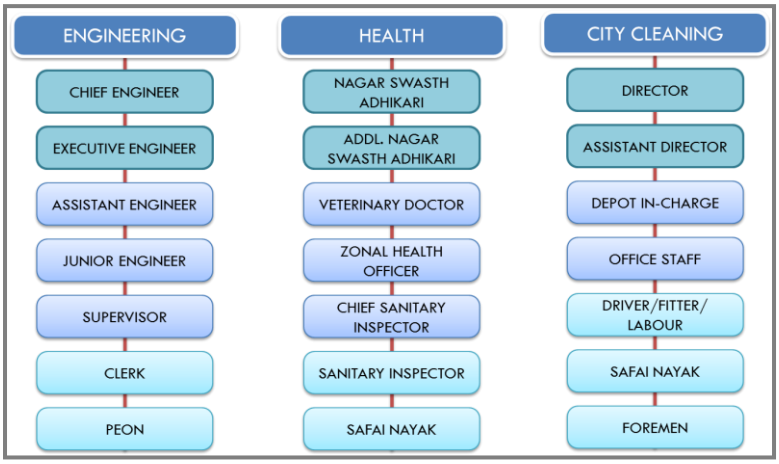


FIGURE 4-2; ORGANOGRAM OF SANITATION RELATED DEPARTMENTS

Dedicated department for sanitation service delivery is lacking in the organizational structure of KNN. The sanitation service roles and responsibilities are divided amongst Engineering, health and city cleaning departments predominantly. The overlap of responsibilities and weak coordination affects the service delivery and accountability.



4.1.1.1.2 Functions of KNN

The duties and powers of the Corporation and Corporation authorities are detailed in Sections 114 of the said Act. The major functions being performed by KNN currently are –

- Public health, sanitation, conservancy and solid waste management
- Urban poverty alleviation
- Provision and maintenance of urban amenities and facilities such as parks, gardens, playgrounds.
- Provide and maintain the lighting of the public streets, corporation markets, and public buildings and other Places vested in the corporation
- Maintenance of ambulance services
- Registration of vital statistics including births and deaths.
- Regulation of slaughter houses and tanneries
- Operation and Maintenance of burial grounds, cremation grounds, etc.

Though Water Supply and sewerage are also obligatory functions of Municipal Corporation as per the 12th schedule of 74th Constitutional Amendment Act (CAA), in the case of city of Kanpur they are looked after by Kanpur Jal Nigam and Jal Kal

4.1.1.2 KANPUR JAL KAL

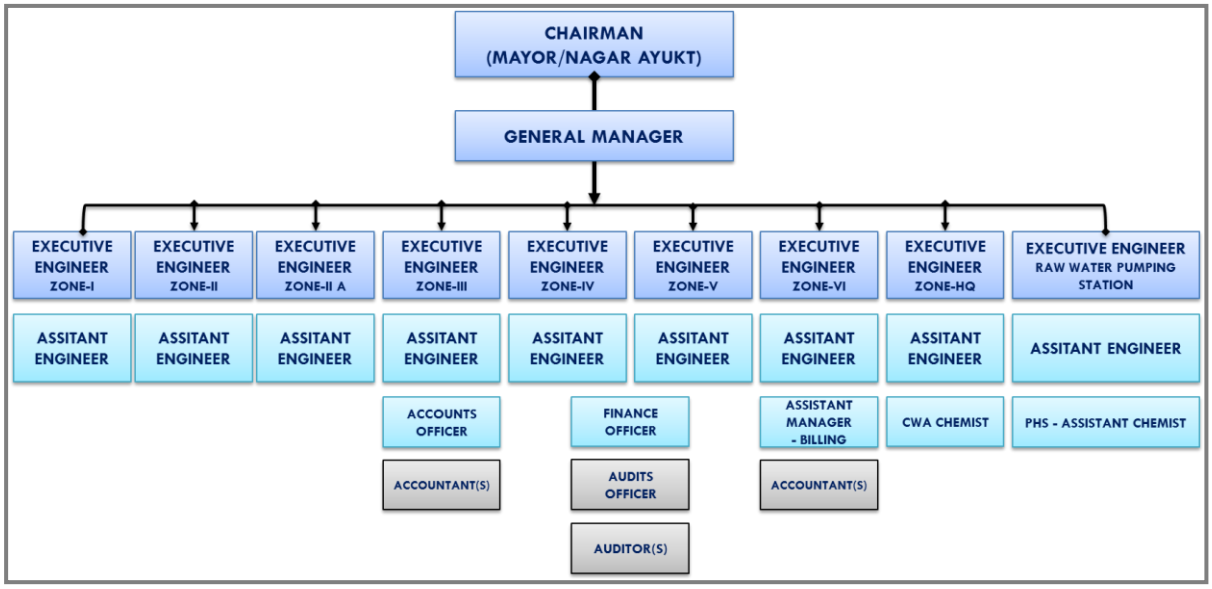
Kanpur Jal Kal was established in the year 1976 under UP Water Supply and Sewerage Act, 1975 to provide a specialized organization to focus on operating and maintaining water supply and sewerage services. It worked under Kanpur Nagar Nigam as its integral part until 1979. In 1979, water supply and sewerage works were taken out from the activities of the Nagar Nigam and entrusted to a local authority duly constituted under the above Act. However, in the year 2003, Jal Kal was merged with Kanpur Nagar Nigam.

4.1.1.2.1 Organizational Structure

In order that the Jal Kal responded to the aspirations and requirements of citizens, it had the Mayor of the Kanpur as the Chairperson of Jal Kal Committee. The committee comprised of following members besides the Mayor as Chairperson – (1) General Manager, Jal Kal; (2) Nagar Ayukt, Kanpur Nagar Nigam; (3) Superintending Engineer, UP Jal Nigam Kanpur; (4) Senior Accounts Officer, nominated by Jal Nigam; (5) Joint Director, Medical and Health; and (6) Director, Local Bodies, GoUP

In the year 2003, Jal Kal was merged with Kanpur Nagar Nigam with the condition that the Chairperson and the General Manager will have same powers as when functioning independently. Accordingly, they are working independently in the present time

FIGURE 4-3: ORGANIZATIONAL STRUCTURE - KANPUR JAL KAL



4.1.1.3 .UP HOUSING AND DEVELOPMENT BOARD

U.P. Housing and Development Board was set up under the Act of 1965 in April 1966. It has been established to implement the various housing and development schemes in a planned way under the guidelines established by the state level and national level residential policy and programmes.

The main objectives of UP Housing and Development Board are to:

- Make the plan for all residence related activities in the urban areas and to get them implemented fast and in effective way;
- Receive grant and loan from central and state government, commercial bank, financial organizations, public bodies etc;
- Acquire the land and construct roads, electricity, water supply, and other urban facilities and to arrange and distribute the land and constructed houses according to the demand from registered people;
- Make special arrangement for the houses for the backward class and scheduled caste and tribe, security workers and freedom fighters.

4.1.1.4 KANPUR DEVELOPMENT AUTHORITY (KDA)

The State Government established the Kanpur Development Authority (KDA) in 1974. It's the largest body of its kind in Uttar Pradesh (UP). It has been responsible since its inception for providing infrastructure related development to the city of Kanpur corresponding to the city expansion. It operates primarily at the outskirts of the KNN area i.e. 8 km stretch beyond the KNN boundary. Today KDA has jurisdiction over an area as large as 300 sq. km, which includes 312 villages. The major functions of KDA are summarized below –

- Overall development of city
- Making & implementation of Master Plan
- Planning for infrastructure for KDA colonies and its construction
- Zoning of the city
- Maintenance of KDA colonies till their handing over to KNN

4.1.1.5 UP JAL NIGAM

Jal Nigam was formed in 1927 to undertake responsibility for the water supply and sewage disposal of the State. Later in 1975 this department was transformed into Uttar Pradesh Jal Nigam under the Uttar Pradesh Water Supply and Sewerage Act, 1975. Under the Uttar Pradesh Water Supply and Sewerage Act, 1975, UP Jal Nigam has to carry out the functions of - **(a)** preparation, execution, and promotion of water supply and sewerage schemes, **(b)** preparation, execution and promotion of state plans for water supply, sewerage and drainage and **(c)** to establish standards for water supply and sewerage in the state.

As per the order of the central government, UP Jal Nigam is currently in the process of transferring the operation and maintenance of the assets created under Ganga Pollution Control Unit to Kanpur Nagar Nigam. The Ganga Pollution Control Unit in Kanpur was formed to undertake the construction and execution of the assets that were created under the Ganga action plan phase I.

4.1.2 **Overlap of Institutional Responsibilities**

The multiplicity of organizations involved in providing urban services makes the management of affairs of the city highly complex. It becomes essential to define the roles and responsibilities of each of the Agencies very clearly.

The inter-relationships of various departments play an important role in the good quality of services deliverability to the community /citizens of the city. Moreover, overlapping of some of the functions requires a high level of coordination. The following table indicates the service-wise planning, implementation and operation and maintenance function being carried out by various agencies involved in providing services in Kanpur city.

FIGURE 4-4: OVERLAP OF INSTITUTIONAL RESPONSIBILITIES - KANPUR CITY

SECTOR	PLANNING	IMPLEMENTATION	OPERATION AND MAINTENANCE
Land Use/ Master Plan/ Building Byelaws	KDA	KDA	KDA
Water Supply	UPJN/ KDA/ UPHB for colonies developed by them/ DUDA for slum areas	KJK/ UPJN/ DUDA for slum areas	KJK/ UPJN
Sewerage		KJK/ UPJN	KJK/ UPJN
Roads/Bridges/Flyovers/Rob	PWD,KDA,KNN	KNN/KDA/PWD/ Housing Board/UPSIDC	KNN/KDA/PWD/ Housing Board/UPSIDC
Multilevel Parking		KNN/Traffic Police	KNN/Traffic Police/RTO
Traffic Control And Management Systems City Public Transportation	SP Traffic, RTA,KNN		
Street Lighting	KNN	KNN	KNN
Storm Water Drainage	KNN	KNN	KNN
Solid Waste Management	KNN	KNN	KNN
Parks/Playground/Golf Course/Beautification Of Road Intersections/Urban Forest	KNN, Forest ,KDA,UPHB	KNN /KDA/Housing Board/Forest	KNN/KDA/Housing Board/Forest
Air, Water And Noise Pollution Control	SPCB	Pollution Control Board	Pollution Control Board
Slum Development	CDO,KNN,DUDA	DUDA/KDA	DUDA
Urban Poverty Programme	KNN,DUDA	DUDA	DUDA
Housing Or Ews		KDA/Housing Board, DUDA	KDA/Housing Board, DUDA
Public Conveyance		R.T.O	R.T.O
Heritage Building Conservation	KNN, Archaeological Department	Archaeological Department/KNN	Archaeological Department/KNN

The table clearly indicates that several services are being provided by more than a single agency which increases the complexity of the service deliverability mechanism. The resulting unavoidable delays due to the lack of coordination and the inordinate delays in transfer of assets to the concerning agencies for the continuity in the service create a major roadblock in the development and operation and maintenance of the sanitation infrastructure.

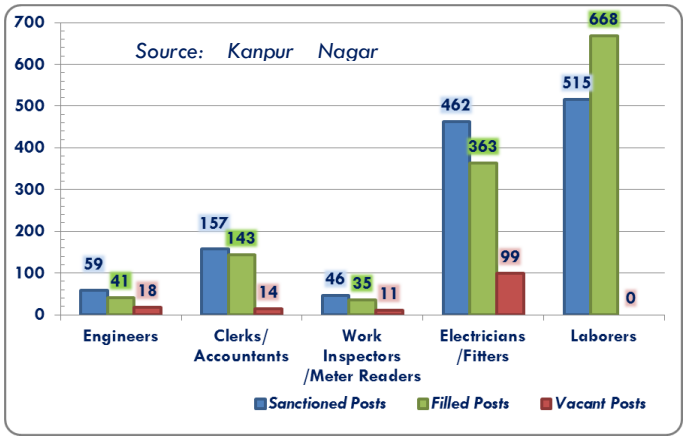
4.1.3 Sector-Wise Staff Assessment

The human resource statistics have been furnished by the City Engineers of the respective departments. The human resource requirements vary from department to department.

4.1.3.1 WATER SUPPLY SECTOR

UP Jal Nigam is responsible for the planning, design and construction/development of the assets in the water supply sector, while Kanpur Jal Kal (KJK) is responsible for the operation and maintenance of the assets. It has been reported that the existing human resource strength has been nearly commensurate to the desired strength of the positions essential in the department. As can been seen from Fig-4.6, the difference of filled and sanctioned positions is minimal for each category of the post. It has also been reported that the senior management positions are filled as per the requirement which enables continuous administration and service delivery management. However,

FIGURE 4-5: STAFF ASSESSMENT - WATER SUPPLY SECTOR



it was observed that the capacities of the existing staff have need of enhancement in order to handle the responsibilities of their roles and dispense their duties per the mandate.

4.1.3.2 SEWERAGE AND DRAINAGE SECTOR

UP Jal Nigam is responsible for the planning, design and construction/development of the assets in the sewerage and drainage sector, while Kanpur Jal Kal (KJK) is responsible for the operation and maintenance of the assets. UP Jal Nigam is the process of transferring the operation and maintenance of the assests in this sector to Kanpur Nagar Nigam (KNN).

KNN has reported that all the sanctioned posts against the staff positions in the department have been filled satisfying the requirement of the human resource strength. However, as experienced in the water supply sector, the capacities of the existing staff have need of enhancement in order to handle the responsibilities of their roles and dispense their duties per the mandate.

TABLE 4-1: STAFF ASSESSMENT - SEWERAGE AND DRAINAGE SECTOR

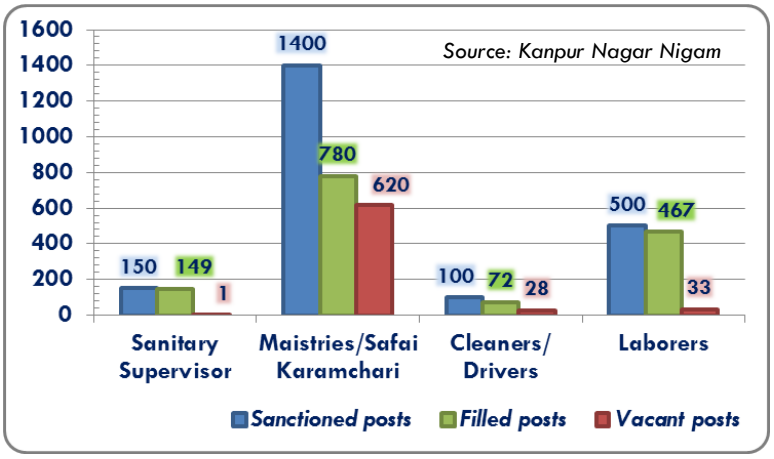
REQUIRED POSITION	SANCTIONED POSTS	FILLED POSTS	VACANT POSTS	REMARKS
Senior Management	1	1	0	
Engineer	1	1	0	
Laborers	458	533	0	Laborers are hired as per the requirement and the current strength is higher than the initial sanctioned number
TOTAL SANCTIONED	460	535	0	

Source: Kanpur Nagar Nigam

4.1.3.3 SOLID WASTE MANAGEMENT (SWM) SECTOR

It has been reported that the existing human resource strength has been nearly commensurate to the desired strength of all the positions essential in the department, with the exception of safai karamcharis/maistries. As can been seen from Fig-4.7, the difference of filled and sanctions positions is minimal for each category of the post; however, there is a reported deficiency of 620 safai karamcharis against the requirement of 1400 safai karmacharis translating to a 44% deficit. It has also been reported that the senior management positions are filled as per the requirement which enables continuous administration and service delivery management. However, as observed in the other sectors, SWM sector has also witnessed an urgent need for capacity enhancement strategy formulation and its implementation for the existing staff in order to handle the responsibilities of their roles and dispense their duties per the mandate.

FIGURE 4-6: STAFF ASSESSMENT - SOLID WASTE MANAGEMENT SECTOR



4.2 Municipal Finance Assessment

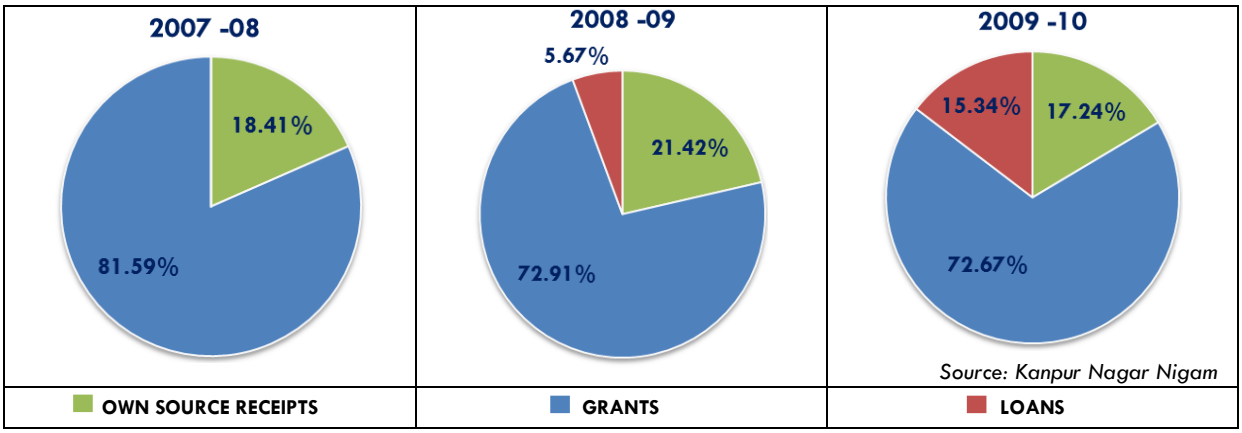
4.2.1 Receipts of Kanpur Nagar Nigam

The total income of Kanpur Nagar Nigam from all sources has witnessed a substantial increase from 406 crores in 2007-08 to 920 crores in 2009-10.

TABLE 4-2: SOURCE OF TOTAL INCOME - KANPUR NAGAR NIGAM

SOURCE OF INCOME (*Rs in Crores*)	2007 -08	2008 -09	2009 -10
Own Source Receipts			
Tax Revenue	51.36	39.96	123.51
Non-Tax Revenue	12.23	22.16	33.81
Grants	281.82	211.46	663.25
Loans		16.46	140.00
Total Income	***345.40***	***290.04***	***960.57***
Opening Balance	60.89	145.44	7.07
Source: Kanpur Nagar Nigam **Grand Total**	**406.30**	**435.48**	**967.64**

FIGURE 4-7: SHARE OF COMPONENTS IN THE TOTAL INCOME - KNN



As is evident from Fig 4-12, the own source receipts of KNN contribute insignificantly towards the total income. KNN relies heavily on the grants to meet the expenses. The revenue income in the past years has been low compared to the revenue expenditure yielding overall annual deficits resulting in a weak credit rating for KNN.

Reinforcing measures are vital to augment the own source receipts to ensure good credit rating for KNN and make the municipal finance systems more robust.

4.2.1.1 OWN SOURCE RECEIPT

KNNs' own source receipts have increased from 63.58 crores in 2007-08 to 109.41 crores in 2009-10, however there was a dip in the receipts in the year 2008-09. The tax revenue is the major component of the receipts, ranging from 64% - 81% of the total own source receipt.

TABLE 4-3: OWN SOURCE RECEIPT - KANPUR NAGAR NIGAM

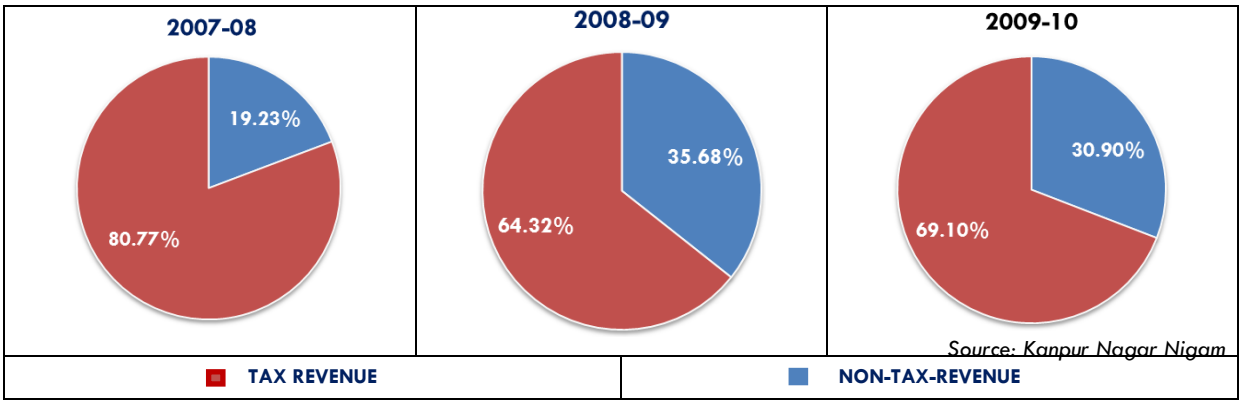
SOURCE OF KNN INCOME	2007-08	2008-09	2009-10
Non-Tax Revenue	122263574	221638915	338106000
Tax-Revenue	513627975	399558597	756010000
Total Income from Own Sources	**635891549**	**621197512**	**1094116000**

Source: Kanpur Nagar Nigam

The sanitation related components contributing to the own source receipts are sewer charges, user charges and sewage disposal tax. The contribution sewer charges to the overall own source receipts has been 0.76% and 1.21% in the years 2008-09 and 2009-10 respectively, while the contribution of the user charges has reportedly been 0.11% and 0.81% in the years 2008-09 and

2009-10 respectively. The contribution of sewage disposal tax has decreased from 0.09% in 2008-09 to 0.03% in 2009-10.

