

CITY SANITATION PLAN FOR BAREILLY



MINISTRY OF URBAN DEVELOPMENT
GOVERNMENT OF INDIA



BAREILLY NAGAR NIGAM, INDIA



ADMINISTRATIVE STAFF COLLEGE OF INDIA
HYDERABAD, 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 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 Bareilly 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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We express our sincere thanks to all the people who supported us and helped to finish this document with all the specifications.

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ABBREVIATIONS

BDA	Bareilly Development Authority
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
NNB	Nagar Nigam Bareilly
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 Bareilly City Municipal Corporation. Bareilly is one of the 10 cities whose CSPs have been prepared by ASCI in partnership with Government of UP and NNB.

The CSP process in Bareilly 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 Bareilly city may well overcome the various plaguing issues and thereby a healthy sanitized environment prevails for the citizens.

The report has two major sections –

- **The Situational Analysis**
- **The Sanitation Strategies**

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 4.

The later section thereafter provides gap identification, 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.

The Situational Analysis

Chapter 1 gives an introduction to the 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 Bareilly city. The process of collection of baseline information – both primary and secondary, has been explained at length. Also presents a review of the policies & programmes that are prevalent and followed in Uttar Pradesh to improve the sanitation conditions in the urban areas. It gives detailed insight into the NUSP 2008 and the sanitation ranking of cities, the MSW 2000 rules, the ILCS scheme, Rajiv Awas Yojana, UIDSSMT and 13th FC which have been taken up for the improvement of access and coverage of sanitary facilities.

Chapter 2 deals with the City Profile where the various aspects of the city are discussed in order to get a fair idea about the city itself. Aspects such as location, regional linkages, demography, economic, land use and housing profiles, the slum and squatter settlements are discussed in brief.

Chapter 3 summarizes the Institutional Arrangements in Bareilly and Finance Information of NNB. Functions of NNB and Parastatal bodies and overlap of institutional responsibility is also briefly discussed. Later part of chapter discusses financial information of NNB related to Water Supply, Sewerage & Drainage and Solid Waste Management.

Chapter 4: Section A covers the Service Profile of Bareilly City. The aim of the chapter is to present a clear picture of the existing systems of sanitation in the city. It contains four sectors; Water supply system, Sewerage & Sanitation, Solid Waste Management and, Storm Water Drainage system of the city. The performance of each of the sectors is evaluated through Service Level Benchmarking (SLB) indicators. In **Section B** discusses Sanitation Situation in Bareilly City based on information collected by primary sample survey. In this chapter situation analysis is done both at the Household and community level.

The Sanitation Strategies

Chapter 5 covers the Gap Identification and Analysis. In this chapter four sectors (Water supply system, Solid waste Management Sewerage and sanitation and, Storm water drainage system) are analyzed based on the captured and available information. Within each sector, the gaps and issues in access and coverage are identified, the problem areas are clearly demarcated, and projections are also made for the future years, later part covers the communication need assessment.

Chapter 6 This chapter discusses sanitation consciousness and appropriate IEC & communication methodologies for Bareilly city.

Chapter 7 The City Wide Sanitation Strategies and Roadmap are presented. It provides the vision for the CSP and its goals. Thereafter, recommendations of most appropriate options and basic guiding strategies for Water Supply, Solid Waste Management, Sewerage and Drainage are suggested. Strategies have been provided to improve coverage and access to sanitation facilities in phased manner. Concluding the report budget plan to implement effectively the short term proposal and, overall plan for mid-term and long term is also proposed.

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 Bareilly 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	<i>Cities on the brink of public health and environmental "emergency"; needing immediate remedial action</i>
2	Black	34-66	228	<i>Needing considerable improvements</i>
3	Blue	67-90	4	<i>Recovering but still diseased</i>
4	Green	91-100	0	<i>Healthy and Clean city</i>

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. Bareilly has been ranked at 188 out of 423 Class I cities, scoring '**36.2**' marks out of 100 marks and in Black category. This means performance of Bareilly in regard to safe sanitation is abysmal on various indicators. A complete profiling of Bareilly 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 BAREILLY