FIGURE 4-8: SHARE OF TAX AND NON-TAX REVENUE IN TOTAL OWN SOURCE RECEIPTS - KNN



4.2.1.2 GRANTS

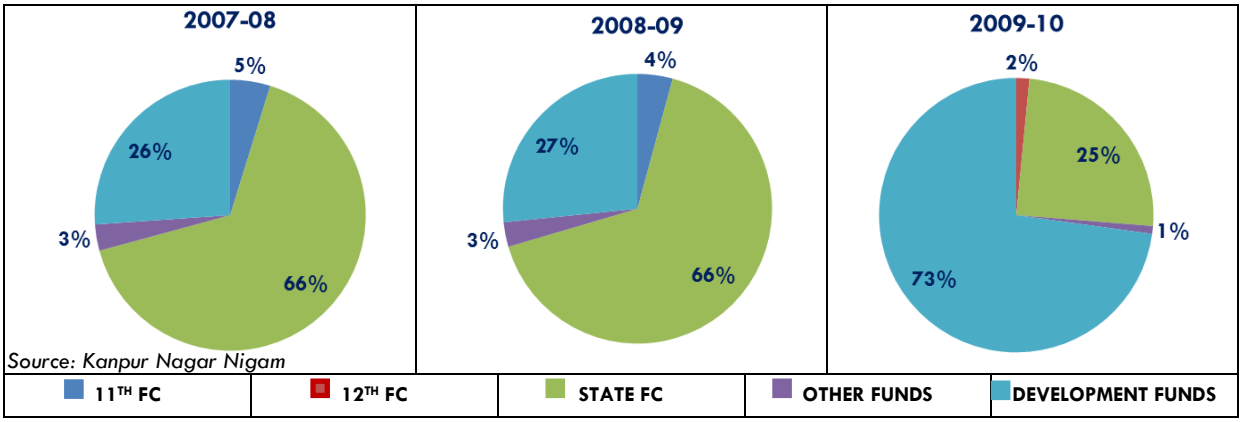
Grants are broadly categorized as plan funds and non-plan funds.

TABLE 4-4: SOURCE OF GRANTS - KANPUR NAGAR NIGAM

SOURCE OF GRANTS	2007-08	2008-09	2009-10
Plan Funds (*Rs in Lakhs*)			
11th FC	1249.66	833.27	
12th FC			1000.00
Non-Plan Funds (*Rs in Lakhs*)			
State FC	17233.30	13068.62	16000.00
Other Funds	817.64	580.40	595.00
Development Funds	6813.60	5250.48	47135.00

Source: Kanpur Nagar Nigam

FIGURE 4-9; SHARE OF THE COMPONENTS OF GRANTS - KANPUR NAGAR NIGAM



Plan Funds comprising of 11th finance commission (FC) and 12th FC and non-plan funds comprising of the grants from State FC and other funds as in grants for UMV, degree college and health treatment grants collectively constituted a major portion of the grants during the years 2007-08 and 2008-09, while the development funds (DF) have been the major source of grants in the year 2009-10. JNNURM funds constitute a significant share of the development funds during the year 2009-10.

4.2.1.3 LOANS

Government loans have been the only source of loans for KNN.

FIGURE 4-10: SOURCE OF LOANS - KANPUR NAGAR NIGAM

SOURCE OF LOANS	2007 -08	2008 -09	2009 -10
Government Loans		164576000	1400000000
Total		**164576000**	**1400000000**
			Source: Kanpur Nagar Nigam

4.2.2 Expenses of Kanpur Nagar Nigam

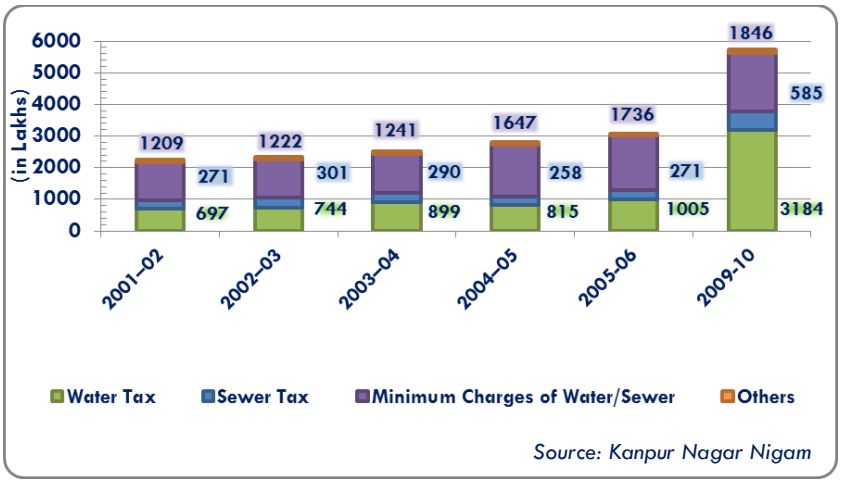
EXPENDITURE ITEM	2007-08	2008-09	2009-10
Capital Expenditure			
Revenue Expenditure			
Other than Establishment Expenses	103.54	122.62	646.14
Expenses on Salaries of Employees	91.24	75.44	109.95
Safai Karmacharies Salaries	45.41	52.57	60.00
Total	***240.19***	***250.63***	***816.09***
Closing Balance	145.44	170.71	87.69
Total Expenses	**385.62**	**421.34**	**903.78**
			Source: Kanpur Nagar Nigam

4.3 Sector-Wise Financial Assessment

4.3.1 Water Supply and Sewerage Sector

The authority responsible for the water supply and sewerage sector is Kanpur Jal Kal (KJK); KJK's financial resources are based on receipts from water tax, sewer tax, and water and sewer user charges levied on properties and on users. As per the present tariff structure, rates of domestic and non-domestic water supply are Rs. 2.90 and Rs. 4.00 to Rs. 5.90 per KL respectively, depending on the nature and quantity of use.

FIGURE 4-11: WATER AND SEWER TAX DETAILS - KNN



Source: Kanpur Nagar Nigam

The main revision of tariff was carried out in the year 1994 on the basis of MV and the size of water connection with a provision of annual enhancement at the rate of 7.5%. The revision of tariff resulted in revenue enhancement as indicated in Fig. 4-8

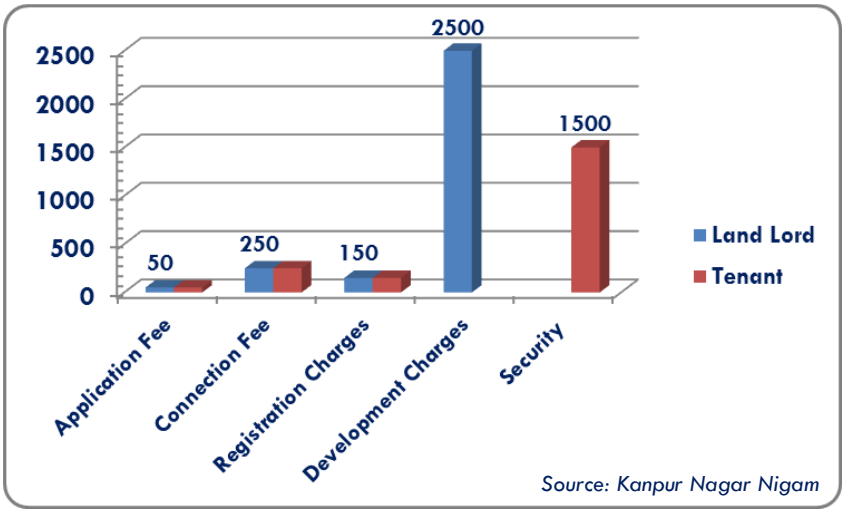
The cost of operation and maintenance of water supply and sewerage system is met through revenue generated from water tax, sewer tax, minimum charges & user charges of water. The water tax and sewer tax is levied on the basis of annual rental value (ARV) of properties @ 12.5% & 4% respectively; ARV is assessed by KNN. However, 70 % of the income is utilized to meet the establishment expenditure, post-retirement benefit of employees, procurement of chemical, maintenance expenditure has to be paid regularly. This leaves very little surplus to undertake any capital works. Under such circumstances, it is only possible to carry out expenditure

related to break down maintenance or emergency works such as replacement of pumping set, sewer lines, pipe-lines, machine etc.

4.3.1.1 WATER AND SEWERAGE CONNECTION COSTS

The water connection costs for the landlords/house owners and the tenants have been presented in Fig.4-9; it may be noted that the tenants are required to deposit a security charge in lieu of the development charges. The security deposit is noted to be lesser than the development charges levied on the owner. However, residents of slum colonies and EWS Houses and the urban poor are exempted from payment of the development charges.

FIGURE 4-12: WATER CONNECTION COSTS



The road cutting charges are levied in addition to the listed fees and charges applied as part of the water connection costs, at actuals.

4.3.1.2 WATER TAX, SEWER TAX, COST OF WATER & MINIMUM CHARGES

The water tax and sewer tax are levied on the ARV of properties, as per the provisions in *U.P.* Water Supply & Sewer Act i.e. 12.5% & 4% respectively. The properties with ARV up to Rs.360/- are exempted from taxes. As per provision of the Act, minimum charge or cost of water, whichever is higher, is also payable based on the size of water connection. The taxes are payable if services are available within 100 meter radius of the house/property.

The charges have been augmented in the year 2007-08 by 5% and as per the Government Order, the rates shall be subject to augmentation at the rate of 5% once in every three years. Minimum charges are levied on domestic connection as the meter connection is discontinued. The rates applicable as per Gazette Notification are presented in the table below -

TABLE 4-5: RATES/PER LITRE OF WATER CONSUMED

TYPE OF CONNECTION	RATES (INR/LITRE)	REMARKS
Domestic	4.55	*As per Gazette Notification*
Non-domestic (commercial)	8.8	
Non-domestic (institutionall)	14.6	

The Minimum charges for half-inch water connection in accordance with the ARV of the house or property is tabulated as below -

ARV SLAB OF HOUSE/PROPERTY (INR)	MINIMUM CHARGE (INR)	REMARKS
Upto 360	799	*Timely Payment Rebate at the rate of 10% shall be awarded upon payment of bill within 30 days of issue;* *Surcharge of 10% shall be levied on non-payment of bill within the financial year*
361- 2000	1370	
2001 - 3500	1754	
3501 - 5000	2338	
5000 & Above	2923	

4.3.1.3 COST RECOVERY IN WATER SUPPLY SECTOR

The total cost recovery in water supply services is reported at 84.21% by the KNN officials; however, the collection efficiency of water supply related charges is stated to be approximately 74.77%.

TABLE 4-6: COST RECOVERY IN WATER SUPPLY SERVICES – OPERATING EXPENSES

FINANCIAL INFORMATION - OPERATING EXPENSES (IN LAKH)	
Regular Staff and administration	2103
Outsourced/Contract Staff Costs	63
Electricity Charges/Fuel Costs	1616
Chemical Costs	255
Repairs/Maintenance Costs	303
Bulk (Raw/Treated) Water Charges	
Other Costs	122
Total Operating Expenditure	**4462**

Source: Nagar Nigam Kanpur

TABLE 4-7: COST RECOVERY IN WATER SUPPLY SERVICES–OPERATING REVENUES

FINANCIAL INFORMATION - OPERATING REVENUES (IN LAKH)	
Arrears at the beginning of previous year (2009-10)	613
Revenue demand from user charges	3649
Revenue demand from tax/cess - Water Service only	
Revenue demand from other revenues (eg. connection costs/Donations etc)	20
Total Revenue Demand for previous year	**3669**

Source: Nagar Nigam Kanpur

TABLE 4-8: COST RECOVERY IN WATER SUPPLY SERVICES–COLLECTION EFFICIENCY (IN LAKH)

TOTAL REVENUE DEMAND FOR PREVIOUS YEAR (FROM USER CHARGES, TAXES ETC)	**3669**
Collection against arrears (2009-10)	303
Collection against the current demand of previous year (2009-10)	3308

Source: Nagar Nigam Kanpur

4.3.2 **3.2.2 Sewerage and Drainage sector**

The total cost recovery in sewerage service is about 40.4%. Further, the collection efficiency in sewerage related charges is about 68.6%. The following table illustrates the details of operating expenses and revenues in sewerage and drainage sector.

TABLE 4-9: COST RECOVERY IN SEWERAGE AND DRAINAGE SERVICES–OPERATING EXPENSES

FINANCIAL INFORMATION - OPERATING EXPENSES (IN LAKH)	
Regular Staff and administration	1229
Outsourced/Contract Staff Costs	
Electricity Charges/Fuel Costs	*57*
Chemical Costs	
Repairs/Maintenance Costs	431
Bulk (Raw/Treated) Water Charges	8
Other Costs	
Total Operating Expenditure	**1725**

Source: Nagar Nigam Kanpur

TABLE 4-10: COST RECOVERY IN SEWERAGE AND DRAINAGE SERVICES–OPERATING REVENUES (IN LAKH)

ARREARS AT THE BEGINNING OF PREVIOUS YEAR	**131**
Revenue demand from user charges - sewerage only	*793*
Revenue demand from tax/cess - sewerage only	
Revenue demand from other sources (eg. connection costs/donations etc.)	*5*
Total Revenue Demand of the previous year (Current Demand of previous year)	**798**

Source: Nagar Nigam Kanpur

TABLE 4-11: COST RECOVERY IN SEWERAGE AND DRAINAGE SERVICES–COLLECTION EFFICIENCY (IN LAKH)

TOTAL REVENUE DEMAND FOR PREVIOUS YEAR (FROM USER CHARGES, TAXES ETC)	798
Collection against arrears (2009-10)	101
Collection against the current demand of previous year (2009-10)	586

Source: Nagar Nigam Kanpur

4.3.3 Solid Waste Management Sector

4.3.3.1 COST RECOVERY IN SOLID WASTE MANAGEMENT SECTOR

The total cost recovery in Solid waste management service is about 56.5%. Further, the collection efficiency in sewerage related charges is about 88.6%. The following table illustrates the details of operating expenses and revenues in solid waste management services.

TABLE 4-12: COST RECOVERY IN SOLID WASTE MANAGEMENT SERVICES–OPERATING EXPENSES

FINANCIAL INFORMATION - OPERATING EXPENSES (IN LAKH)	
Regular Staff and administration	58.2
Outsourced/Contract Staff Costs	10.1
Electricity Charges/Fuel Costs	90
Chemical Costs	2.85
Repairs/Maintenance Costs	11.8
Bulk (Raw/Treated) Water Charges	
Other Costs	
Total Operating Expenditure	**173**

Source: Nagar Nigam Kanpur

TABLE 4-13: COST RECOVERY IN SOLID WASTE MANAGEMENT SERVICES – OPERATING REVENUES (IN LAKH)

ARREARS AT THE END OF PREVIOUS YEAR	0
Tax / Cess - Solid Waste only	0
User Charges	0
Fixed Charges based on Property Tax/ State Taxes/Cess/Surcharges	0
Sale of Recyclables	0
Sale from processing - compost/energy	0
Royalty	0
Others (Specify)	0
Total Revenue Demand Raised for the previous year	0

Source: Nagar Nigam Kanpur

TABLE 4-14: COST RECOVERY IN SOLID WASTE MANAGEMENT SERVICES–COLLECTION EFFICIENCY (IN LAKH)

TOTAL REVENUE DEMAND FOR PREVIOUS YEAR (FROM USER CHARGES, TAXES ETC)	199
Collection against arrears (2009-10)	0
Collection against the current demand of previous year (2009-10)	15

Source: Nagar Nigam Kanpur

CHAPTER 5. INFRASTRUCTURE AND SERVICES GAP ASSESSMENT

Topics of Discussion

- Gap Assessment – Sewerage
  - Identification of Problem Areas
- Gap Assessment – Access to Toilets
  - Identification of Problem Areas
- Gap Assessment – Storm Water Management
  - Identification of Problem Areas
- Gap Assessment – Solid Waste Management
  - Identification of Problem Areas

The Service Level Benchmarks (SLB) established by Ministry of Urban Development, Government of India shall enable the comparison of the existing levels of service and hence ascertain the performance gaps. In addition to the SLBs' certain established norms and specification in the specific sectors and few assumptions based on best practices shall be considered to establish the infrastructure gaps; the primary and secondary data analysis shall facilitate the performance gap assessment. The gap assessment shall help the authorities to introduce improvements through the sharing of information and best practices, ultimately resulting in creation and sustenance of better services to the citizens

5.1 Performance Gap Assessment – Sewerage

5.1.1 Premises for Infrastructure and Performance Gap Assessment

The table below shall represent the norms, specifications and the assumptions employed in the determination of the infrastructure gaps –

TABLE 5-1: LIST OF NORMS, SPECIFICATIONS AND ASSUMPTIONS – SEWERAGE SECTOR

COMPONENT	NORM/SPECIFICATION/ ASSUMPTION	REMARKS
Sewerage Management System		
Coverage	**100%**	*SLB, MoUD, GoI*
Wastewater Collection		
Connections	**1 per household**	*Every household /property should be connected to a sewerage system*
Street Collection Sewers	**1.50m per household**	*Best Management Practices*
Grit/Grease Trap	**I per property**	*Best Management Practices*
Wastewater Conveyance System		
Branch Sewers	**0.75m per household**	*Best Management Practices*
Trunk Sewers	**0.40m per household**	*Best Management Practices*
Wastewater Treatment and Disposal		
Adequacy of waste water treatment capacity	**100%**	*SLB, MoUD, GoI*
Quality of waste water treatment	**100%**	*SLB, MoUD, GoI*
Extent of reuse and recycling of waste water	**20%**	*SLB, MoUD, GoI*
Disposal into rivers / natural water bodies	**80%**	
Septage Clearance		
No. of septic tanks cleared per vehicle per day	**3 tanks per day per vehicle**	*Best Management Practices*
Frequency of septage clearance	**Once in 5 years**	*Best Management Practices*
Septage Treatment and Disposal		
Sludge drying beds area	**225 sq.m**	*Best Design Practices*
Thickness of Liquid sludge	**20 cm**	*Best Design Practices*
Sludge volume per bed	**45 cum**	*Best Design Practices*
Septage drying cycle	**10 days**	*Best Management Practices*

TABLE 5-2: GENERAL DISCHARGE STANDARDS

PARAMETER	INLAND SURFACE WATER	PUBLIC SEWERS	LAND FOR IRRIGATION	MARINE/COASTAL AREAS
Colour and Odour	++		++	++
Suspended solids mg/l, max.	100	600	200	· For cooling water effluent 10 per cent above total suspended matter of influent.
pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
Temperature	shall not exceed 5oC above the receiving water temperature			shall not exceed 5oCabove the receiving water temperature
Oil and grease, mg/l max,	10	20	10	20
Total residual chlorine, mg/l max	1	-	-	1
Ammonical nitrogen (as N),mg/l, max.	50	50	-	50
Total kjeldahl nitrogen (as N);mg/l, max. mg/l, max.	100	-	-	100
Free ammonia (as NH3), mg/l, max.	5	-	-	5
BOD, mg/l, max.	30	350	100	100
COD, mg/l, max.	250	-	-	250
Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent

5.1.2 Existing Situation of Service Delivery and Gap Assessment

5.1.2.1 COLLECTION OF WASTE WATER

Interpretation: ***It is evident that the present central collection system does not serve the entire area; only fifty-eight (58%) percent of the total area of city is served by this system. It is roughly estimated that only32 % of the properties are connected to the system.***

55000 out of the total 5, 54,399 households are connected to septic tanks and only the septic tanks in 10000 of the households fulfill the requirement of the sewerage management system as stipulated in the CPHEEO manual on sewerage and sewage treatment.

The ongoing sewerage projects undertaken under the JNNURM will ensure 80% collection network and 20% collection still requires to be provided besides providing last mile household connections.

5.1.2.2 CONVEYANCE OF WASTE WATER

Interpretation: ***An insignificant amount equaling 50% of total waste water generated is conveyed through the central conveyance system and hence most of the sewage generated is disposed in open drains / areas and eventually the rivers, resulting in environmental and health hazards.***

5.1.2.3 TREATMENT AND DISPOSAL OF WASTE WATER

Interpretation: ***The city lacks an adequate treatment and ultimate disposal system. Currently, the collective treatment capacities of the STP's in the city is only 52% of the required capacity. Reuse and recycle of the treated sewage is practiced in Jajmau area wherein the treated sewage is fed to the open farms. The inadequacy of treatment and disposal system has resulted in pollution of land, natural water bodies and ground water.***

5.1.2.4 INSTITUTIONAL ASSESSMENT

5.1.2.4.1 Organizational Structure

Interpretation: ***Non-compliance to best management practices and occupational health and safety rules; lack of training, regular vacancies in KNN department are evidently the major issues.***

5.1.2.4.2 Functional Assessment

Interpretation: ***Qualified staff is inadequate to design and sustain the existing systems; Support systems are rather weak in assessing the appropriateness of the system and do not well-equip KNN to meet the challenges posed by the system;***

Weak coordination among the KNN, Jal Kal and Jal Nigam involved in the development of asset (Jal Nigam), and the operations and management (Jal Kal – KNN) also poses a severe challenge which results in the accountability issues.

The limited capacity of KNN reflects in the absence of community engagement and participatory means in the planning, operations and management of the sewerage management system / service.

5.1.2.5 REGULATORY AND GOVERNANCE ASSESSMENT

Interpretation: ***Initiatives to introduce municipal bye-laws, building codes that shall ensure the best-management practices at the citizens' level need to be geared; Lack of committees / community-government collaborations with representation from pro-poor and community at large that shall provide inputs for planning with inclusive approach and monitor the implementation on a periodic basis***

5.1.3 Overview of Performance Gap Assessment – Sewerage Management

TABLE 5-3: OVERVIEW OF PERFORMANCE GAP ASSESSMENT - SEWERAGE MANAGEMENT

COMPONENT OF SERVICE	DESIRED SERVICE DELIVERY	EXISTING SERVICE DELIVERY
Collection of Waste Water		
Coverage of Sewer Network	***100% of City Area***	***41.38 % of City Area***
Household Connection to Network	***100%***	***32%***
Compliance of Septic Tanks to CPHEEO Standards	***100%***	***18%***
Conveyance of Waste Water	***100%***	***50%***
Treatment Capacity of STPs	***100%***	***52%***

5.1.4 Identification of Critical Problem Areas

CRITICAL PROBLEM AREA 1 - The complete coverage of centralized sewer network in Kanpur is in progress, however, the willingness of households to get connected is low

CRITICAL PROBLEM AREA 2 – Adverse risk to public health due to improper septic tanks and septage management leading to contamination of water bodies/water supply distribution system and incidences of water borne diseases

5.2 Performance Gap Assessment – Access to Toilets

5.2.1 Premises for Infrastructure and Performance Gap Assessment

The table below shall represent the norms, specifications and the assumptions employed in the determination of the infrastructure gaps –

TABLE 5-4: LIST OF NORMS, SPECIFICATIONS AND ASSUMPTIONS – ACCESS TO TOILETS SECTOR

COMPONENT	NORM / SPECIFICATION / ASSUMPTION	REMARKS
Household Sanitation		
Coverage	**100%**	*SLB, MoUD, GoI*
Toilet Connected to Sewer / Septic Tank	**1 per household**	*Best Management Practices*
Community Toilets		
Accessibility	**24X7**	*SLB, MoUD, GoI*
Toilet Seats, if not used in the night	**1 seat per 50 users**	*Guidelines for Community Toilets, Ministry of Urban Affairs & Employment*
Toilet Seats, if used round the clock	**1 seat per 35 users***	
Bathing Units	**1 unit per 50 users**	*Guidelines for Community Toilets, Ministry of Urban Affairs & Employment*
Urinal Units	**1 unit per 200-300 users**	
Clothes Washing Area	**4-5m² per 10 toilet seats**	
Public Toilets		
Toilet Seats	**1 seat per 100 users**	*Guidelines for Community Toilets, Ministry of Urban Affairs & Employment*
Bathing Units, not used in the night	**1 unit per 50 users**	
Bathing Units, if used round the clock	**1 unit per 70 users**	
Urinal Units, not used in the night	**1 unit per 200-300 users**	
Urinal Units, if used round the clock	**1 unit per 300-500 users**	
Clothes Washing Area, not used in the night	**4-5m² per 10 toilet seats**	
Clothes Washing Area, if used round the clock	**4-5m² per 30 toilet seats**	

5.2.2 Existing Situation of Service Delivery and Gap Assessment

5.2.2.1 COVERAGE

Interpretation: ***It is established that in Kanpur city, 79.54% of population has access to individual toilets. However, only 7% out of the 20.56% of the population without individual toilets has access to community toilets.***

Only 38% of the market/commercial areas have toilet facilities; and only 85% of the schools have toilet facilities.

5.2.2.1.1 Open Defecation

Interpretation: It ***is established that in Kanpur city, 23.3% of the total population defecates in the open.***

5.2.2.2 CONDITION OF TOILETS

Interpretation: ***It is reported that 15% of the total individual toilets (all in the slum and LIG areas) are in unusable condition; 50% of the community / public toilets are in average condition, while 23% are in bad condition and 6% of the community toilets are in unusable condition.***

50% of the toilets in the commercial/market areas are in bad condition; it is noted that 90% of the toilets in the schools are in working condition.

5.2.2.3 INSTITUTIONAL ASSESSMENT

5.2.2.3.1 Organizational Structure

Interpretation: ***Lack of an organizational unit dedicated to the sector of access to sanitation.***

5.2.2.4 FUNCTIONAL ASSESSMENT

5.2.2.4.1 Inadequacy of Qualified Staff

Interpretation: Qualified Staff is inadequate to design and sustain the existing systems.

5.2.2.4.2 Overlap of Responsibilities

Weak coordination among the various departments involved in the construction and operations and management also poses a severe challenge to RMC, which results in the absence of accountability. Proper devolution of responsibilities is greatly hindered as well.

5.2.2.4.3 Limited Community Engagement

Interpretation: ***the public outreach and education programs are deficient.***

5.2.2.5 REGULATORY AND GOVERNANCE ASSESSMENT

5.2.2.5.1 Lack of Initiatives

Interpretation: ***Initiatives to introduce municipal bye-laws, building codes that shall enforce performance standards for the new development are lacking; Citywide design guidelines of the order of toilet design manual, sustainable sanitation technologies manual & water conservation manual are not mandated yet! Laws imposing sanitation/septage management is not enforced yet stringently***

5.2.3 Overview of Performance Gap Assessment – Access to Toilets

TABLE 5-5: OVERVIEW OF PERFORMANCE GAP ASSESSMENT - ACCESS TO TOILETS

COMPONENT OF SERVICE	DESIRED SERVICE DELIVERY	EXISTING SERVICE DELIVERY
Coverage of Toilets		
Individual	***1 toilet per every household***	***0.79 toilet per every household***
Community	***1 seat per every 35 users***	***1 seat per every 100 users***
Public Toilets in Commercial/Market Areas	***1 seat per every 100 users***	***1 seat per every 263 users***
Condition of Toilets		
Individual	***100% in working condition***	***85% in working condition***
Community	***100% in working condition***	***71% in working condition***
Public Toilets in Commercial/Market Areas	***100% in working condition***	***50% in working condition***
Toilets in Schools	***100% in working condition***	***90% in working condition***

5.2.4 Identification of Critical Problem Areas – Access to Toilets

CRITICAL PROBLEM AREA 3 – Inadequate number and inappropriately designed, operated and maintained individual and community toilets in urban poor areas leading to open defecation and eventual health and environmental risks;

CRITICAL PROBLEM AREA 4 – Inadequate number and inappropriately designed operated and maintained toilets in commercial and market areas leading to health and environmental threats;

5.3 Performance Gap Assessment – Storm Water Management

5.3.1 Premises for Infrastructure and Performance Gap Assessment

The table below shall represent the norms, specifications and the assumptions employed in the determination of the infrastructure gaps –

TABLE 5-6: LIST OF NORMS, SPECIFICATIONS & STANDARDS - STORM WATER MANAGEMENT

COMPONENT	NORM / SPECIFICATION / ASSUMPTION	REMARKS
Coverage of drainage network	**100%**	*Service Level Benchmarking, MoUD, GoI*
Incidence of water logging / flooding	**0**	*Service Level Benchmarking, MoUD, GoI*

5.3.2 Existing Situation of Service Delivery and Gap Assessment

5.3.2.1 COVERAGE

Interpretation: The storm water drainage network coverage in the city is 55% and the length of the network in the city measures to 1465 km

5.3.2.2 CONDITION OF DRAIN NETWORK

Interpretation: The storm water drains are choked due to indiscriminate dumping of solid waste and are also the predominant carriers of sewage generated in the city. This results in the deterioration of the condition of the drains. The capacity of the drains to carry the storm water is also impeded due to the sewage and the solid waste filling the storm water drains in several location of the city, eventually leading to water logging and flooding in these areas.

5.3.2.3 INCIDENCES OF WATER LOGGING/FLOODING

Interpretation: 45 incidences of water logging / flooding are observed in the entire city.

5.3.2.4 INSTITUTIONAL ASSESSMENT

5.3.2.4.1 Organizational Structure

Interpretation: Lack of an organizational unit dedicated to the sector of storm water

5.3.2.5 FUNCTIONAL ASSESSMENT

5.3.2.5.1 Inadequacy of Qualified Staff

Interpretation: Qualified Staff is inadequate to design and sustain the existing systems.

5.3.2.5.2 Limited Community Engagement

Interpretation: the public outreach and education programs are deficient.

5.3.2.6 REGULATORY AND GOVERNANCE ASSESSMENT

5.3.2.6.1 Lack of Initiatives

Interpretation: Initiatives to introduce municipal bye-laws, building codes that shall enforce performance standards for the new development are lacking; Citywide design guidelines of the order of source control measures, rain water harvesting, sustainable storm water management technologies manual & water conservation manual are not mandated yet!

5.3.3 Overview of Performance Gap Assessment – Storm Water Management

TABLE 5-7: OVERVIEW OF PERFORMANCE GAP ASSESSMENT – STORM WATER MANAGEMENT

COMPONENT OF SERVICE	DESIRED SERVICE DELIVERY	EXISTING SERVICE DELIVERY
Coverage of Drainage Network	*100%*	*55%*
Incidences of Water Logging / Flooding	*0*	*45*

5.3.4 Identification of Critical Problem Areas

CRITICAL PROBLEM AREA 5 – Inadequate storm water drainage network along with poor maintenance and non-integration of source control measures with the existing storm water drainage network leading to a considerable number of water logging areas and ultimately unhygienic conditions;

5.4 Performance Gap Assessment – Solid Waste Management

5.4.1 Premises for Infrastructure and Performance Gap Assessment

The table below shall represent the norms, specifications and the assumptions employed in the determination of the infrastructure gaps –

TABLE 5-8: LIST OF NORMS, SPECIFICATIONS & STANDARDS - STORM WATER MANAGEMENT

COMPONENT	NORM / SPECIFICATION / ASSUMPTION	REMARKS
PROCESSES		
Household Coverage of Solid Waste Management Services	**100%**	*Service Level Benchmarking, MoUD, GoI*
Efficiency of collection of municipal solid waste	**100%**	*Service Level Benchmarking, MoUD, GoI*
Extent of segregation of municipal solid waste	**100%**	*Service Level Benchmarking, MoUD, GoI*
Extent of municipal solid waste recovered/recycled	**80%**	*Service Level Benchmarking, MoUD, GoI*
Extent of scientific disposal of municipal solid waste	**100%**	*Service Level Benchmarking, MoUD, GoI*
Extend of processing and treatment of MSW	**100%**	*Service Level Benchmarking, MoUD, GoI*
Area with Door to Door Collection (DTDC) service	**100%**	*Best Design & Management Practices*
Area under DTDC through motorized vehicles	**60%**	*Best Design & Management Practices*
Area with Community Bins for collection of waste	**100%**	*Best Design & Management Practices*
No. of Pushcarts for DTDC	**5 in 1000 HHs**	*Best Design & Management Practices*
No. of Cycle Rickshaws for DTDC	**5 in 1000 HHs**	*Best Design & Management Practices*
No. of Auto Tippers	**1 in 800 HHs**	*Best Design & Management Practices*
No. of Containers (3.0 cum capacity)	**2.5 per 1000 HHs**	*Best Design & Management Practices*
No of Containers (4.5 cum capacity)	**1.5 per 1000 HHs**	*Best Design & Management Practices*
Area under street sweeping	**100%**	*Best Design & Management Practices*
No. of Handcarts in use for collection of Street Sweepings	**2.4 per km of road**	*Best Design & Management Practices*
No of Covered Containers	**100%**	*Best Design & Management Practices*
No of covered transportation vehicles	**100%**	*Best Design & Management Practices*
Waste dumped in open environment	**0%**	*Best Design & Management Practices*
COST RECOVERY		
Extent of cost recovery in SWM services	**100%**	*Service Level Benchmarking, MoUD, GoI*
Efficiency in collection of SWM charges	**90%**	*Service Level Benchmarking, MoUD, GoI*
CUSTOMER SERVICE		
Efficiency in redressal of customer complaints	**80%**	*Service Level Benchmarking, MoUD, GoI*

5.4.2 Existing Situation of Service Delivery and Gap Assessment

5.4.2.1 SEGREGATION OF WASTE

Interpretation: Segregation of waste at source is not practiced in the city of Kanpur

5.4.2.2 HOUSEHOLD COVERAGE

Interpretation: 84% of the households are covered by the solid waste management services

5.4.2.2.1 Primary Collection

Interpretation: A meager 39% of the households are covered by the door-to-door collection service

5.4.2.2.2 Secondary Collection

Interpretation: 45% of the households dispose their waste in the designated secondary collection bins which are lifted by the private agency contracted by KNN.

5.4.2.3 COLLECTION EFFICIENCY OF THE WASTE

Interpretation: 80% collection efficiency is reported for the city of Kanpur

5.4.2.4 TREATMENT AND DISPOSAL

Interpretation: Kanpur City has treatment facility which is adequate both in terms of capacity and technological efficiency and will meet the demands of the population until 2041.

The entire waste that is collected at the treatment facility is processed for waste recovery and reuse – RDF and electricity generation being the important components.

Less than 5% of the inert material from the waste is disposed to the landfill

5.4.2.5 INSTITUTIONAL ASSESSMENT

5.4.2.5.1 Organizational Structure

Interpretation: Lack of an organizational unit dedicated to the sector of solid waste management

5.4.2.6 FUNCTIONAL ASSESSMENT

5.4.2.6.1 Inadequacy of Qualified Staff

Interpretation: Qualified Staff is inadequate to design and sustain the existing systems.

5.4.2.6.2 Limited Community Engagement

Interpretation: the public outreach and education programs are deficient.

5.4.2.7 REGULATORY AND GOVERNANCE ASSESSMENT

5.4.2.7.1 Lack of Initiatives

Interpretation: Initiatives to introduce municipal bye-laws, building codes and regulatory measures that shall ensure and enforce performance standards for the existing and new development are lacking;

5.4.3 Overview of Performance Gap Assessment – Solid Waste Management

TABLE 5-9: OVERVIEW OF PERFORMANCE GAP ASSESSMENT – SOLID WASTE MANAGEMENT

COMPONENT OF SERVICE	DESIRED SERVICE DELIVERY	EXISTING SERVICE DELIVERY
Household Coverage	*100%*	*84%*
Segregation at Source	*100%*	*0%*
Collection Efficiency	*100%*	*80%*
Extent of Reuse and Recovery	*80%*	*100%*
Extent of Treatment	*100%*	*80%*
Extent of Scientific Disposal	*100%*	*80%*
Cost Recovery		
Extent of Cost Recovery	*100%*	*0%*
Efficiency of Collection of Charges	*90%*	*7%*
Customer Service		
Efficiency in redressal of customer complaints	*80%*	*53.6%*

5.4.4 Identification of Critical Problem Areas

CRITICAL PROBLEM AREA 6 – The household coverage of solid waste management services as well as the overall collection efficiency is inadequate and deficient in urban poor areas leading to the dumping of solid waste in open areas and drains resulting in health and environmental risks ;

CHAPTER 6. IEC AND AWARENESS CAMPAIGN

6.1 Introduction

Information, Education and Communication (IEC) & Communication strategy are integral to the core issue of developing the city sanitation plan. In fact it will lead to development of robust yet effective awareness and communication strategy for promoting hygiene & sanitation in the city to trigger behavior change and demand for sanitation. The strategy will aim for citizen participation in improving city sanitation specifically reaching out to the slum dwellers and urban poor in the city. It will evolve a method, tools & techniques, and use of various media (interpersonal, print, electronic, folk) including advocacy with opinion leaders NGOs/CBOs and other stakeholders to deliver awareness strategy in the city. The experience of previous awareness programmes organized in the city has also been taken into account to integrate the innovative ideas and strategies used.

6.2 Objectives

The objective of IEC & Communication Strategy is to evolve an effective plan of sustainable programmes for capacity building and sensitization of implementers, education and enhanced awareness for stakeholders specifically citizens regarding sanitation activities in Kanpur City. The strategy is designed to:

- Strengthening CSP implementation by Kanpur Nagar Nigam (KNN) through training and capacity building;
- Evolve methodology to sensitize public for adopting water wastage minimization, segregation & management and open defecation free practices through IEC campaign.

By working at both the levels mentioned above a culture of communications and consultations is fostered leading to participation

6.3 Communication Methodology

Water and sanitation services in UP cities face specific challenges. Kanpur is an industrial center. A major issue in Kanpur is the floating population. Migrants come and live in Kanpur for varying periods of time. Water and sanitation challenges faced by the city due to massive influx of people list high among the concerns expressed by citizens; These pose challenges to the city administration with respect to toilets, solid waste management and water supply. National sanitation rankings survey has ranked Kanpur within the top 10 cities of India. However, this cannot conceal the major challenges in water and sanitation that the city faces. There is much scope for improvement. It was found that communication is a crucial element in improving service delivery standards. However, apart from educating citizens on health and hygiene, improving municipal processes by way of citizen consultation and participation remains a necessary goal. Without citizen inputs right from the design stage implementation of water and sanitation projets risk failure;

Communication needs assessment identified three stages for implementation of Information, Education and Communication strategy for improvement in water and sanitation services – (1) Awareness, (2) Process and (3) Compliance.

While it is generally understood that these stages would lead to better citizen participation in the schemes, it is in fact imperative for all stakeholders to be appraised of them from their own specific stand points. Awareness includes an understanding of health and hygiene related education specifically directed towards slums. Equally important is an awareness of municipal leaders about the problems face by all the residents including slum and middle class households, sanitation workers. This awareness is generally taken for granted. Here, we propose that open

and specific appraisals be carried out without assuming too much of prior knowledge regarding sanitation issues. Next is to create processes which are essential to maintain improved services. These could include citizen participation in community toilet maintenance, outsourcing of operations and maintenance to private partners in public toilets, solid waste management and establishing citizen grievance resolution systems to name a few.

A consolidation of these gains can only occur when all stakeholders comply with the rules. As system of 'incentivizing' desirable behaviors and weeding out undesirable behaviors must be developed, these programmes, processes and goals will be set by the urban local body.

The key idea is to carry out a needs assessment within the existing infrastructure as well as the strategy to go with expansion of infrastructure. Following steps were identified before visiting the field:

- Identifying stakeholder groups and available channels of communication
- Focus Group Discussions, Interviews, Transect Walks.
- Topic Guides prepared for each stakeholder group.
- Data Collection. Field assessment of communications needs was carried out.

These methods helped the author evolve a case study approach towards communication needs assessment for Kanpur. Case study approach offers the best possible method for evolving a Information, Education and Communications strategy for the city concerned. As the city is large a random sample based survey will cost a lot and will be labor intensive - Such as survey is likely to conceal extreme situations within a large city. A case study approach utilizing information sampling can reveal much more through discussions with citizens on the margins and those on the frontlines of implementation.

☐ **Stakeholders:** Opinion leaders to be targeted as a high influence group both for interviews and implementation of communications strategies.

- Key officials-Commissioners, sanitation inspectors, medical/health officers,
- Corporators, Community elders,
- City media: newspapers reporters,
- RWA office bearers,
- NGOs,
- Safaikaramcharies union office bearers,
- Heads of Commercial establishments and shopkeepers, including public Places such as bus stands
- Slum /LIG/MIG/HIG areas residents
- School student, teachers, employees etc.
- Hospital employees and doctors

Residents, establishments and KNN officials; Resident include all those living within city municipal limits; they can be classified as HIG, MIG, LIG and slum dwellers. Shop keepers and commercial establishments constitute a separate group especially for generation of market and industrial waste.

☐ FGDs, Transect Walks, Interview/Discussion: In Kanpur city, 12 focus group discussions (FGDs) and various transect walks with slum residents in various parts of the city were conducted. Interview and discussions included officials from various departments, councilors, elected Member of Parliament, residents in middle class areas, sanitation workers, NGOs involved in water and sanitation sector, shopkeepers, media persons etc. Locations for FGDs must be selected to represent the variety of samples. Slum locations can be classified based on local knowledge. Generally, slums in outskirts and those in interiors offer two different typologies. Some cities have old town areas with predominantly Muslim populations- this represents diversity in terms of demography. Similarly there are slum with predominant SC or ST populations. Slums along

railway lines and those along riverbeds form an essential typology. Vicinity to industry constitutes another significant parameter.

6.4 Probes for Field Trip and FGD

☐ **Residents Including Slum Residents**

- Awareness regarding Health and Hygiene: The current practices and awareness regarding ill-effects of lack of sanitation
- ODF, Hand washing, SWM, water logging, community and individual toilet use etc
- Awareness regarding government policies for improving water and sanitation: NUSP, SUDA, DUDA, Sources and channels of such knowledge and communication
- Awareness regarding technical options such as Toilet options
- Willingness to upgrade: financial and behavioral constraints
- Participation in any public awareness campaign regarding sanitation, Agencies that carried the campaign and learnings from the campaign
- Activities of local SHG's and other community organization, areas of engagement, in non-slum areas - check for RWAs
- Media consumption patterns reading newspapers, Cable TV etc (also in non-slum areas)
- Information regarding demography of the slum, Quality of water supply (also in non-slum areas), (To be gathered from surveys)
- Complaint resolution system: complaints and mechanisms of resolution, how do they deal with water and sanitation crisis, approaching local corporators, complain to KNN, extent of satisfaction with current arrangement of civic services.

☐ **KNN Officials**

- Role envisaged for communication for implementing CSP
- Channels of communication are at ULB's disposal, Extent to which these channels are being exploited
- Technological options, geographic and infrastructural issues involved in implementing Water and Sanitation schemes
- M&E, feedback, support, rewards: Maintenance of citizen grievance records, discernible patterns in complaints, efficiency of complaint redressal
- Details of any specific communication campaign being take up, Content, Channels used, budget allocated, awareness regarding multiplying message through media
- Kinds of training are given to safaikaramcharies for safe disposal of waste etc and their satisfaction at what has been provided

☐ **Commercial Establishment And Public Places**

- Observation regarding sanitation is these Places
- Practices involved in disposal of commercial waste such as segregation, shopkeeper participation
- O&M, regular upkeep of public Places
- Major Complaints, redressal mechanisms, willingness to participate
- Residents often refer to Kanpur city as 'the armpit of Uttar Pradesh' due to widespread pollution. Kanpur is an industrial city with hazardous waste producing tanneries and plastic industry.