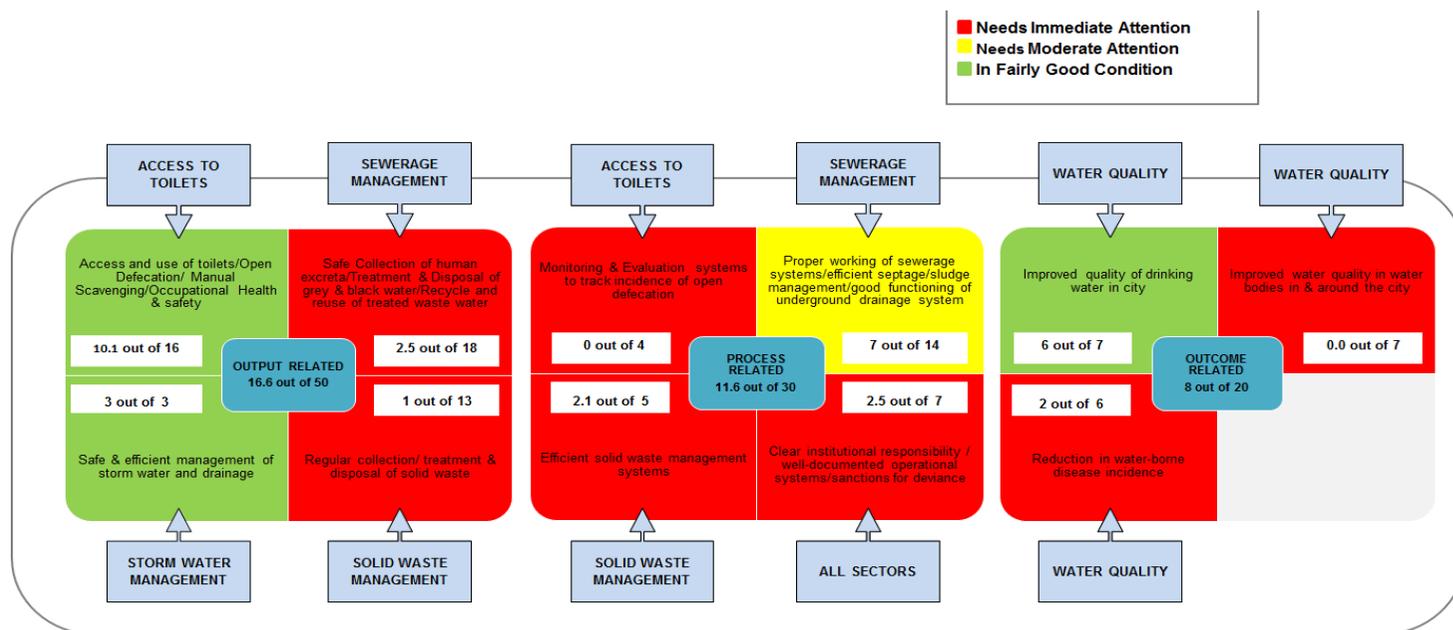
	INDICATORS	POINTS	POINTS SCORED BY BAREILLY
1	OUTPUT RELATED	50	16.6
A	No open defecation		
i.	Access and use of toilets by urban poor and other un-served households (including slums) - individual and community sanitation facilities	4	3
ii.	Access and use of toilets for floating and institutional populations - adequate public sanitation facilities	4	1.6
iii.	No open defecation visible	4	1.5
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	2.5
C	Proportion of total black waste water generation that is treated and safely disposed off (6 points for 100%)	6	0
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	3
F	Proportion of total storm-water and drainage that is efficiently and safely managed (3 points for 100%)	3	3
G	Proportion of total solid waste generation that is regularly collected (4 points for 100%)	4	1
H	Proportion of total solid waste generation that is treated and safely disposed off (4 points for 100%)	4	0
I	City wastes cause no adverse impacts on surrounding areas outside city limits (5 points for 100%)	5	0
2	PROCESS RELATED**	30	11.6
A	M&E systems are in place to track incidences of open defecation	4	0
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	0
D	Underground and surface drainage systems are functioning and are well maintained	4	2
E	Solid waste management (collection and treatment) systems are efficient (and are in conformity with the MSW Rules, 2003)	5	2.1
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	2.5

	INDICATORS	POINTS	POINTS SCORED BY BAREILLY
3	OUTCOME RELATED	20	8
A	Improved quality of drinking water in city compared to baseline	7	6
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	2
GRAND TOTAL		100	36.2

IDENTIFICATION OF PROBLEMS AREAS

Based on the survey conducted in the City of Bareilly 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 BAREILLY City: Identification of Problem Areas