6.5 Problem Analysis

6.5.1 Open Defecation:

In some areas of Kanpur such as Narayanpur people refuse to pay even Re.1 towards usage of Sulabh Sauchalays built. However, the number of people who do not consider paying for toilet usage is rather high in Kanpur. Going by the number of people defecating in open, toilet usage is not yet a priority for large number of citizens. One strategy that can be thought of is to subsidize the toilet usage for a period of time. Upon forming the habit re-introduction of user charges might not prompt them to go back to the habit of open defecation.

6.5.2 Public Toilets:

Kanpur is a city that is witnessing short and long-term migration. Being a industrial city several people come, move in and out of the city every day, these calls for increased public conveniences. Industrial labor is come from the city slum as well as adjoining rural areas. Busy market areas like Naveen Market have no public toilets.

6.5.3 Open Drains:

Kucha and pucca drains can be found in the slum areas of Kanpur. Jajmau a slum catering to the tanneries of Kanpur is marked with huge drains with industrial effluents leading to Ganga. These drains pose a threat to health and life of the local residents. In Ramraj Sarai, Jajmau open drain had been covered with cement slab without reinforcing beams. Ever week this slab bears the rush of vegetable market. Owing to the faulty design unable to bear the load the slab collapsed last year leading to loss of several lives. Another avoidable tragedy followed last month, when a cyclist new to the area fell into caved drain losing his life.

6.5.4 Solid Waste Management:

Roadside filth is a common problem in Kanpur. City's roads, markets and public Places are rather dirty. Integrated solid waste management contract has been outsourced to A2Z under PPP model. The private partner has been entrusted the responsibility of door to door collection, picking garbage dumping from intermediate points and including transportation of city municipal waste to composting site for safe and scientific disposal.

6.5.5 Water Supply:

City's water supply leading to treatment plan is flowing in open channels. These open channels are akin to open drains. In the Rajapurva area open defecation is observed on the either side of the channel. Pig rearers leave the pigs in this tributary of Pandu River, which eat fecal remains. Dead pigs and their remains were also seen floating on this drain! KNN claims helplessness over the state of affairs as the channel comes under the jurisdiction of state irrigation department. This calls for a greater co-ordination among the various government departments.

6.5.6 Other issues:

There are other important issues such as air pollution, traffic and unauthorized roadside vendor, which effect city sanitation though they are not direct variables for this study. As noted, Kanpur is an industrial city with tanneries and plastic industries. These industries pollute air, water and soil. Not surprisingly, Kanpur's Air is among the most polluted one is likely to encounter. Long hours in Kanpur's traffic cause irritation in skin and eyes. Traffic congestion is worsened by unauthorized stalls on either side of the roads and unauthorized parking's in the middle of the road especially in the busy commercial and market places

6.6 Sanitation Consciousness – Current Status of Services and Behaviours

As noted in the methodology section slum locations can be classified based on local knowledge. Generally, slums in outskirts and those in interiors offer two different typologies. Some cities have old town areas with predominantly Muslim populations- this represents diversity in terms of demography. Similarly there are slums with predominant SC or ST populations especially in the outskirts of Kanpur. Slums along railway lines and those along riverbeds such as Nallas Budhan Syed and New Rajnagar respectively form an essential typology. Vicinity to industry such as leather industry in the Mantola area constitutes another significant parameter. Based on these typologies we have identified the following stakeholder groups and their behavioral patterns:

TABLE 6-1: IEC ADVOCACY PLAN

STAKEHOLDER GROUPS	AREAS OF HABITATION	SOCIO-CULTURAL/BEHAVIOURAL PATTERNS
Slums Outskirts	Eg: Krishnanagar Slum areas (Zone2). Salulapur, For other areas refer to map.	Open defecation is widely practiced. There is poor awareness regarding risks of open defecation. Garbage tends to pile on itself forming huge heaps all around. The area is witnessing depleting underground water, often blamed on the eucalyptus pa plantation. Polluted water is percolating into ground and some low hand pumps give polluted water. Public stand posts have been closed for over 20 years. A related behavioural issue, as tariffs went up illegal connections from raising main increased. Drainage system is not developed. For instance, Illegal settlements are found in the Salulapur comprising of Asamees and Bangladeshi labour. NGOs such as Sakhi are active and provide vocational training to women. Community toilets have issues septic tanks are leaking, toilet seats are broken and there is no electricity. Work needs to start from the scratch 1) building process, 2) Awareness and 3) Punitive measures/rewards.
Slums Inner City including old city	Rajapurva, Ghanta ghar, Dada Nagar, Fazal Gunj. For other areas refer to mapping.	Old city areas are marked with higher air pollution and greater traffic congestion. Toilets in the area are small owing to lakhk of space. People generally use community toilets/sulabh sauchalays. Open defecation is not preferred except along railway line. Interestingly UGD was laid in 80s but was never connected. People throw domestic waste at the municipal bin, in the open drains and on the roads frequented by sweepers. There is a general awareness regarding sanitation but community pressure is yet to be built. When confronted people immediately agree to change practices such as burning plastics.
Slums in Ganga Area	Jajmau: Ambedkar Colony, Ramraj Nagar. For other areas refer to mapping.	These areas include Muslim dominated as well as Scheduled Caste populations. Those without space to build toilets defecate in open. Open defecation is a taboo especially for Muslim women. Ground water in this area is polluted owing to proximity to Ganga. Several open drains leave out domestic and industrial effluents directly into the river without treatment. Jajmau a slum catering to the tanneries of Kanpur is marked with huge drains with industrial effluents leading to Ganga. These drains pose a threat to health and life of the local

STAKEHOLDER GROUPS	AREAS OF HABITATION	SOCIO-CULTURAL/BEHAVIOURAL PATTERNS
		residents. In Ramraj Sarai, Jajmau collapse of this drain owing to market rush has resulted in loss of lives and turned it into an accident prone area.
Shopkeepers, Commercial and industrial Areas	Naveen Nagar. For other areas refer to mapping.	Main roads in commercial and public Places witness daily sweeping. However, sanitation workers don't seem to venture far from main roads and shopkeepers dump commercial waste in inaccessible Places. Traffic congestion is causing increased air pollution. Public toilets are lakhking in Kanpur. For instance Naveen Nagar has no public toilets. Tanneries need to upgrade waste disposal infrastructure in order to reduce air, water and soil pollution caused by them.
Higher Income Residents	Eg. Shivaji Nagar, Narayan Nagar, (Zone 6)Krishnanagar (Zone 2)Other Areas as per map	Residents of this area have UGD. Citizens complain water and road issues take long to be solved. People are resisting moves by water board to cut trees and build water tanks in the public parks. Resident's welfare associations are active in taking up civic issues and works. For instance, citizens along Pandu nadi are organizing themselves to beautify areas along the stream. Solid waste management conditions are good. There is door to door collection and regular cleaning of the intermediate points by Parivartan and A2Z in their areas.
Low Income Residential areas		These areas are inhabited by people working in the town. There is considerable awareness regarding health and hygiene and communities resist open defecation. UGD lines were laid in early 80s but were never connected. Children of some households defecate in open. Citizens complain water and road issues take long to be solved. There is door to door collection and regular cleaning of the intermediate points by Parivartan and A2Z in their areas.
Municipal officials/ Jal Kal Vibhag		Fogging activities are being taken up in malaria prone areas. A lot of the butchers slaughter animals at home. Officials need call meetings with SLFs, shopkeepers specially butchers and concerned officials to raise awareness about hygiene and facilitate their shifting of slaughter house out of the city. Jal Kal Vibhag is building water tanks under Ganga action plain in public parks. The Municipal officials need to appreciate people needs for better design and implementation of projects. Citizens complain that complaints take very long to be resolved be it water or condition of roads. Agenda for regular co-ordination meeting should be streamlines to bring our concrete results.
City Wide		Awareness programme to tackle Open Defecation are needed. Overall civic sense and administrative response are crucial for improvement of services. Top priority must be given to repairing and rebuilding community toilets. As the city witnesses migration public toilets need to be built. Another major issue is about the unclear garbage in the by-lanes. Ground water pollution and air pollution are also a matter of concern.

6.7 IEC and Awareness Key Issues – Primary Survey Findings

6.7.1 Households

A sample of 621 houses was surveyed to gauge water and sanitation situation in Kanpur city. All these households were in slum areas. Though the data claim to yield statistically significant results there were some interesting findings. About 20% of the respondents were defecating in open. A high proportion 89% of the respondents claimed to be depositing solid waste in approved manner. But, only 8% claimed to be segregating waste at the source. However, 59% claimed municipality did not pick waste in their areas. Looking specifically at sweeping services, 35% of the slum residents surveyed their streets were not swept regularly and 6% complained that drains were not being cleaned regularly. Also, 39% said they had sewerage connections. An overwhelming majority said they took their water and sanitation complaints to elected representatives. Further, 92% said they complained directly through face-to-face interactions. About half of those surveyed in slum areas were dissatisfied with complaint resolution systems. About half of those surveyed claimed to have fallen ill to a water-borne infection in the last six months. If these numbers are any indication to the situation with regards to water-borne infections KNN needs to launch a campaign to raise public awareness on the issue

6.7.2 Community Toilets

As explained, in the worst case scenario these are in dilapidated condition with crumbling building, leaking septic tanks, broken seats, and broken doors, with no water or electricity or maintenance person; several such toilets need to be rebuilt. Our survey covered two hundred community toilets in Kanpur. Half the toilets were rated as average, 43 of these made the grade as either very good or good. 61 were reported to be in bad or worse implying they were in unsanitary or dilapidated condition. At present O&M work is being shared by a host of organizations including KNN, NEDA and Sulabh International. It is estimated that around 40,000 people use about 200 community toilets surveyed by us.

6.7.3 Public Toilets in Commercial Areas

Kanpur is a city with traveling migrants and floating population. Investing in public toilets in commercial Places considered well for the city. According to our survey 13% of the shops have been found not to have access to toilets. Our survey results indicate that while on one hand shopkeepers and customers are experiencing difficulties due to lack of access to toilets the overall willingness for pay per use option was found to be low. Only 15% of the respondents claimed to be disposing off the waste safely. In such a situation a behavior change campaign is first required to create demand for toilets. Then it could be recommended to build toilets in commercial areas on pay and use terms. Shopkeepers could opt for monthly passes and customers pay per use.

6.8 Messages for Stakeholders

National Urban Sanitation Policy 2008, by the Ministry of Urban Development, Government of India has outlined constitution, roles and responsibilities of City Sanitation Task Forces envisaging multi-stakeholder involvement. Some eminent persons from the city (from fields of academics, NGOs, media, art, business etc) could be included into this task force. At a more micro level, creation of Ward Sanitation Action Committees headed by corporators of the concerned wards and comprising members from ULBs, office bearers of RWAs, safaikaramcharies is recommended. A set of powerful mnemonics related to sanitation could be one of the ways of beginning the process of developing sanitation consciousness- say something like ***'swach ghar samridh parivar'***. The messages that need to be put across to the stakeholders are presented Table 6-3 below -

TABLE 6-2: MESSAGES AND CHANNELS OF COMMUNICATIONS FOR STAKEHOLDERS - IEC

TARGET AUDIENCE	MESSAGES/THEMES	CHANNELS OF COMMUNICATION
Councillors, Commissioner, Engineers	Sanitary use of Community Toilets Status of Community toilets How the toilets should be designed for social acceptance? Promoting Septic tank latrines in slums How to ensure compliance from people, Rewards/Punishments Better implementation of sanitation projects Safe handling of garbage by Sanitation workers	Organise walk to the zonal office programme to dispel mistrust specially for the slum residents, Council meeting, CSP workshops, Newspaper Advt calling for meeting/ participating in walks Press Conference-sharing the goals and plan of action for CSP with press persons Short Films on best practices
Councillors, office bearers Slum Resident Federations representing slums in inner City	Consultations on preventing open defecation Improved sanitation and hygienic practices in community toilets, hand washing Safe disposal of Human Excreta Contamination due to Fecal Matter Do not burn garbage Segregation of household waste, and disposal in designated bins Health and hygiene Diarrhea, GE, Malaria, Scabies Consultation on problems with current toilets, taking stock of the community toilets status Consultation of water supply situation Consultation on Environmental sanitation Consultation on expectations from Municipality	Organise walk to the zonal office programme with local councillor or officials, RWA Meeting (with the local councillor) Door to door campaign Newspaper Advt calling for meeting Press Conference Short Films on best practices
Councillors, office bearers Slum Resident Federations representing slums in City Outskirts	Consultation on land tenure, voter ID card address related issues Consultation on problems with community toilets, household toilets, hand washing, Improved sanitation and hygienic practices in community toilets Health Risks due to open defecation Toilet options two pit, septic tank Safe disposal of Human Excreta Health and hygiene, Diarrhea, GE, Malaria, Scabies Consultation of water scarcity, water quality problems Consultation on expectations form Municipality and how they could be met	Organise walk to the zonal office programme with local councillor or officials, RWA Meeting with local councilor and zonal officials Door to door campaign Newspaper Advt calling for meeting/ seeking participation in the walks Press Conference Short Films on best practices
Office bearers of Residents Welfare Association middleclass localities	Consultation on problems with community toilets Consultation on septic tank cleaning Consultation on Environmental sanitation Consultation of water supply situation Consultation of willingness to pay for tricycles etc Consultation on expectations form Municipality	RWA Meetings with concerned officials, Door to door campaigning Newspaper Advt calling for meeting Press Conference Short educational videos etc
Water and sanitation officials	Display numbers of responsible officials esp. Sanitation Inspectors prominently in their Zones Establish grievance redressal mechanism.	Printed pamphlets given with newspapers, newspaper advertisements, painting on

TARGET AUDIENCE	MESSAGES/THEMES	CHANNELS OF COMMUNICATION
	Emphasis on time bound resolution of public grievances	Elevated/underground reservoirs Print the phone numbers of responsible officials on the municipal garbage tractors
Water and Sanitation Workers	Importance of safe handling of waste Do not burn garbage Do not dump Garbage on roads leading to dump yard Educating people on waste segregation	Meetings and workshops to include Parivartan and A2Z employees along with Municipal workers
Shopkeepers, commercial industrial, slaughterhouses	Do not dump garbage in by-lanes If you need to dispose hazardous waste call the municipality and ask for a tractor. Slaughter house waste disposal consolations	Meeting of the local shopkeeper associations to sort out the problems among themselves, meeting with municipal officials and councillors.
		Specific meetings with tanneries and tanneries on waste disposal
City Wide	Keep house and neighborhood Clean Keep your community toilets clean Boil/Filter the Water before drinking Wash your hands before and after eating/drinking Don't allow mosquitoes to breed in your neighborhood Immunize Children Don't share clothes of persons infected with skin diseases	Road Side Billboards
		News Paper, radio and TV Ads
		City Cable
		Press conference
		Know your city and heritage walks etc
		Short films for screening in Theatres etc.

CHAPTER 7. SECTOR SPECIFIC AND CITY-LEVEL STRATEGIES

Topics of Discussion

- City-Level Vision and Goals of Kanpur CSP
- City-Level Problem Areas, Strategy and Recommendations
- City-Level Action Plans
  - Technology
  - Finance
  - Institution & Governance
  - Capacity Enhancement and Awareness
  - Inclusiveness

The key challenge that the cities face in the process of the preparation of the CSP is developing a implementation strategy to promote sustainable sanitation infratsructure. The development of the implementation strategy entails detailed planning; initiatives supported by incentives, guidance system / sound financial systems; innovations; context specific solutions, prioritization; supportive context; and most importantly, the ownership and leadership from the city administrators.

The prime responsibility of implementation of the CSP rests with Kanpur Nagar Nigam (KNN), however, it is imperative that KNN shall engineer and institutionalize the collaborative efforts of all stakeholders involved to help achieve the defined goals as part of the implementation strategy.

The implementation strategy is evolved based on the detailed analysis of the situation in the major sectors of sanitation namely, (a) sewerage; (b) access to sanitation – toilets; (c) storm water and (d) solid waste (please refer to Annexures Chapters 3 and 4). The sanitation mapping, initial and final analysis of the baseline data, and projection of demand for various sanitation services in the defined sectors (please refer to Status Report) have helped identify the level of deficiency in respect of sanitation in Kanpur. A broad city level strategy for implementation of the City Sanitation Plan for Kanpur is outlined along the five strategic intervention areas, namely, (1) Technology Options; (2) Financial Options; (3) Institutional and Governance Options; (4) Capacity Enhancement and Awareness Generation Options; and (5) Inclusive Approach.

7.1 Vision and Goals of Kanpur CSP

Vision Statement **- "Kanpur shall be environmentally safe and totally sanitized & liveable city so as to ensure good public health standards, human dignity, and privacy for all citizens"**

The broad goals for Kanpur City shall reflect thus -

- ***Goal 1*** *- The entire population of the city shall have access to toilets in the form of either individual toilets, shared toilets or community toilets, with adequate water supply by 2017;*
- ***Goal 2 -*** *All major public places shall have adequate number of public toilets in fully serviceable condition by the year 2017;*
- ***Goal 3 -*** *The quality of drinking water shall be improved and the entire population shall have access to quality drinking water by the year 2017;*
- ***Goal 4 -*** *All the households shall be connected to the sewerage network, centralized or decentralized by the year 2014*

- ***Goal 5 –*** *All the waste water generated in the city shall be collected and conveyed through an appropriate sewer network to treatment plants, treated to acceptable quality levels and disposed, recycled or reused by the year 2014;*
- ***Goal 6 -*** *All households as well as non-residential users shall have access either to a door-to-door collection of garbage or to a secondary collection facility within easy accessible distance by the year 2013;*
- ***Goal 7 -*** *All the solid waste generated in the city shall be segregated, collected, transported and either processed for reuse or disposed of in a sanitary landfill by the year 2013;*
- ***Goal 8 -*** *The entire sanitation system as visualized above is socially, environmentally and economically sustainable and effectively managed by a capable team in the municipality, maintaining adequate standards of safety for the workers;*

7.1.1 Guiding Principles

The guiding principles for the realization of the vision and hence the defined goals as articulated above are enumerated below –

- ☐ Equity
- ☐ Sustainability – Technical, Financial, and Environmental
- ☐ Transparency
- ☐ Local Adaptability
- ☐ Improved Public Heath
- ☐ Inclusiveness

7.1.2 Framework

The National Urban Sanitation Policy, Uttar Pradesh Urban Sanitation Strategy, and the National Rating and Award Scheme for Sanitation for Indian Cities by Government of India, provide a good framework for defining the guidelines to prepare the City Sanitation Plan and its implementation strategy.

INDICATORS AS PER NUSP	GUIDELINES FOR CSP
OUTPUT RELATED	☐ Proposals to provide safe access to household sanitation and serve entire population by toilets ☐ Proposals for safe disposal of waste water, storm water and solid waste ☐ Proposals to meet the national standards for safe disposal of liquid and solid wastes
PROCESS RELATED	☐ Proposals to ensure the efficient design of the system in conformity with applicable rules and regulations ☐ Proposals to ensure clear devolution of responsibility and accountability in the institutional system ☐ Proposals to ensure competent documentation of the operational and monitoring systems ☐ Proposals to ensure the formulation of prudent sanctions for deviances / violations of the system both at individual / institutional level and ensure the enactment
OUTCOME RELATED	☐ Proposals to ensure the systems facilitate and sustain good public health and environmental conditions

7.1.3 Timeline

The system shall be designed under the broad framework as per the guidelines for a design period of 30 years; however, the planning shall entail the implementation of the design in phases to meet the ultimate goals of the CSP.

The phased approach aims to navigate through the challenges posed by the limitations in investments, institutional capacities, and community engagement in a proficient manner. The phases and the corresponding timelines are defined as stated below –

TABLE 7-1: PHASES AND TIMELINES FOR CITY SANITATION STRATEGY

PHASE	YEAR
IMMEDIATE TERM	2012 - 2014
SHORT-TERM	2012 - 2017
MID-TERM	2012 - 2030
LONG-TERM	2012 - 2041

TABLE 7-2: ASSUMPTIONS FOR STRATEGIC PLANNING

	PHASE/YEAR		
	SHORT-TERM 2012 - 2017	**MID-TERM 2018 - 2028**	**LONG-TERM 2031 - 2041**
ASSUMPTIONS	Efforts initiated to eradicate slums and award land tenure and achievement of eradication of slums and award of lan-tenure - regular small houses replace slum settlements	Regular Houses for all	Regular Houses for all
	Efforts initiated towards public outreach and education and 80% Literacy rate is achieved	90% Literacy rate is achieved	95% Literacy rate is achieved
	Efforts initiated to generate awareness campaigns to promote better hygiene and sanitation practices and Citizens adopt the better hygiene and sanitation practices	Citizens adopt the better hygiene and sanitation practices and sustain the systems	Citizens adopt the better hygiene and sanitation practices and sustain the systems
	Efforts initiated to regularize the particpatory planning and budgeting and participatory planning institutionalized	Participatory planning institutionalized	Participatory planning institutionalized
	Efforts Initiated to enhance employement rates through local adaptivity and productivity and 70% of the population is employed and has regular income	90% of the population is employed and has regular income	100% of the population is employed and has regular income
	Efforts initiated to promote 3R Principle - Reduce, Reuse and Recycle and citizens adopt the 3R Principle - Reduce, Reuse and Recycle in all sectors	Water Conservation practices are prevalent; Storm Water Source Control Mechanims are regularized; Reduction/Reuse/Recycle of liquid/solid waste is achieved	Water Conservation practices are prevalent; Storm Water Source Control Mechanims are regularized; Reduction/Reuse/Recycle of liquid/solid waste is achieved
	Efforts initiated to provide 135 lpcd water supply to all citizens and water connections to all has been achieved and 135 lpcd water supply is also achieved	Water connections to all has been achieved and 135 lpcd water supply is also achieved	Water connections to all has been achieved and 135 lpcd water supply is also achieved

7.2 City-Level Critical Problem Areas, Strategy and Recommendations

7.2.1 Sewerage Management

7.2.1.1 CRITICAL PROBLEM AREAS

- CRITICAL PROBLEM AREA 1 - The complete coverage of centralized sewer network in Kanpur is in progress, however, the willingness of households to get connected is low.

- **CRITICAL PROBLEM AREA 2** – Adverse risk to public health due to improper and non-compliant septic tanks and septage management leading to contamination of water bodies/water supply distribution system and incidences of water borne diseases

7.2.1.2 STRATEGY

Based on the comprehensive situation analysis executed for the city within the sewerage sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 30 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of KNN, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

TABLE 7-3: TARGETS FOR SERVICE DELIVERY LEVELS IN SEWERAGE MANAGEMENT SECTOR

COMPONENT OF SERVICE	DESIRED LEVEL OF SERVICE DELIVERY	EXISTING LEVEL OF SERVICE DELIVERY	TARGETS FOR SERVICE DELIVERY LEVELS			
			IMMEDIATE-TERM 2012-2014	SHORT-TERM 2012-2017	MID-TERM 2012-2030	LONG-TERM 2012-2042
Collection of Waste Water						
Coverage of Sewer Network (% of city area)	*100%*	*41%*	*80%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Household Connection to Network	*100%*	*32%*	*80%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Compliance of Septic Tanks to CPHEEO Standards	*100%*	*18%*	*70%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Conveyance of Waste Water	*100%*	*50%*	*80%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Treatment Capacity of STPs	*100%*	*52%*	*100%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Cost Recovery						
Extent of Cost Recovery	*100%*	*61%*	*80%*	*100%*	*100%*	*100%*
Efficiency in Collection of Sewage Charges	*100%*	*87%*	*100%*	*100%*	*100%*	*100%*
Customer Service						
Efficiency in redressal of customer complaints	*80%*	*67%*	*70%*	*80%*	*80%*	*80%*

The strategy adopted to achieve the aforementioned targets in the service delivery shall include the restoration of the existing sewerage network system for use in the immediate phase while engaging in the assessment of further requirement in both the sewer network coverage and treatment and disposal systems. The possibility of a judicious blend of centralized and decentralized systems to meet the demands of the city shall be thoroughly investigated. The technology and service delivery options shall be designed to ensure the sewerage is managed efficiently through the entire cycle of operations originating at the generation of wastewater and culminating in the ultimate disposal. (please refer to Annexure 7 for the O&M procedures and systems).

All stages of the complete cycle are carefully planned to extend services to the entire city population cutting across all sections of the society and all levels of the settlements. The several options are designed with a focus on energy efficiency and overall sustainability of the system, keeping in mind the existing limitations of technical, financial and social capacities of KNN. The service delivery options shall enmesh the community participation and NGO involvement to complement KNN capacities.

Given the fact that the city is largely characterized by population with a low awareness in terms of the available sewerage management services and also the adverse impacts of the current malpractices leading to disintegration of health and environment; hence the proposals shall bear in mind the requirement for generation of awareness in the community alongside the provision for educating theses masses. This approach shall ensure sustainability of the proposed systems. (*please refer to Chapter 6 for awareness generation strategy)*

7.2.1.2.1 Design Premises

The proposals shall be based on the following parameters –

- ☐ Projected Populations and
- ☐ Projected Households,
- ☐ Existing Situation vis-à-vis the Key Issues at Ward Level
- ☐ Projected Sewerage Generation4
- ☐ Existing Institutional Capacities
- ☐ Existing Financial Capacities

Table 6.4 represents the design inputs for the development of the sewerage management system with respect to the projected populations considering the growth and development patterns within the city –

TABLE 7-4: DESIGN INPUTS - SEWERAGE MANAGEMENT SYSTEM

YEAR	TOTAL POPULATION	WATER DEMAND (MLD) @ 150 LPCD	SEWERAGE GENERATION (MLD) @ 80% OF WATER DEMAND
2015	3,524,062	528.61	**422.89**
2020	3,825,577	573.84	**459.07**
2025	4,155,281	623.29	**498.63**
2030	4,515,122	677.27	**541.81**
2035	4,907,274	736.09	**588.87**
2040	5,334,158	800.12	**640.10**
2045	5,798,477	869.77	**695.82**

The table below presents the requirement for the septage collection vehicles as part of the septage management process –

TABLE 7-5: ASSESSMENT OF SEPTAGE COLLECTION VEHICLE REQUIREMENT

No. of Households Connected to Septic Tanks	55000
Septage Clearance Frequency	once in 2 years
No. of Septic Tanks to be cleared every Year	27500
No. of Operation Days in a Year	300
Total No. Septic Tanks to be Cleared every Day	92
Septage Generation @ 2 cum/septic Tank/pit /year	55000
Daily Septage Generation (cum)	151
CPHEEO Norm for Requirement of Septage Collection Vehicle	1 for Clearing 3 Septic Tanks in a day
Total No. of Septage Collection Vehicle Required	**31**

The type of vehicle required depends on factors such as the septage generation in a day as well as the width of access routes to the households connected to septic tanks. The overall strategy of integrating septage management into either sewerage or solid waste management will also have

[4] The sporadic maximum sewage contributions from the floating population, during festivals and major events in the city, are considered and compounded with the regular city-level sewage quantities towards peak load considerations for design purposes. The proposed system shall provide for the buffer capacity to address the intermittent extreme waste loads.

a greater bearing on the requirement assessment for the number and type of the septage collection vehicles.

7.2.1.2.2 Design Phases

PHASE	DESIGN COMPONENTS
IMMEDIATE-TERM (2012-2014)	☐ Connections to the households; ☐ Initiate primary collection and conveyance system ; ☐ Initiate septage management system
SHORT-TERM (2012-2017)	☐ Finalize collections to households and the conveyance system ☐ Intermittent decentralized waste water treatment systems for existing waste generation; ☐ Finalize decentralized waste water treatment systems if found feasible ☐ Finalize Treatment and Disposal Processes ☐ Finalize Septage Treatment & Disposal Processes
MID-TERM (2012-2031)	☐ Augmentation of the system to meet the demands of the growing population ☐ Replacements of components and operation & maintenance
LONG-TERM (2012-2042)	☐ Augmentation of the system to meet the demands of the growing population ☐ Replacements of components and operation & maintenance

7.2.1.3 RECOMMENDATIONS

7.2.1.3.1 Solution for the Critical Problem 1 – 'The complete coverage of centralized sewer network in Kanpur is in progress, however, the willingness of households to get connected is low'

Immediate Action Directives

☐ In order to achieve the last mile connectivity, as an immediate measure it is recommended that KNN in consultation with KJK release a notification for the household connections process initiation. The notification shall include the following information –

- The work schedule and the time schedules for the phase-wise connection process. The details of the administrative zones and wards with respect to the phases of work shall be provided as well.
- The details of the sewerage management system including the length of sewer lines, capacity of STP serving the area with a note detailing the benefits of the system for the community;
- The connection fee details
- The helpline[5] details including the number(s) and the concerned officials' information

☐ KNN shall initiate the IEC campaigns to generate awareness amongst residents of the existing sewerage system and their benefits. The IEC shall also aim at enhancing the willingness of the households to connect to the network.

☐ As an integral part of the IEC campaign, KNN and KJK shall hold a series of public meetings with the several stakeholders / target groups to reinforce the willingness of households to connect to the system and also gain their agreement on the connection fees. The officials may also disseminate incentive schemes for the citizens to catalyze the connection process

☐ In order to ensure proper connectivity, KNN and KJK may provide support to the citizens by establishing a connection mechanism through a certified plumber

☐ KNN and KJK shall initiate the connection process in the HIG and MIG areas and facilitate efficient collection of charges in order to provide cross-subsidy to the lower MIG, LIG and slum areas (if any).

☐ KNN in consultation with KJK and UP Jal Nigam shall release a '***tender***' requesting expression of interest and subsequent award of the contract of operationalizing the connection process including the IEC campaigns; operation and maintenance (O&M) of the existing sewerage network and

[5] KNN shall establish a helpline in the Kanpur Jal Kal (KJK) section to enable a timely redressal of residents' concerns or queries with respect to the household connections.

pumping stations and STP to a ***Private Service Provider*** (PSP) in PPP mode. The scope of the PSP shall include –

- maintenance of the sewerage network;
- operation and maintenance of the pumping stations;
- survey for identification of the households without connections;
- development of a GIS based information system to award unique IDs to all assets of the sewerage management system and property tax based household IDs in consultation with KNN and KJK;
- development and continuous updation of the sewerage system maps in 1:2,000 scale following NUIS standards; and
- operationalize household connection process – work closely with KJK and connect the households to the sewer network taking the services of the certified plumber.

Administrative and Regulatory Measures

- ☐ **Institutionalizing of the Household Connection Mechanism**–The connection will be undertaken by certified plumper, who is authorized by KNN. Training courses for the plumber is to be organized by KNN at the end of which the '***certification and license***' shall be provided.
- ☐ **Institutionalizing Monitoring and Evaluation (M&E) Mechanisms** – M&E mechanisms for the design implementation/asset development as well as operation & maintenance of the assets shall be developed under the technical wing of KNN supported by a dedicated team of engineers and laborers to handle the O&M of the system. '***Training and certification***' of the technical team and laborers shall be organized by KNN which shall include the use of sophisticated instrumentation required for the O&M.
- ☐ **Develop and Regularize Municipal Bye-Law**– Municipal Bye-Laws or Building Codes shall be introduced to make connectivity mandatory for grounds situated in a defined distance from the next sewer line. Grounds, with exceeding distance maybe allowed installing onsite systems. Connectivity applies for all black or grey water outlets.
- ☐ **Develop and Conduct Awareness Generation Campaigns**– Campaigns shall be conducted to propagate the benefits of better hygienic and sanitation practices and also advocate the efficiency and benefits of the sewerage management systems designed for the community. Through the campaigns, KNN shall encourage the residents to connect to the existing and proposed network through financially sustainable mechanisms and cross-subsidy mechanisms;
- ☐ **Ring Fence Sector Specific Budgets**–Budgets shall be established and the dedicated Sewerage Sectoral Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities) in order to promote efficient '***cost recovery mechanisms***'. '***Impact benefit tax***' is also proposed to be levied upon regularization of services.
- ☐ **Establish Connection Fee** – Each ground will be provided with a nominal connection fee, which is to be reinvested into the system for capital investment and not for O&M cost. Connection for lower income groups shall be subsidized.
- ☐ **Regularize Incentive Mechanism** – Incentive Mechanisms shall be institutionalized in order to motivate both the citizens and ward corporators and councilors to improve the sanitation situation in their respective localities.

7.2.1.3.2 Solution for the Critical Problem 2 – 'Adverse risk to public health due to improper and non-compliant septic tanks and septage management leading to contamination of water bodies/water supply distribution system and incidences of water borne diseases'

Immediate Action Directives

- ☐ As an immediate measure, it is recommended that KNN procure 31 septage suction vehicles (*please refer to Table 7-5, pg 98 for the requirement assessment of the septage suction vehicles)* and engage a private service provider (PSP) to implement the septage clearance for the existing septic tanks; the disposal site may be decided in consultation with STP or integrated solid waste management facility operators. The decision shall be based on the following factors – (**1**) septage characteristics; (**2**) potential of waste to energy options for septage; and (**3**) availability of land/capacity to integrate septage treatment in the respective processes.
- ☐ KNN shall facilitate the IEC campaigns to educate the residents on the benefits of compliance of septic tanks to the prescribed guidelines by CPHEEO.
- ☐ Through the IEC campaigns KNN shall disseminate the incentive mechanisms for compliance to standards.

Feasibility Study

In order to establish a sustainable septage clearance and management system for the city, a study shall be conducted to assess the possibility of integrating the septage management into the sewerage or the solid waste management system. It may be recommended to strategize the management separately for the existing and the future septic tanks.

'Premises' – Theseptage clearance from the ***existing septic tanks*** shall be integrated with the solid waste management primary collection system and the septage either disposed to the solid waste management facility or the STP site. The septage treatment again shall be integrated either with the solid waste treatment or the sewerage treatment process.

'Premises' – The septage clearance from the ***future septic tanks*** shall be integrated into the sewerage network system, while the septage treatment shall be integrated either with the solid waste treatment or the sewerage treatment process.

The scope of the feasibility study shall include –

- Assessment of the ward wise demand for desludging facilities and the feasibility of separation of black and grey water;
- Assessment of the septage characteristics in ward-wise and sewerage zone-wise manner in the city so its potential of integration into sewerage treatment or solid waste treatment may be established;
- Assessment of the potential of use of septic tanks as interceptor tanks for the sewerage systems – assess the design options of septic tanks for the new constructions so connection to the sewer network is feasible;
- Assessment of the potential of the waste to energy options to ascertain the viability of the integration of septage treatment into the sewerage or solid waste treatment process
- Assessment of the vehicle options to collect septage along with solid waste to make the system more financially viable and sustainable.

DPR

- ☐ Based on the findings of the feasibility study, KNN may release a notice to invite expression of interest to prepare a DPR for the – (**a**) rehabilitative and up-gradation works of the existing septic tanks and (**b**) planning and design of the new septage management system[6] that shall integrate th eseptage management with either sewerage or solid waste management. The scope shall include – (**1**) Procedures for rehabilitation of septic tanks to arrest seepage as well as upgradation into interceptor tanks to integrate into proposed off-site sewerage system , (**2**) develop design guidelines for the septic tanks to be adopted by the city so septage management system including clearance & treatment gradually can be integrated into the future/proposed off-site sewerage

[6] Annexure 13 provides literature on septage management practices and design guidelines

system(s) or solid waste systems, (3) develop GIS based asset registry system for septage management and the computerized maintenance management plan coupled with comprehensive M&E system - this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance;

Administrative and Regulatory Measures

- ☐ **Develop and Conduct Awareness Generation Campaigns**– Campaigns shall be developed and conducted to propagate the benefits of integration of the existing septic tanks into the off-site sewerage systems so it may increase the acceptance of the procedures by the community and their willingness to pay for the management services may be reinforced;
- ☐ **Regularize Municipal Bye-Laws and Building Codes** – Municipal bye-laws and building codes shall be developed and enforcing mechanism shall be institutionalized by KNN to promote sustainable septage management system for the city. The directive shall (**1**) mandate the stringent compliance mechanism for the design of septic tanks along with the approval of new constructions; (**2**) Regulatory oversight mechanisms to penalize the citizens violating the establishing regulation and standards; (**3**) Approve construction of septic tanks only if CPHEEO guidelines are followed (certification mechanism), which include - (**i**) includes only the discharge of black water (toilets), (**ii**) does not exceed population density of 300 capita/hectare, (**iii**) exclude use of soak pits in areas with impermeable soil, hardrock or high groundwater table.
- ☐ **Institutionalize Incentive Schemes**–Incentives shall be introduced in the form of property tax rebates in order to achieve connectivity (can be linked with sewerage issue!)

7.2.2 Access to Toilets

7.2.2.1 CRITICAL PROBLEM AREAS

- **CRITICAL PROBLEM AREA 3** - Inadequate number and inappropriately designed, operated and maintained individual and community toilets in urban poor areas leading to open defecation and eventual health and environmental risks.

7.2.2.2 STRATEGY

Based on the comprehensive situation analysis executed for the city within the access to toilet sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 30 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of KNN, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

TABLE 7-6: TARGETS FOR SERVICE DELIVERY LEVELS IN ACCESS TO TOILETS SECTOR

COMPONENT OF SERVICE	DESIRED SERVICE DELIVERY	EXISTING SERVICE DELIVERY	TARGETS FOR SERVICE DELIVERY LEVELS			
			IMMEDIATE-TERM 2012-2014	SHORT-TERM 2012-2017	MID-TERM 2012-2030	LONG-TERM 2012-2042
Coverage of Toilets						
Individual Toilets (toilets per every household)	*1*	*0.79*	*0.75*	*1*	*1*	*1*
Community Toilets (seat per every user)	*1 in 35*	*1 in 100*	*1in 75*	*1 in 35*	*1 in 35*	*1 in 35*
Public Toilets (seat per every user)	*1 in 100*	*1 in 263*	*1 in 175*	*1 in 100*	*1 in 100*	*1 in 100*
Condition of Toilets						
Individual Toilets (% in working condition)	*100%*	*85%*	*100%*	*100%*	*100%*	*100%*
Community Toilets (% in working condition)	*100%*	*71%*	*85%*	*100%*	*100%*	*100%*
Public Toilets in (% in working condition)	*100%*	*50%*	*75%*	*100%*	*100%*	*100%*
Toilets in Schools (% in working condition)	*100%*	*75%*	*90%*	*100%*	*100%*	*100%*

The strategy adopted to achieve the aforementioned targets in the service delivery shall include the rehabilitation and upgradation of the existing sanitary facilities for use in the immediate phase while engaging in the assessment of further requirement in theindividual and community category as well as toilets in municipal schools, commercial and market areas.

Given the fact that the city is largely characterized by population with a low awareness in terms of the available sewerage management services and also the adverse impacts of the current malpractices leading to disintegration of health and environment; hence the proposals shall bear in mind the requirement for generation of awareness in the community alongside the provision for educating theses masses. This approach shall ensure sustainability of the proposed systems. (*please refer to Chapter 6 for awareness generation strategy)*

7.2.2.2.1 Design Premises

The proposals shall be based on the following parameters –

- ☐ The Population Densities
- ☐ Development Pattern of the City – Present & Future Land-Use
- ☐ Opportunities of means of livelihood
- ☐ Existing Institutional Capacities
- ☐ Existing Financial Capacities
- ☐ Existing Situation vis-à-vis the Key Issues at Ward Level

Based on the primary survey and the focus group discussions conducted in the slum areas the following assumptions have been defined to strategize the improvement of access to toilets –

TABLE 7-7: ASSUMPTIONS FOR PROVISION OF TOILET FACILITIES IN SLUM AREAS

PERCENTAGE OF HOUSEHOLDS WITHOUT ACCESS TO TOILETS	STRATEGY
30%	Develop individual toilets w/support of different schemes ILCS/RAY/KAY/BSUP
20%	Develop shared toilets - 1 toilet amongst 5 households
20%	Willing to develop individual toilets if assured water supply / sewerage management
30%	Develop Community Toilet Complexes - 1 seat per every 35 users

Based on the above assumptions, the design inputs for the interventions to improve the access to toilets in the city of Kanpur are presented in Table 7-8. Access to toilets Strategy

TABLE 7-8: DESIGN INPUTS - ACCESS TO TOILETS STRATEGY

	NON-SLUM AREAS	SLUM AREAS
Population	2268965	498066
Households	453793	99613
Households without access to toilets	45379	67065
No. of individual toilets required	**45379**	**33532**
No. of shared toilets required	**NA**	**2683**
No. of CTCs required (15-seater)	**NA**	**192**

7.2.2.2.2 Design Considerations

The various boundary conditions that influence the design of the community toilets and enhance the acceptability levels amongst the community and also promote sustainability of the developed assets and the overall sanitation system are presented below –

- ☐ Location
  - Proximity to settlements – preferably 100-200 m
  - Visibility
  - Safety aspect
  - Near sewage lines
  - Co-location – compatible use
- ☐ Signage
  - Directional and Labelling
- ☐ Gender Sensitive Design
  - Women and children specific
- ☐ Disability Access
- ☐ Elderly User Access
- ☐ Well-lit / ventilated
- ☐ Environmentally Sustainable
  - Energy Considerations
    - High degree of natural lighting
    - Low energy light fittings
    - Use of solar power
    - Passive ventilation
    - Recycled, recyclable, renewable and locally sourced source materials
  - Water Considerations
    - Grey Water Flushing
    - Low-flow/water less urinals
    - Recycling of storm water for flushing

7.2.2.2.3 Design Phases

TABLE 7-9: DESIGN PHASES - ACCESS TO TOILETS SECTOR

PHASE	DESIGN COMPONENTS
IMMEDIATE (2012-2014)	☐ Detailed survey of existing facilities to initiate rehabilitation and augmentation ☐ Repairs and up gradation of the existing toilets; ☐ Design & Construction of the new facilities in areas with no sanitation facilities ☐ Initiation of septage management
SHORT-TERM (2012-2017)	☐ 100% coverage and infrastructure development ☐ Design of System to handle the human excreta
MID-TERM (2012-2031)	☐ Finalization of septage management ☐ Augmentation of the system to meet the demands f eth growing population ☐ Repairs & Maintenance
LONG-TERM (2012-2042)	☐ Augmentation of the system to meet the demands of the growing population ☐ Repairs & Maintenance

7.2.2.3 RECOMMENDATIONS

7.2.2.3.1 Solution for the Critical Problem 3 – 'Inadequate number and inappropriately designed, operated and maintained individual and community toilets in urban poor areas leading to open defecation and eventual health and environmental risks'

Immediate Action Directives

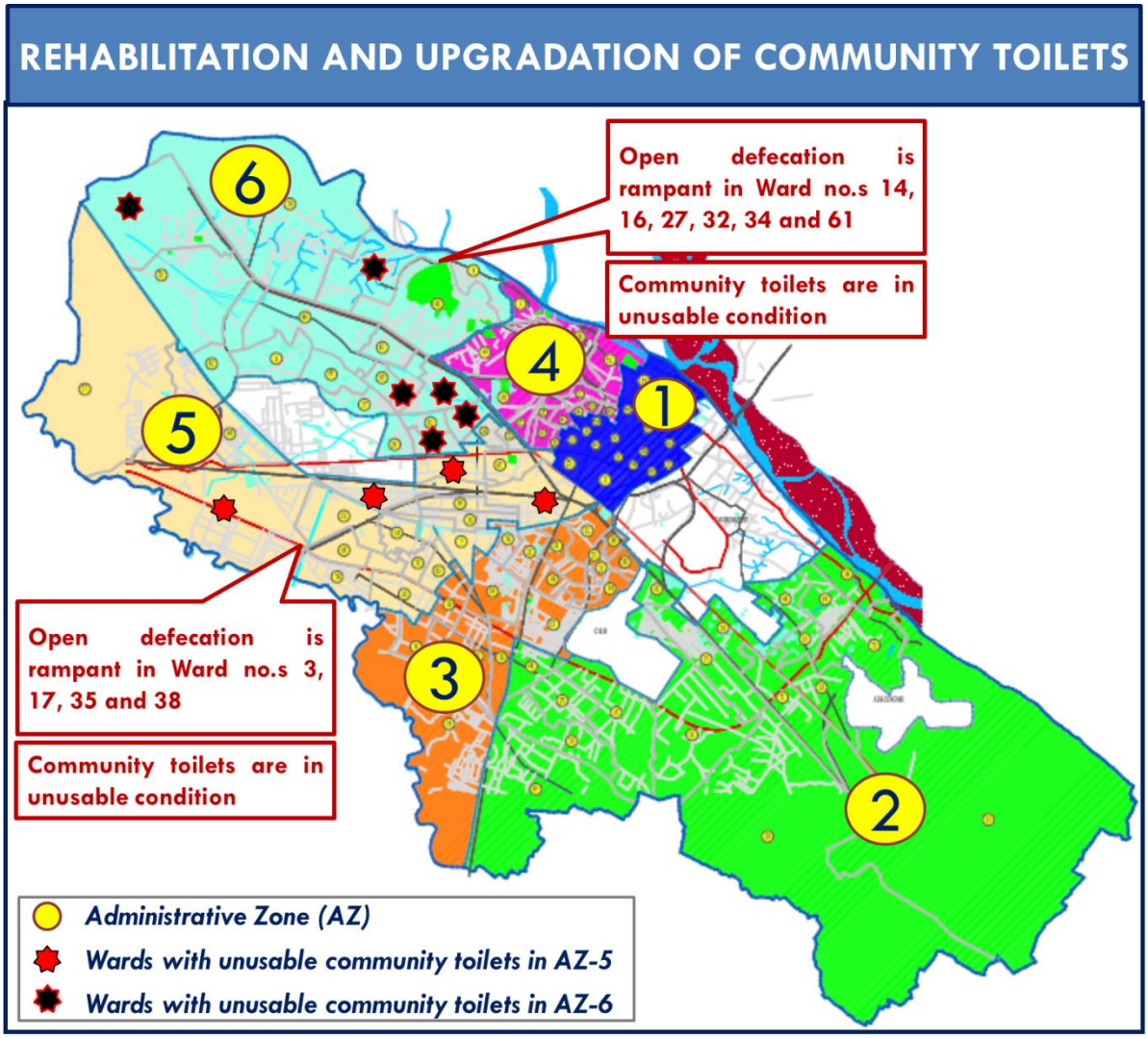
☐ It is recommended to release a notice to invite expression of interest for the design, rehabilitation and upgradation of the existing toilet facilities on a Rehabilitate, Operate and Transfer (ROT) basis in People Public Private Participation (PPPP[7]) mode in the immediate phase with a horizon of

[7]In the PPPP mode, people shall be treated as customers rather than as beneficiaries and hence shall contribute towards both the capital and O&M investments as far as possible. People shall also be actively involved in the O&M activities leading to an

year 2014 in the administrative zones 5and 6 on priority basis and the community toilet facilities in the listed wards are in need of repairs and have inadequate capacity and design to handle the expected demand in the urban poor areas in compliance to established design guidelines by Ministry of Housing and Urban Poverty Alleviation and the design standards through relevant Government Orders. The scope shall also include the survey of the remaining city and ascertain the exact numbers and ward-wise location for rehabilitation and upgradation sanitation facilities

2	3	5	10	11	12	14	16	17	21	23	25	27	31	32	34	35	38	41	53
61	92	99	102															

FIGURE 7-1: AREAS OF INTERVENTION - ACCESS TO TOILETS



☐ Launch a pilot project for the usage of mobile toilets as (a) temporary solution for CTCs wherever in-situ development of slums or relocation of the community is planned under RAY or areas where land tenure issues are flagged, (b) seasonal need for additional toilet seats is prevalent in area with floating population and (c) place constraint does not allow any permanent solution. The project can be trialed in model Wards. KNN shall appoint a consultant to prepare the proposal for the pilot project. The consultant shall provide –

- a need assessment at the outset
- develops an Operator model and a Financial Model for the capital investment as well as O&M cost,

enhanced sense of ownership and ultimate sustainability. The capital investment may also be in the form of labor, material as well.

- prepares a septage management plan (if direct connection to the sewerage system is not given); and
- implements the Ward level pilot project (subject to mutual agreement or may be contracted separately to an agency through tender process)

Feasibility Study

☐ The feasibility study shall be conducted to ascertain the model of toilets to be adopted in the city to address the access to toilets issue. – shared/community/mobile. The scope shall include –(**1**) ward wise identification of demand for toilet facilities, (**2**) assessment of the land availability at household,/community/ward level in the areas which are prone to open defecation(**3**) assessment of opportunities for rain water harvesting systems and use of water thus tapped for operational & maintenance activities, (**4**) Based on the database of spatial distribution of inadequacy of the toilet facilities , (**5**) the willingness to pay by the community and their participation interest levels in the O&M of the sanitation facilities in order to develop operator and finance models

DPR

☐ Based on the findings of the feasibility study, KNN may release a notice to invite expression of interest to prepare DPR. It is recommended to evolve a city-wide strategy through DPR, yet the city-wide plan shall be broken down into packages to ensure phase-wise development in order to ease the financial burden. The DPR is detailed as under -

- DPR for the construction works of new toilets which shall include – (**1**) Design of toilets[8] as per the design guidelines by Ministry of Housing and Urban Poverty Alleviation and the design standards through relevant Government Orders, (**2**) Detailing the construction procedure of shared toilets, and community toilets (**3**) Design the fecal sludge management system including clearance & treatment gradually integrating into the future/proposed off-site sewerage system(s) (**4**) Develop asset registry for toilet management and the computerized maintenance management plan coupled with comprehensive M&E system – this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance

Administrative & Regulatory Measures

☐ It is recommended to '***establish a dedicated unit for Toilets Sector***' under the Sanitation Department to streamline the design, construction, operation & maintenance processes within the sector with regular O&M training programs for the both the KNN officials and O&M team and the community and regular helpline.

☐ **Develop and Conduct Awareness Generation Campaigns**– Campaigns shall be conducted to propagate the benefits of better hygienic and sanitation practices and encourage the residents to adopt toilet facilities through financially sustainable mechanisms and cross-subsidy mechanisms. Along the lines of the National School Sanitation Initiative (NSSI), the awareness campaigns to promote behavioral change shall lay emphasis on personal hygiene, proper sanitation, clean toilet habits, safe drinking water, separate toilets for girl child, disposal of waste water, human excreta disposal/toilets, waste water recycling, waterless urinals, waste segregation, and compositing, food hygiene and creation, and conservation of green spaces. Schools shall be adopted as the prime media for the campaign.;

☐ **Regularize Municipal Bye-Lawsand Building Codes**– Municipal bye-lwas and building codes shall be developed to encourage "Water Reuse Strategy," for utilization of the recycled water/waste water in the operation and maintenance of the toilet facilities; punitive measures shall be enforced to discourage the open defecation practices; Building codes enforced to adopt the prescribed design standards for toilets; (*Please refer to Annexure 14 for literature on regulatory and governance initiatives*).

- **Develop and Institutionalize MIS System**– KNN shall promote the documentation and mapping of the system. An asset register shall be maintained and the computerized maintenance management plan shall emphasize on the preventive and corrective maintenance; this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance;

Financial Mechanism Interventions

- **Institutionalize Sector Specific Budgets**– Budgets shall be established; and the dedicated Toilet Sector Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities on area up gradation plans) in order to promote efficient cost recovery mechanisms;
- KNN shall assist in the construction of new shared toilets in densely populated areas at the rate of one (1) toilet for every five (5) households through micro-financing in areas lacking the basic services in the immediate and short-term phase with a horizon of year 2017;

7.2.3 Storm Water Management Sector

7.2.3.1 CRITICAL PROBLEM AREAS

- **CRITICAL PROBLEM AREA 4** - Inadequate storm water drainage network along with poor maintenance and non-integration of source control measures with the existing storm water drainage network leading to a considerable number of water logging areas and ultimately unhygienic condition.

7.2.3.2 STRATEGY

Based on the comprehensive situation analysis executed for the city within the storm water management sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 30 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of KNN, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

TABLE 7-10: TARGETS FOR SERVICE DELIVERY LEVELS IN STORM WATER MANAGEMENT SECTOR

COMPONENT OF SERVICE	DESIRED SERVICE DELIVERY	EXISTING SERVICE DELIVERY	TARGETS FOR SERVICE DELIVERY LEVELS			
			IMMEDIATE-TERM 2012-2014	SHORT-TERM 2012-2017	MID-TERM 2012-2030	LONG-TERM 2012-2042
Coverage of Drainage Network	*100%*	*63.66%*	*70%*	*90%*	*100%*	*100%*
Incidences of Water Logging / Flooding	*0*	*16*	*12*	*10*	*5*	*5*

The strategy adopted to achieve the aforementioned targets in the service delivery shall include a decentralized approach to storm water management in addition to the centralized storm water drain network to manage the run-off. This approach entails the introduction of systems that temporarily store or permanently remove storm water from the location of rainfall on impervious areas. New and evolving methodologies involving 'source controls'[9], green infrastructure, rain water harvesting methodologies, low impact development and best management practices are recommended to be adopted.

The objective of the said approach is to reduce storm water flow into the centralized storm water drain system while increasing soil infiltration and pollutant removal, providing urban ecological restoration opportunities, and increasing overall green spaces within watersheds.*This shall facilitate the ground water recharge*. There are three major source control techniques – (**a**) detention, (**b**)

[9] 'Source Controls' is the term used to emphasize the location of the measure adopted to control the run-off at the place where runoff is generated.

retention, and (**c**) bioretention/biofiltration and available technological source control measures include blue roofs, rainwater harvesting, vegetated controls, permeable pavements, and green roofs. Each source control technique provides certain benefits that can be matched to the city's needs –

TABLE 7-11: BENEFITS OF SOURCE CONTROL TECHNIQUES

BENEFITS	DETENTION	RETENTION	BIO-FILTRATION
Reduces Drain Overflows	X	X	X
Reduces Potable Water Consumption		X	
Reduces Flooding	X	X	X
Reduces Backups	X	X	X
Reduces Direct Discharges		X	X
Reduces Strain on Drains	X	X	X

Potential source control strategies and initiatives are listed as below –

TABLE 7-12: SOURCE CONTROL STRATEGIES

BUILDINGS AND LOTS
Performance Standards for New Development
Performance Standards for Existing Buildings
Low- and medium-density residential controls
RIGHT OF WAY
Road reconstruction design standards
Sidewalk design standards
Right of way buildout
OPEN SPACE
Green Infrastructure - green streets, rain gardens and swales

TABLE 7-13: SOURCE CONTROL INITIATIVES

STRATEGY	DESCRIPTION	EFFECT
Blue Roof 2-in / 1-in Detention	Install roof top detention systems	Cost Effective method to detain water
Green Roof	Install a green roof on at least 50 percent of a roof	Cost-effective storage or removal of runoff from new rooftops
Rain Water Harvesting	Methodologies to capture run-off	Cost-effective storage or removal of runoff from impervious surfaces
Side walk Bio-filtration	Vegetated Controls	Reduction in annual run-off from catchment area
Greening of Parking Lots	Implement vegetation and stormwater controls in new parking lots	Reduction in annual run-off from catchment area
Porous Parking Lots	commercial and community facility parking lots to plant street trees and perimeter and interior landscaping that will detain water or infiltrate to the soil as feasible.	Retention of stormwater and reduction in run-off
Porous Concrete Sidewalk	porous pavement on publicly-owned parking lots	Retention of stormwater and reduction in run-off
Green Street	New zoning amendment requires street tree plantings	Cost-effective infiltration of street stormwater
Permeable Pavements	Install and monitor porous pavement on publicly-owned lots and new construction of roads	Retention of stormwater and reduction in run-off

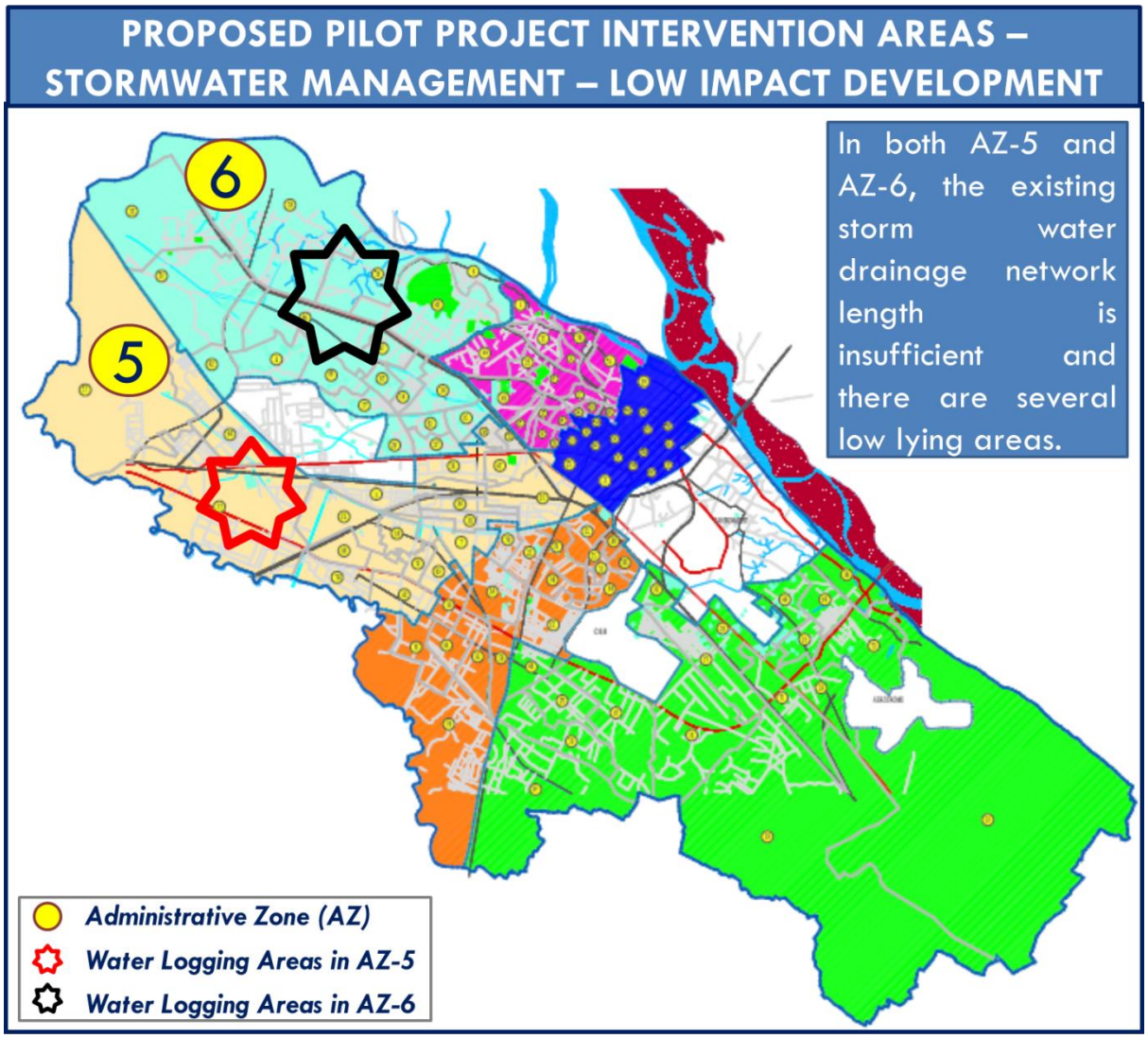
7.2.3.3 RECOMMENDATIONS

7.2.3.3.1 Solution for the Critical Problem 4 – 'Inadequate storm water drainage network along with poor maintenance and non-integration of source control measures with the existing storm water drainage network leading to a considerable number of water logging areas and ultimately unhygienic condition'

Immediate Action Directives

- It is recommended that KNN coordinate with the sewerage & solid waste management department and prioritize the activity of prevention of indiscriminate dumping of solid waste and waste water discharge into the drains;It is recommended that KNN implement a pilot project in administrative zones – 5 and 6 to promote low impact development (LID) and 'wet weather green infrastructure10'. The pilot project shall address these concerns through a variety of techniques, including strategic site design, measures to control the sources of runoff, and thoughtful landscape planning. Considering a greater measure of the storm water management infrastructure is in need of replacement or repair and the communities are not equipped to financially support the development, KNN needs to consider resilient and affordable solutions that meet many objectives at once and green infrastructure is one such solution. (*please refer to Annexure 15 for case studies and literature on green infrastructure*)

Figure 7-2: Proposed Pilot Project Intervention - Model Ward Concept - Storm WAter Management



[10] Green infrastructure is an approach that communities can choose to maintain healthy waters, provide multiple environmental benefits and support sustainable communities. Unlike single-purpose gray stormwater infrastructure, which uses pipes to dispose of rainwater, green infrastructure uses vegetation and soil to manage rainwater where it falls. By weaving natural processes into the built environment, green infrastructure provides not only stormwater management, but also flood mitigation, air quality management, and much more. (US EPA et al)

Feasibility Study

- ☐ It is proposed to conduct a study to ascertain the feasibility of integrating the water bodies in the city into the future storm water drainage network system as rain water harvesting (RWH) structures to reduce the capacity requirement encumbrance on man-made drains as well as create a continuous drainage network;.
- ☐ It is also proposed to study the feasibility of constructing rain water harvesting structures / source controls in low-lying areas to address the storm water issue since the areas cannot be integrated into the surrounding drainage network owing to the undulating levels;
  - Conduct hydraulic modeling studies in few selected pilot areas of the city in order to improve the water retention potential within the city and decrease the run-off load for low lying areas as well as the downstream areas of river
  - Assessment of the following parameters with respect to water bodiesand the low-lying areas – **(a)** water quality analysis **(b)** influent characteristics **(c)** ground infiltration characteristics and sub-strata soil investigations **(d)** sedimentation analysis
- ☐ It is proposed to study the techno-economic feasibility for developing the water-bodies as recreational facilities considering the importance of Kanpur as a strategic tourist location

DPR

- ☐ Based on the findings of the feasibility study, KNN may release a notice to invite expression of interest to prepare DPR. The scope shall include – (**1**) Design and construction works of new storm water drainage network, (**2**) design and construction works of source controls in the low-lying areas(**3**) Design and construction works of recreational facilities – water bodies (**4**) Develop asset registry for storm water management and the computerized maintenance management plan coupled with comprehensive M&E system – this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance

Administrative & Regulatory Measures

- ☐ It is recommended to establish a dedicated unit for Storm Waste Sector under the Sanitation Department to streamline the design, construction, operation & maintenance processes within the sector; personnel management system & Sanitation worker's training program shall be implemented to conduct occupational safety and health training campaigns to educate the sanitary workers with respect to the benefits of adopting best operating practices;
- ☐ Municipal Bye-Laws shall be enforced to encourage the residents to adopt the practices of source control initiatives to promote reduce, reuse and recycle principle; Regulatory Mechanisms (polluter pays) shall be enforced to discourage open dumping of waste;
- ☐ Awareness generation campaigns shall be conducted to propagate the benefits of source control initiatives;
- ☐ KNN shall develop and institutionalize the MIS system to document and map the drainage network system. An asset register shall be maintained and the computerized maintenance management plan coupled with comprehensive M &E system shall emphasize on the preventive and corrective maintenance; this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance.

Financial Mechanism Interventions

- ☐ It is recommended to initiate incentives for adopting the source control initiatives;
- ☐ Sector specific budgets shall be established; and the dedicated Storm Water Sectoral Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities on area up gradation plans) in order to promote efficient cost recovery mechanisms.

Impact benefit tax is also proposed to be levied on properties in areas where services are provided

7.2.4 Solid Waste Management

7.2.4.1 CRITICAL PROBLEM AREA

- **CRITICAL PROBLEM AREA 5** - The household coverage of solid waste management services as well as the overall collection efficiency is inadequate and deficient in urban poor areas leading to the dumping of solid waste in open areas and drains resulting in health and environmental risks.

7.2.4.2 STRATEGY

Based on the comprehensive situation analysis executed for the city within the sewerage sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 30 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of KNN, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

TABLE 7-14: TARGETS FOR SERVICE DELIVERY LEVELS IN SEWERAGE MANAGEMENT SECTOR

COMPONENT OF SERVICE	DESIRED LEVEL OF SERVICE DELIVERY	EXISTING LEVEL OF SERVICE DELIVERY	TARGETS FOR SERVICE DELIVERY LEVELS			
			IMMEDIATE-TERM 2012-2014	SHORT-TERM 2012-2017	MID-TERM 2012-2030	LONG-TERM 2012-2042
Household Coverage	*100%*	*82%*	*100%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Segregation at Source	*100%*	*0%*	*40%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Collection Efficiency of MSW	*100%*	*100%*	*100%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Extent of Reuse & Recovery	*80%*	*72%*	*80%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Extent of Treatment	*100%*	*80%*	*100%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Extent of Scientific Disposal	*100%*	*100%*	*100%*	*100% (Demand until 2017)*	*100% (Demand until 2030)*	*100% (Demand until 2042)*
Cost Recovery						
Extent of Cost Recovery	*100%*	*60%*	*80%*	*100%*	*100%*	*100%*
Efficiency in Collection of Sewage Charges	*100%*	*34%*	*50%*	*100%*	*100%*	*100%*
Customer Service						
Efficiency in redressal of customer complaints	*80%*	*70%*	*80%*	*80%*	*80%*	*80%*

The strategy adopted to achieve the aforementioned targets in the service delivery shall include the coverage of entire households in the city under the collection services – primary and secondary collection network. The cost recovery mechanisms need to be strengthened.. The service delivery options shall enmesh the community participation and NGO involvement to complement KNN capacities.

Given the fact that the city is largely characterized by population with a low awareness in terms of the available sewerage management services and also the adverse impacts of the current malpractices leading to disintegration of health and environment; hence the proposals shall bear in

mind the requirement for generation of awareness in the community alongside the provision for educating theses masses. This approach shall ensure sustainability of the proposed systems. (*please refer to Chapter 6 for awareness generation strategy)*

7.2.4.3 RECOMMENDATIONS

7.2.4.3.1 Solution for the Critical Problem 5 – 'The household coverage of solid waste management services as well as the overall collection efficiency is inadequate and deficient in urban poor areas leading to the dumping of solid waste in open areas and drains resulting in health and environmental risks'

Immediate Action Directives

- ☐ In order to achieve 100% coverage the private concessionaire who holds the contract for the city shall enforce measures to implement the services per the contract.
- ☐ IEC campaigns shall be initiated to promote segregation at source and also support the primary collection and secondary collection processes.

Administrative and Regulatory Measures

- ☐ It is recommended to establish a dedicated unit for Solid Waste Sector under the Sanitation Department to streamline the design, construction, operation & maintenance processes within the sector; personnel management system & Sanitation worker's training program shall be implemented to conduct occupational safety and health training campaigns to educate the sanitary workers with respect to the benefits of adopting best operating practices;
- ☐ Municipal Bye-Laws shall be developed to encourage the residents to adopt the practices of solid waste reduce, reuse and recycle; Regulatory Mechanisms (polluter pays) shall be enforced to discourage open dumping of waste;
- ☐ Awareness generation campaigns shall be conducted to propagate the benefits of better hygienic and sanitation practices and encourage the residents to adopt solid waste management systems through financially sustainable mechanisms and cross-subsidy mechanisms

KNN shall develop and institutionalize the MIS system to document and map the collection & transportation system. An asset register shall be maintained and the computerized maintenance management plan coupled with comprehensive M &E system shall emphasize on the preventive and corrective maintenance; this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance.

Financial Mechanism Interventions

- ☐ It is recommended to initiate the CDM process to avail the CDM revenue benefits that shall substantially contribute towards both the O&M and Capital Investment recovery;
- ☐ Sector specific budgets shall be established; and the dedicated Solid Waste Sectoral Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities on area up gradation plans) in order to foster efficient cost recovery mechanisms. Impact benefit tax is also proposed to be levied on properties where services are provided.

7.3 Action Plans

7.3.1 Technology Options

The technology and service delivery options shall be designed to ensure the sanitation services are managed efficiently through the entire cycle of operations. All stages of the complete cycle are carefully planned to extend services to the entire city population cutting across all sections of the society and all levels of the settlements. The several options are designed and phased keeping in mind the existing limitations of technical, financial and social capacities of KNN. The service delivery options shall enmesh the community participation and NGO involvement to complement the KNN capacities.

PHASE	SEWERAGE	TOILETS	STORM WATER	SOLID WASTE	QULAITY OF WATER
Immediate 2012-2014	☐ Finalize the Connections to the Households; ☐ Initiation of Collection and Conveyance System ; ☐ Intermittent Measures for Septage Clearance ☐ Feasibility study for DEWATS as a permanent solution ☐ Intermittent DEWATS for existing waste generation areas served by Septic tanks; ☐ Finalize DEWATS if found feasible	☐ Detailed Survey of existing facilities to initiate rehabilitation and up gradation ☐ Finalize the Repairs and up gradation of the existing toilets; ☐ Initiate the Design & Construction of the new facilities in areas with no sanitation facilities ☐ Initiation of phasing out of the septic tanks ☐ Initiate the Design of System to handle the human excreta	☐ Finalize repairs and up gradation of the storm water drains in the flood prone areas; ☐ Initiate the source control strategies and initiatives ☐ Initiate the construction of the new drains; ☐ Initiate the procurement of the maintenance equipment and devices; ☐ Initiate the outfall drain structures / RWH structures / supporting activities	☐ Finalize Primary Storage and Primary Collection System; ☐ Initiate Secondary Storage, Collection and Transport System; ☐ Initiate Sanitary Landfill for existing Waste and Treatment Facility; ☐ Initiate the Transfer Station	☐ Detailed study to determine and map the contamination points / lengths ☐ Initiate the casing works for water supply pipes at the contamination points / lengths ☐ Initiate the shifting of the hand-pumps/stand-posts from the contaminations points ☐ Initiate training programs for household water purification mechanisms

PHASE	SEWERAGE	TOILETS	STORM WATER	SOLID WASTE	QULAITY OF WATER
Short-Term 2012 - 2017	☐ Finalization of collection & Conveyance System ☐ Initiate the Treatment and Disposal mechanisms – sewerage zone wise ☐ Intermittent arrangements for Septage Treatment & Disposal	☐ Finalize 100% Coverage of toilets and supporting Infrastructure Development ☐ Finalize the System to handle the human excreta	☐ Finalize and operationalize RWH structures / ground water recharge initiatives ☐ Finalize Construction Works ▪ Source Control Installations ▪ New Drains ▪ Outfall structures ☐ Finalize procurement of the maintenance equipment	☐ Finalize Secondary Storage, Secondary Collection and Transport ☐ Finalize and operationalize the transfer station ☐ Finalize Construction Works ▪ Compost Plant ▪ Sanitary Landfill ☐ Finalize the Capping of Sanitary Landfill for existing Waste ☐ Initiate the operations of Integrated Solid Waste Management Facility (ISWM)	☐ Finalize the casing works for water supply pipes at the contamination points / lengths ☐ Finalize the shifting of the hand-pumps/stand-posts from the contaminations points ☐ Initiate training programs for household water purification mechanisms ☐ Repairs and Mainatenance
Mid-Term 2012 – 2031	☐ Phasing out of Septic Tanks by institution of DEWATS / connections to central sewer system ☐ Augmentation of the system to meet the demands of the growing population ☐ Replacements/repairs of components & maintenance	☐ Finalization of eth septage management system ☐ Augmentation of the system to meet the demands of the growing population ☐ Replacements/repairs of components & maintenance	☐ Augmentation of the SDM system to meet the demands of developing city ☐ Replacements of components as per the maintenance plan	☐ Augmentation of the MSW system to meet the demands of growing population ☐ Annual Phases of the ISWM facility ☐ Replacements of components as per the maintenance plan	☐ Regular / Periodic / Preventive repairs and maintenance
Long-Term 2012 – 2042	☐ Augmentation of the system to meet the demands of the growing population ☐ Replacements/repairs of components & maintenance	☐ Augmentation of the system to meet the demands of the growing population ☐ Replacements/repairs of components & maintenance	☐ Augmentation of the SDM system to meet the demands of developing city ☐ Replacements of components as per the maintenance plan	☐ Augmentation of the MSW system to meet the demands of growing population ☐ Finalization of the Annual Phases of the ISWM facility ☐ Replacements of components as per the maintenance plan	☐ Regular / Periodic / Preventive repairs and maintenance

7.3.2 Financial Options

The implementation of the City Sanitation Plan necessitates substantial financial resources and the corresponding strategic planning for resource generation. The financial strategy shall encompass Capital Investment Plan, Operations & Management (O&M) Expenditure Layout and the financial assessment for the critical support activities like Community Mobilization, Awareness Workshops and Capacity Enhancement to ensure sustainability of the planned sanitation services.

The strategy shall align itself along the paradigm that the resource generation shall broadly target the funds earmarked for water and sanitation development within KNN and the Chhattisgarh State Government budgets; however, it shall also access the funds from the 13th Finance Commission and other Center and State schemes for sanitation improvement.

7.3.2.1 CAPITAL INVESTMENT PLAN

A conceptual capital investment plan is presented below which is corresponding to the strategic actions in the various sectors that are defined in the earlier sections. The unit rates considered for the calculation purposes are provided as Annexure 11; This section outlines the annual capital expenditure (capex) required, ***An annual inflation factor of 5% is applied for all capital expenditure (from 2012-13 onwards)***

TABLE 7-15: CAPITAL INVESTMENT PLAN

		SHORT-TERM ACTION PLAN (2012-2017)	MID-TERM ACTION PLAN (2018-2030)	LONG-TERM ACTION PLAN (2031-2041)
	Population	***2910389***	***3176563***	***3325773***
	Incremental Population		***266174***	***149210***
	Households	***582078***	***635313***	***665155***
	Incremental Households		***53235***	***29842***
NEW SERVICES				
1	**Household Toilets**			
	Strategy	**Address the deficiency**	**Address the additional requirement for the incremental population**	**Address the additional requirement for the incremental population**
	Individual Toilets	34031	9519	2248
	Shared Toilets	22687	2094	450
	Capital Investment Estimate	***19851***	***763***	***666***
2	**Community Toilets**			
	Strategy	**Address the deficiency**	**Address the requirement for the incremental population**	**Address the requirement for the incremental population**
	Community Toilets	454	102	33
	Capital Investment Estimate	***6810***	***1530***	***495***
3	**Public Toilets**			
	Strategy	**Address the deficiency**	**Address the additional requirement for the incremental population**	**Address the additional requirement for the incremental population**
	Public Toilets	80	*75*	100
	Capital Investment Estimate	***1200***	***1125***	***1500***
	TOTAL CAPITAL INVESTMENT-TOILETS	***27861***	***3418***	***2661***
4	**Centralized Sewerage System**			

		SHORT-TERM ACTION PLAN (2012-2017)	MID-TERM ACTION PLAN (2018-2030)	LONG-TERM ACTION PLAN (2031-2041)
	Population	***2910389***	***3176563***	***3325773***
	Incremental Population		***266174***	***149210***
	Households	***582078***	***635313***	***665155***
	Incremental Households		***53235***	***29842***
	Strategy	**Address the deficiency**	**Address the additional requirement for the incremental population**	**Address the additional requirement for the incremental population**
a	Household Connections	405892	53235	29842
	Capital Investment Estimate	***16236***	***2129***	***1194***
5	**Decentralized Sewerage System -Water Bodies**			
	Strategy	**Address the deficiency**	**Address the additional requirement for the incremental population**	**Address the additional requirement for the incremental population**
a	Interceptor Drains Network with Treatment	20 km		
	Capital Investment Estimate	***1241***		
b	Protection Works	3 % of Sewer Network Estimate		
	Capital Investment Estimate	***37***		
6	**Septage Management System**			
	Strategy	**Address the deficiency**	**Address the additional requirement for the incremental population**	**Address the additional requirement for the incremental population**
a	Vaccum Trucks	75	8	5
	Capital Investment Estimate	***600***	***64***	***40***
b	Septage Sludge Drying Beds	401633 sq.m	36732 sq.m	20590 sq.m
	Capital Investment Estimate	***8033***	***735***	***412***
c	Office and Ancillary Units	Lumpsum	Lumpsum	Lumpsum
	Capital Investment Estimate	***8***	***1***	***0.5***
	TOTAL CAPITAL INVESTMENT-WASTE WATER	***26154***	***2929***	***1646***
6	**Storm Water Management System**			
	Strategy	**Address the deficiency**	**Address the additional requirement for the incremental population**	**Address the additional requirement for the incremental population**
a	Source Controls			
	Capital Investment Estimate	***1686***	***201***	***273***
b	Storm Water Drain Network	800 km	80 km	90 km
	Capital Investment Estimate	***33720***	***4026***	***5463***
c	Supporting Infratsructure		Pumping Stations/Culverts/CD Works	
	Capital Investment Estimate	***1686***	***201***	***273***
	TOTAL CAPITAL INVESTMENT-STORM WATER	***37092***	***4428***	***6009***
7	**Solid Waste Management System**			
	Strategy	**Address the deficiency**	**Address the additional requirement for the incremental population**	**Address the additional requirement for the incremental population**
a	Collection and Transportation			
	Capital Investment Estimate	***567***	***2522***	***3689***
b	Transfer Station			

		SHORT-TERM ACTION PLAN (2012-2017)	MID-TERM ACTION PLAN (2018-2030)	LONG-TERM ACTION PLAN (2031-2041)
	Population	***2910389***	***3176563***	***3325773***
	Incremental Population		***266174***	***149210***
	Households	***582078***	***635313***	***665155***
	Incremental Households		***53235***	***29842***
	Capital Investment Estimate	***134***	***525***	***768***
g	Supporting Infrastructure			
	Capital Investment Estimate	***35***	***287***	***382***
	TOTAL CAPITAL INVESTMENT-STORM WATER	***736***	***3334***	***4839***
REHABILITATION/UPGRADATION SERVICES				
1	**Household Toilets**			
	Strategy	**Address the deficiency - improve physical condition/upgrade to connection to Conventional Sewer**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**
	Individual Toilets	402		
	Capital Investment Estimate	***261***		
2	**Community Toilets**			
	Strategy	**Address the deficiency - improve physical condition/upgrade to connection to Conventional Sewer**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**
	Community Toilets	94		
	Capital Investment Estimate	***470***		
3	**Public Toilets**			
	Strategy	**Address the deficiency - improve physical condition/upgrade to connection to Conventional Sewer**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**
	Public Toilets	44		
	Capital Investment Estimate	***220***		
4	**Centralized Sewerage System**			
	Strategy	**Address the deficiency**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**
a		Lumpsum		
	Capital Investment Estimate	***100***		
5	**Storm Water Management System**			
	Strategy	**Address the deficiency**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**	**In the event of efficient O&M mechanism in place, no capital investment envisaged**
a	Desilting and realignment of Drains	45 km		
	Capital Investment Estimate	***1138***		
b	Lining and Restructuring of Drains	20 km		
	Capital Investment Estimate	***674***		
	TOTAL CAPITAL INVESTMENT-STORM WATER	***1812***		
	GRAND TOTAL CAPITAL INVESTMENT-CSP	***94707***	***14109***	***15155***

7.3.2.2 OPERATIONS AND MANAGEMENT EXPENDITURE PLAN

In addition to the Capital Investment; recurring financial resources requirement is envisaged to support the O&M of the various sanitation service facilities. The O&M Expenditure layout is presented below; please refer to Annexure 11– for the unit rate analysis for both the CAPEX and the O&M expenditure for all the sanitation service sectors. The annual O&M inflation is taken at seven (7%) percent; all rates are as per 2011 rates for the tasks detailed in the unit rate analysis Annexure 11–

As can be assessed from Table 6-4, O&M expenditure for Centralized Sewer System and MSW Management System would be a significant burden on KNN's finances. It is evident that KNN would be demanded to introduce tariff structure and charge user fees for the various sanitation services that it would provide, as outlined in the CSP

TABLE 7-16: O&M EXPENDITURE PLAN

		SHORT-TERM ACTION PLAN (2012-2017)	MID-TERM ACTION PLAN (2018-2030)	LONG-TERM ACTION PLAN (2031-2041)
Population		***2910389***	***3176563***	***3325773***
Incremental population			***266174***	***149210***
Households		***582078***	***635313***	***665155***
Incremental households			***53235***	***29842***
1	**Community Toilets**			
	Total Capital Investment Estimate	1727	1689	592
	Total O&M Expenditure Estimate	***104***	***348***	***558***
2	**Public Toilets**			
	Total Capital Investment Estimate	1111	1242	1790
	Total O&M Expenditure Estimate	***67***	***220***	***437***
	GRAND TOTAL O&M EXPENDITURE ESTIMATE - TOILETS	***171***	***568***	***995***
3	**Centralized Sewerage System**			
	Total Capital Investment Estimate	65780	17487	29339
	Total O&M Expenditure Estimate	***3506***	***8526***	***14550***
4	**Decentralized Sewerage System**			
	Total Capital Investment Estimate	6228	11286	16335
	Total O&M Expenditure Estimate	***93***	***330***	***741***
	GRAND TOTAL O&M EXPENDITURE ESTIMATE – WASTE WATER	***3599***	***8856***	***15291***
5	**Storm Water Management System**			
	Total Capital Investment Estimate	38904	4429	6009
	GRAND TOTAL O&M EXPENDITURE ESTIMATE – STORM WATER	***1945***	***4430***	***6192***
6	**Solid Waste Management System**			
	Total Capital Investment Estimate	12098	20036	19258
	GRAND TOTAL O&M EXPENDITURE ESTIMATE – SOLID WASTE	***4870***	***22093***	***26933***

7.3.2.3 COST RECOVERY OPTIONS

It is recommended to explore the possibility of levying user charges for the services, globally, user charges for sewerage disposal services are normally based on water charges, i.e., a set percentage of the water charge that has typically varied between 50-80% of user water charges. It is proposed that KNN shall levy a 50% sewage disposal surcharge to the user water charges. As regards MSW services, it is recommended that DMC levy a monthly user fee as indicated in the table

below, this fee could vary for users belonging to various economic slab and would also depend on the land-use category. However, it is recommended that user charges for the urban poor shall be levied with effect from 2013-14, i.e., after Kanpur's citizens have witnessed a significant improvement in waste water disposal services. With the above indicated user charges, KNN would generate substantial revenue per annum, which shall enable KNN to undertake capital expenditure programs. The suggestions for the Cost-Recovery Mechanisms are presented in the Table: 6-5-

TABLE 7-17: TARRIF STRUCTURE OPTIONS

	CATEGORY			MONTHLY FEE						ANNUAL FEE						ANNUAL TARIFF REVENUE					
				SOLID WASTE		SEWERAGE		STORM WATER		SOLID WASTE		SEWERAGE		STORM WATER		SOLID WASTE		SEWERAGE		STORM WATER	
	ID	PERCENTAGE OF TOTAL NUMBER IN CATEGORY	QUANTITY	IMMEDIATE PHASE*	SUBSEQUENT PHASES	IMMEDIATE PHASE	SUBSEQUENT PHASES	IMMEDIATE PHASE	SUBSEQUENT PHASES	IMMEDIATE PHASE*	SUBSEQUENT PHASES	IMMEDIATE PHASE	SUBSEQUENT PHASES	IMMEDIATE PHASE	SUBSEQUENT PHASES	IMMEDIATE PHASE*	SUBSEQUENT PHASES	IMMEDIATE PHASE	SUBSEQUENT PHASES	IMMEDIATE PHASE	SUBSEQUENT PHASES
1	**Households**	**100%**	2774512																		
	Urban Poor	40%	1109805	0	10	0	30	0	15	0	120	0	360	0	180	*0*	*1332*	*0*	*3995*	*0*	*1998*
	Low Income	20%	554902	10	20	30	40	20	25	120	240	360	480	240	300	*666*	*1332*	*1998*	*2664*	*1332*	*1665*
	Middle Income	30%	832354	30	30	100	100	80	80	360	360	1200	1200	960	960	*2996*	*2996*	*9988*	*9988*	*7991*	*7991*
	High Income	10%	277451	50	50	100	100	80	80	600	600	1200	1200	960	960	*1665*	*1665*	*3329*	*3329*	*2664*	*2664*
	Sub-Total - Cost Recovery Estimate - Households															***5327***	***7325***	***15315***	***19976***	***11986***	***14316***
2	**Commercial Establishments**	**100%**	**15484**																		
	Small Scale	30%	4645	50		200		160		600		2400		1920		28	28	111	111	89	89
	Medium Scale	40%	6194	100		450		360		1200		5400		4320		*74*	*74*	334	334	268	268
	Large Scale	30%	4645	500		2000		1600		6000		24000		19200		279	279	1115	1115	892	892
	Sub-Total - Cost Recovery Estimate - Commercial Establishments															***381***	***381***	***1561***	***1561***	***1249***	***1249***
3	**Hotels & Restaurants**	**100%**	**517**																		
	Small Scale	30%	155	200		600		480		2400		7200		5760		4	4	11	11	9	9
	Medum Scale	40%	207	1000		2500		2000		12000		30000		24000		25	25	62	62	50	50
	Large Scale	30%	155	5000		6000		4800		60000		72000		57600		93	93	112	112	89	89
	Sub-Total - Cost Recovery Estimate - Hotels & Restaurants															***122***	***122***	***185***	***185***	***148***	***148***
4	**Marriage Halls**	**100%**	**229**																		
	Small	40%	92	3000		3000		2400		36000		36000		28800		33	33	33	33	26	26
	Large	60%	137	6000		4500		3600		72000		54000		43200		99	99	74	74	59	59
	Sub-Total - Cost Recovery Estimate: Marriage Halls															***132***	***132***	***107***	***107***	***86***	***86***
5	**Market Areas**	**100%**	**84**																		
	Small	30%	25	5000		3000		2400		60000		36000		28800		15	15	9	9	*7*	*7*
	Large	70%	59	10000		4500		3600		120000		54000		43200		71	71	32	32	25	25
	Sub-Total - Cost Recovery Estimate: Market Areas															***86***	***86***	***41***	***41***	***33***	***33***
GRAND TOTAL - COST RECOVERY ESTIMATE - KANPUR CITY																**6047**	**8045**	**17209**	**21870**	**13501**	**15831**

It is further proposed that KNN shall investigate the possibility of a judicious alignment of impact benefit fee closely with expected property owner benefits. The total revenues thus generated shall aim to cover annual O&M expenditure, and also partly/substantially fund capital replacement in the long-term. The recommendations are presented thus –

TABLE 7-18: PROPERTY BASED TAX OPTIONS

PROPERTY BASED TAX		
	TAX ID	**VALUE**
1	***Solid Waste Benefit Tax***	3% of Annual Ratable Value (ARV) of the Property
2	***Drainage Benefit Tax***	3% of Annual Ratable Value (ARV) of the Property

7.3.2.4 FINANCING SOURCES

It is established that Government of India (GoI) and Government of Uttar Pradesh (GoUP) are both open to financially supporting the implementation of City Sanitation Plans. The table below presents the several scenarios of financing sources and the options that may be explored with each of the source –

TABLE 7-19: FINANCING SOURCE AND RELATED OPTIONS

FINANCING SOURCE	OPTIONS
13TH FINANCE COMMISSION	Pooling of the 13th Finance Commission Grants for Sanitation Services Improvement Projects;
STATE FINANCE COMMISSION	The grants from State Finance Commission support the operational revenue expenses of the corporation while funding the provision of basic services to Urban Population including urban poor;
JAWAHARLAL NEHRU NATIONAL URBAN RENEWAL MISSION (JNNURM), GOI	The Urban Infrastructure and Governance component of JNNURM has fund allocations for developing sanitation services.
MINISTRY OF HOUSING AND URBAN POVERTY ALLEVIATION (MOHUPA)	The construction of individual and shared toilets finds funding through the schemes of MoHUPA
INTEGRATED LOW COST SANITATION (ILCS), MOHUPA	Funding for the development of basic sanitation services - Central Contribution - 75% of Capital Expenditure; State Contribution - 15% of Capital Expenditure; Beneficiary - 10% of Capital Expenditure; Currently ILCS supports the construction of individual toilets for economically weaker sections of society.
RAJIV AWAS YOJANA (RAY), MOHUPA	RAY assures Central Grants for slum redevelopment and achieves basic sanitary services in an inclusive approach; the possibility of the financial support under the IHSDP/RAY schemes of GoI for waste water disposal and MSW within Kanpur's urban poor settlements may well be examined.
SARVA SHIKSHA ABHIYAN (SSA), MINISTRY OF HUMAN RESOURCE DEVELOPMENT (MOHRD), GOI	MoHRD is developing a manual on school sanitation under the SSA component. The SSA component has considerable funding for school sanitation.
SARVAJANIK PRASADHAN YOJANA	A state-sponsored scheme that provides 100% grant to ULBs to build public toilets.
INTERNATIONAL DONORS/FUNDING AGENCIES	Funding from World Bank, ADB, WWF and the likes shall be aimed at and considerable efforts made to bring in the funding to develop sanitation projects in an inclusive approach.
URBAN LOCAL BODIES (ULB) EQUITY	ULB shall earmark an explicit budget for the sanitation services improvement; It shall establish tariff structure for the sanitation services provided and levy sanitation cess as part of the property tax; the user charges and the sanitation cess revenues hall be directed to the sanitation department for utilization for funding sanitation improving projects in the long-term besides tackling the operation & maintenance costs.
PUBLIC PRIVATE PARTNERSHIP (PPP)	PPP shows greater promise in bringing in major capital investment and finances required to develop basic sanitation services for the urban population including the urban poor. The following PPP options shall be considered to employ their services appropriately - (a) service contracts; (b) performance-based service contract; (c) a management contract for operations and maintenance (O&M); (d) BOOT/BOT/ROT Contracts; (e)Joint Ventures between State Government/ULB and the private company. In the event of weak financial situation and greater financial burden on the Municipal Finances, PPP model shall be explored to support the equity contribution of ULB in the total capital expenditure.
BENEFICIARY CONTRIBUTION - PUBLIC PRIVATE PEOPLE PARTNERSHIP (PPPP)	PPPP shall be promoted as a sustainability model in order to garner support of the beneficiaries in both the capital investments and the O&M investments. This shall aim at increasing the sense of ownership and hence ensure sustainability of the services; In the event of weak financial situation and greater financial

FINANCING SOURCE	OPTIONS
	burden on the Municipal Finances, PPPP model shall be explored to support the equity contribution of ULB in the total capital expenditure. THis move shall be supported by reforms in the Governance structure that involves greater community participation and hence promote greater accountability and transparency.
NGO	NGO involvement shall be encouraged in the sanitation services sectors especially the access to toilets; Appropriate contract models shall be developed to attract their contributions in both the development and O&M activities.

7.3.3 Institutional & Governance Options

The improvement in the urban infrastructure and hence the quality of urban life is explicitly associated with sound and reliable management and governance practices. The good management is facilitated by a committed and balanced institutional framework while the better governance practices stem from a persuasive policy framework.

It is the goal of the CSP to recommend the promotion of institution structures that provide the platform for management efficiency and the development of the good governance framework that shall effect sustainable and inclusive infrastructure development.

The institutional and governance action plan that shall dictate the accountability of the institution in service delivery vide clear roles and responsibilities. The governance framework shall infuse more accountability, transparency and participatory planning.

The following diagram illustrates the broad instrumental outcomes of the detailed action plan that follows -

FIGURE 7-3: BROAD INSTRUMENTAL OUTCOMES - INSTITUTIONAL & GOVERNANCE ACTION PLAN

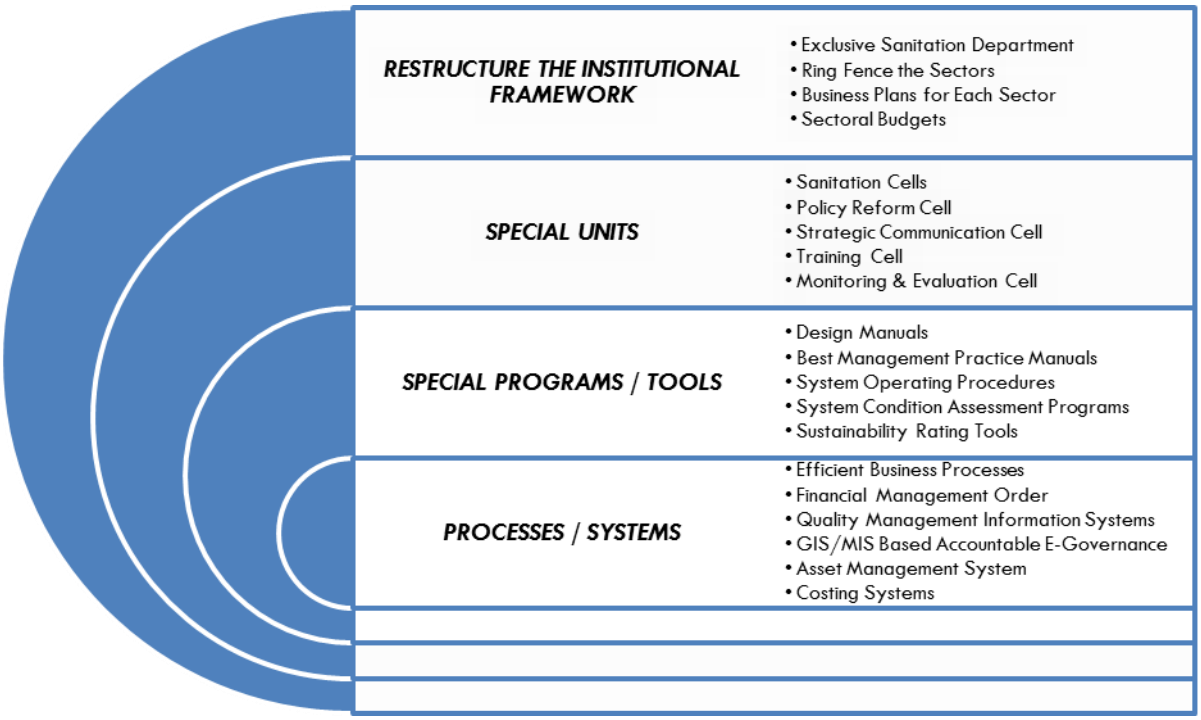


TABLE 7-20: INSTITUTIONAL AND GOVERNANCE ACTION PLAN

PHASE	COMPONENTS
Short-Term 2012-2017	☐ Initiate the restructuring of the institutional framework as per the recommendation in the CSP with the help of institutional development expert and streamline the operations ☐ Corporatize the various sectors under the sanitation department – **'Ring Fence'** the sectors (WSS, Solid Waste and Toilets) with supporting technical services and O&M units ▪ Water Supply & Sewerage (Water Supply, Sewerage & Storm Water Units) ▪ Solid Waste and ▪ Toilets ▪ Establish Sectoral Budgets ▪ Create Business Plans for each sector ▪ Develop Costing systems (costs & tariff structures) in collaboration with the Finance & Accounts Department, Startegic Communication Cell working with communities ▪ Develop Asset Management system ☐ Establish a dedicated 'Policy Reforms' unit to continually implement policy reforms that will support accountable governance and regulatory oversight of the local bodies, service providers and the citizens as well to achieve sustainability of the ever dynamic infrastructure development ▪ Achieve the objectives of Model Municipal Law through incentivized transition plan resulting in devolution of fiscal powers and authority ▪ Achieve the E-Governance using GIS/MIS ▪ Initiate Property Tax Management System using GIS ▪ Sector Regulations – Quality & Fiscal Standards ▪ Monitoring & Evaluation performance ▪ Enforcement Mechanisms - of rules, by-laws, municipal codes & building codes ▪ Realize transparency, disclosure and citizen education ▪ Promote Private Sector participation and investment ☐ Revamp the business processes and the financial management order of the '*Finance & Accounts Department*' by putting in place new accounting standards as per the directive of C&AG – ***'Accounting and Budget Formats for Local Bodies'*** ▪ Implement Double Entry Accounting System (DEAAS) ▪ Revamp Audit & Account Procedures for each sector ▪ Adopt Budgeting and Accounting Formats for each sector ▪ Set up quality management information systems (MIS) ▪ Set up & develop contract management team ▪ Develop financial operating Plans (FOP) for each sector ☐ Develop the design manuals, best management practices (BMP) manual, system operating procedures, O&M Manuals, Condition Assessment Programs (CAPs'), sustainability rating tools for each sector in collaboration with the technical and O&M experts; ☐ Initiate the empanelment process for technical experts, third party technical review agencies to assist with the preparation of design manuals/BMP manual/O&M Manuals/SOP/CAP and periodic reviews of the efficiency of the systems ☐ Develop the strategic communication cell that shall ensure community participation and implement participatory planning – ▪ Confederate community representatives and link to city Ward committees; ▪ Form neighborhood groups; ▪ Organize focused group discussions regularly and steer meetings to plan area upgrading solutions; ▪ Promote community oversight committees and community contracting arrangements to involve the community in implementation activities – means of livelihood, sense of ownership and sustainability of systems in the corresponding areas; ▪ Pave way for community O&M systems; ▪ Promote system to utilize community to collect user charges; ☐ Establish Monitoring Cell and develop the M&E mechanisms and the coordination framework with parastatal and State agencies ☐ Establish the training cell and implement capacity enhancement strategy ☐ Establish Capacity, Management, Operation & maintenance Program (CMOM) ☐ Initiate the staffing plan for the various sectoral units through re-organization of existing staff, new-hires and transfers from state agencies – ▪ Fill the top hierarchical level of both the technical services and O&M unit ▪ Initiate the staffing upto 50% at the mid-hierarchical level and supplement with the private consultants ▪ Initiate the staffing upto 70% at the low-hierarchical level and supplement with the staff of the private service provider/concessionaire ☐ Complete the staffing plan for the Finance & Accounts departments – ▪ Financial Analyst

PHASE	COMPONENTS
	▪ Accounts Specialist ▪ Tax Expert ▪ Public Finance & Legal Advisor – Financing arrangements/Concession Agreements ▪ Infrastructure Insurance Experts ▪ Micro-credit Product Development Specialists ☐ Complete the staffing plan for the Strategic Communication Cell – ▪ Social Development Experts ▪ Community Organizers ☐ Finalize the staffing plan for the Policy Reform unit – ▪ Planners ▪ Policy Advisors ▪ Legal Advisors / Retired Judges / Policy Analysts ☐ Finalize the staffing Plan for monitoring cell which will work with external sector specific experts and third party agencies ☐ Establish the sanitation cells at the city level as part of the state sanitation strategy
Mid-Term 2018 - 2030	☐ Finalization of the staffing plan across all sectors and departments ☐ Review the procedures and implement amendments ☐ Review the Policy Reforms and implement amendments ☐ Reprocess the empanelment ☐ Review and update the various manuals and operating procedures ☐ Review and reengineer the M&E mechanisms
Long-Term 2031 - 2041	☐ Finalization of Review and update mechanisms ☐ Finalization of successful Institutional Structure and business operations & processes ☐ Achievement of Municipal Model Law objectives in totality ☐ Successful implementation of City Financial Viability Mechanism ☐ Establishment of Participatory Planning Process ☐ Establishment of accountable governance framework

7.3.4 Capacity Enhancement & Awareness Generation Options

The assessment of KNN institutional set up has identified a major shortfall both in terms of resources and staff skills. The deficiency necessitates a thorough planning to develop forceful mechanisms that will enhance the capacities of KNN.

Participation from stakeholders throughout the city ensures good governance by augmenting the limited capacity of KNN by community based resources; awareness generation campaigns shall impart the education and the knowledge sharing vital for local capacity building.

The action plan details the approaches and technologies adopted and the new roles and responsibilities defined to improve the service delivery system.

TABLE 7-21: CAPACITY ENHANCEMENT & AWARENESS GENERATION ACTION PLAN

PHASE	CAPACITY ENHANCEMENT	AWARENESS GENERATION
Short-term 2012-2017	☐ The Environmental Vision for Kanpur Nagar Nigam can be jointly drafted in a workshop supported by ASCI and subsequently approved by the Council; ☐ Initiate the establishment of a permanent management representative responsible for environmental management; ☐ Finalize the Inventory of all relevant regulations; ☐ Initiate the assessment of the training needs regularly and to develop training calendar and program to impart trainings to staff across all categories; ☐ Budget allocation for training and environmental activities; ☐ Initiate the creation of a training database capturing a record of the name, position and function of the employee as well as the content, duration and date of the training programme participated in including participant feedback about the relevance and efficiency of the course to the roles and responsibilities;	☐ Pilot awareness campaign to be conducted in two (2) wards ☐ Awareness Campaign strategy to be developed ☐ Initiate the Knowledge Exchange between ULB's and communities using either the web based knowledge platform or focused group discussions ☐ Prepare effective IEC material for awareness campaign ☐ Initiate School Sanitation Workshops ☐ Initiate workshops on sanitation and related infrastructure ☐ Involve NGOs to work continuously with the community to bring about change. o The consultants have a local partner who is involved from land use and infrastructure survey, stakeholder consultations, issue and target group identification, deciding the strategies for awareness campaign and pilot awareness campaign in 2 wards. There are other

PHASE	CAPACITY ENHANCEMENT	AWARENESS GENERATION
	☐ To implement an internal and external communication protocol and train the ULB staff in accordance to the plan; ☐ Establish HR Working Group ☐ Initiate the formation of HR Department, and design of HR Policies, Performance linked Incentive Programs; Induction Program; ☐ Finalize the Formulation of HR Policy for the ULB and Finalize the Induction Training Curriculum; ☐ Develop Staffing Plan & Strategy and initiate recruitment in accordance; ☐ Initiate the development of HR Information System ☐ Initiate the development of Knowledge Exchange Mechanism among cities using the web based knowledge platform ☐ Environmental Awareness Workshop for the ULB staff and elected representatives resulting in identification and prioritisation of all environmental aspects; ☐ Create a State Level Steering Committee on Human Resource Development (HRD) ☐ Prepare a City level Urban Management Plan; ☐ Training Programme and training on Urban Management for the ULB ☐ Establishment of a State level Urban Management Institute ☐ Monitoring of cities with the ICD	NGOs who are also involved as part of the CTF. Thus several local NGOs are oriented to local sanitation issues and awareness needs. ☐ Institutionalize the role of CTF to disseminate the information on sanitation issues, projects undertaken and progress of each component ☐ Press release of sanitation scenario of the city ☐ Involve media in demonstrating healthy sanitation practices ☐ Finalize school sanitation program – train school children and make them aware of the sanitation situation and need for healthy sanitation practices ☐ Social mobilization by creating women's group and sensitise them about sanitation related issues ☐ Create *area sabhas*/community groups specifically targeting their sanitation needs ☐ Interpersonal Communication (IPC) to be used to reach out larger public ☐ Build up institutional capacity of KNN to conduct awareness campaigns as part of their agenda ☐ Address the tenure security issues of urban poor which in turn help them build basic services of permanent nature ☐ Develop Information Management System
Mid-Term 2018 - 2030	☐ Lateral recruitment of key positions ☐ Update and upgrade Training Calendar and Training Programs ☐ Update the HR Policies and Incentive programs ☐ Conduct Environmental Workshops ☐ Update the City level Urban Management Plan ☐ Update and upgrade Monitoring & Evaluation Systems	☐ KNN and the CTF have to periodically take feedback from the community groups and provide necessary support. ☐ Update IEC material and the sanitation awareness programs ☐ Update Information Management System
Long-Term 2031 - 2041	☐ Lateral recruitment of key positions ☐ Update and upgrade Training Calendar and Training Programs ☐ Update the HR Policies and Incentive programs ☐ Conduct Environmental Workshops ☐ Update the City level Urban Management Plan ☐ Update and upgrade Monitoring & Evaluation Systems	☐ A long term and permanent effect on awareness can be made by sustained effort from the KNN and community. ☐ The CTF is recognized as a body holding the sanitation campaign for Kanpur. The CTF will also ensure long term influence in the sanitation scenario of Kanpur ☐ KNN and the CTF have to periodically take feedback from the community groups and provide necessary support.

7.3.5 Inclusive Approach

Traditionally, the net of service providers has excluded the urban poor, weaker sections, migrants, and the like. The CSP shall advocate an approach that shall ensure infrastructure planning shall serve all irrespective of the diverse situation of income, education and use. Participatory Planning processes shall be emphasized upon as critical elements of the sanitation infrastructure planning. This shall provide a strong impetus to sustain projects. The approach shall ensure regular and meaningful community participation to foster community ownership and consensus

The action plan shall detail the propositioned approaches and corresponding mechanisms to achieve inclusiveness in infrastructure planning at the city-level –

TABLE 7-22: INCLUSIVE APPROACH ACTION PLAN

PHASE	COMPONENTS
SHORT-TERM 2012-2017	☐ Community Mobilization Strategy shall be defined by the Strategic Communication Cell, KNN; ☐ Implement the Community Mobilization Mechanism to enable the inclusion of the needs & demands of

PHASE	COMPONENTS
	the community in the CSP – **Task 1.** Transect Walks, Social Mapping and Ward & Slum Profiling; Task 2. Social and Gender Audits; Task 3. Confederating Community Groups & Linking to Ward Committees Task 4. Development of a SHG for each ward Task 5. Form Neighborhood Groups ☐ Initiate GIS based information management systems to create central repository of community ideas, needs and prioritization of projects information ☐ Institute Community Oversight Committees & Community Contracting Cell to involve communities in construction & O&M activities; ☐ Design & Implement Participatory Planning Process in line with the Participatory Law, JNNURM Reforms, MoUD; ☐ Initiate the institutionalization of the periodic meetings between Local Government and the community as part of participatory planning and review; ☐ Identify NGO's with community mobilization skills, planning & implementation experience and establish contracting mechanism to institutionalize their participation; ☐ Establish guidelines to translate the community participation into budget allocations and formalize the participatory budgeting; Task 6. Allocate budgets to implement pilot scale projects with Community based organizations; Task 7. Allocate budgets to establish and institutionalize CBOs' ☐ Initiate the development of microfinance model to enable the urban poor to extend services within their areas; Task 8. Awareness Campaign to encourage households to invest in connections and in-situ work of basic services; Task 9. SHG to help with group loans and savings accounts of individuals that serve as collaterals; Task 10. NGO's and the Strategic Communication cell to help State owned Banks to establish community mobilization cells to help design interventions and ensure high repayment rates; ☐ Initiate the development of a revolving fund for poor through State Urban Infrastructure Fund to help with the micro-financing options; ☐ Establish Guidelines and Initiate the Microenterprise Models in the service delivery Task 11. Provide Basic Services as microenterprises Task 12. O&M shall be the SHG/CBO's responsibility Task 13. Livelihood Mechanism ☐ Cross-subsidy mechanisms to finalize the connection fees and tariff structures/user charges; ☐ Establish capacity building initiatives to train the communities in the construction and O&M of the facilities ☐ Citizen Report Cards and feedback mechanism to be institutionalized and formalized;
Short-Term 2014 - 2021	☐ Finalize the Microfinance Model; ☐ Finalize the Microenterprise Model; ☐ Institutionalize the mechanisms of participatory planning and budgets; ☐ Establish the City Community Vocational Training Unit(s) engaging the skilled professionals from within community; ☐ Finalize GIS based information management systems to create central repository of community ideas, needs and prioritization of projects information ☐ Establish the Revolving Fund Mechanism
Mid-Term 2022 - 2031	☐ Update and upgrade the mechanisms; ☐ Improve the participatory planning process & participatory budget mechanisms based on monitoring and evaluation; ☐ Review and reengineer the City Vocational Training Units and Curriculum;
Long-Term 2032 - 2041	☐ Update and upgrade the mechanisms; ☐ Improve the participatory planning process & participatory budget mechanisms based on monitoring and evaluation; ☐ Review and reengineer the City Vocational Training Units and Curriculum; Achievement of Municipal Model Law objectives in totality ☐ Successful implementation of City Financial Viability Mechanism ☐ Establishment of Participatory Planning Process ☐ Establishment of accountable governance framework