- IDENTIFIED PROBLEM AREAS -**
- Output Related Category**
- ⊙ Sewerage Management
 - ⊙ Safe collection of human excreta
 - ⊙ Treatment & Disposal of black & grey water
 - ⊙ Recycle & Reuse of treated water
 - ⊙ Solid Waste Management
 - ✓ Regular collection of MSW
 - ✓ Treatment & Disposal of MSW
- Process Related Category**
- ⊙ Institutional, Governance and Regulatory
 - ✓ Clear role & responsibilities
 - ✓ Operational systems
 - ✓ Sanctions for non-compliance
- Outcome Related Category**
- ⊙ Improved Quality of Drinking Water in City
 - ⊙ Water quality in water bodies, in and around the city
 - ⊙ Reduction in water-borne diseases

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 I 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.

	EARLIER PROVISION	REVISED PROVISION
2	<p>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.</p> <p>Category/Subsidy/Loan/Beneficiary Contribution</p> <ul style="list-style-type: none"> ✓ EWS/45%/50%/5% ✓ LIG/25%/60%/15% ✓ MIG/HIG/Nil/75%/25% 	<p>75% subsidy for the EWS beneficiaries 15% of State's contribution and 10% of Beneficiaries contribution.</p>
3	<p>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.</p>	<p>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.</p>
4	<p>No provision of IEC component.</p>	<p>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.</p>
5	<p>No involvement/ participation of NGOs at implementation stage.</p>	<p>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.</p>
6	<p>Technology used for construction and conversion of toilets was as per HUDCO's pattern/recommendation.</p>	<p>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.</p>

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 up gradation 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 existing 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 Urban infrastructure Development Scheme for Small & Medium Towns (UIDSSMT)

UIDSSMT aims at improvement in urban infrastructure in towns and cities in a planned manner. It shall subsume the existing schemes of Integrated Development of Small and Medium Towns (IDSMT) and Accelerated Urban Water Supply Programme (AUWSP).

The objectives of the UIDSSMT scheme are to:

- ▣ Improve infrastructural facilities and help create durable public assets and quality oriented services in cities & towns

- ❑ Enhance public-private-partnership in infrastructural development and
- ❑ Promote planned integrated development of towns and cities.

1.2.6 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 Bareilly City Sanitation Plan

The City Sanitation Plan (CSP) is aimed at developing and maintaining a clean, safe and pleasant physical environment in Bareilly 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 Bareilly 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

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 NNB 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 Nagar Nigam Bareilly (NNB). *(Please refer to [Annexure 1](#) for the policy paper on the formalization of CSTF for city of Bareilly)*

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 NNB authorities. As per the guidelines of NUSP 2008, the NNB constituted the CSTF for the city of Bareilly. *(Please refer to [Annexure 2](#) for the final list of CSTF members for Bareilly city)*

Task 2. CSTF Sensitization cum Orientation Workshop

A City level sensitization cum orientation workshop was organised at Nagar Nigam Bareilly on 15 December, 2010. All the CSTF members, Nagar Ayukta Mr. Prabhat Mittal, Swastha Adhikari Dr. R.K. Sharma and other NNB officials attended the meeting, while Col. Jamwal of ASCI gave a detailed presentation highlighting the various aspects of City Sanitation Plan as per the NUSP 2008.

Task 3. Final CSTF Workshop

Final CSTF workshop was organised at Mayor's office, Nagar Nigam Bareilly on 1st December 2012. All the CSTF members, City Mayor Dr. I.S.Tomar, Nagar Ayukta Umesh Pratab Singh and Other NNB officials attended the meeting, while Mr. Rajratna Sardar of ASCI gave a precise final presentation.



FIGURE 1-2 FINAL CSTF PRESENTATION AT NNB ON 1ST DEC, 2012

It was communicated that the purpose of 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 BNN, BDA, JNB, 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 4. Preparatory Work (Profiling Of NNB)

As a preparatory work, a preliminary profiling of NNB 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 5. 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 6. 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 7. 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	300 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, NNB office, Bus & Rail station	Questionnaire	Random Sampling	10 (in Nos.)
4	Community Toilets	All potential areas	Questionnaire	Random	50 – 100%

	ACTIVITIES	FOCUSED AREAS	TOOLS	SAMPLING	SAMPLE SIZE
				Sampling	
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%;
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 organized city wide field reconnaissance and walks along with NNB officials and other stakeholders to gauge and access the first hand sanitation situation of Bareilly city.

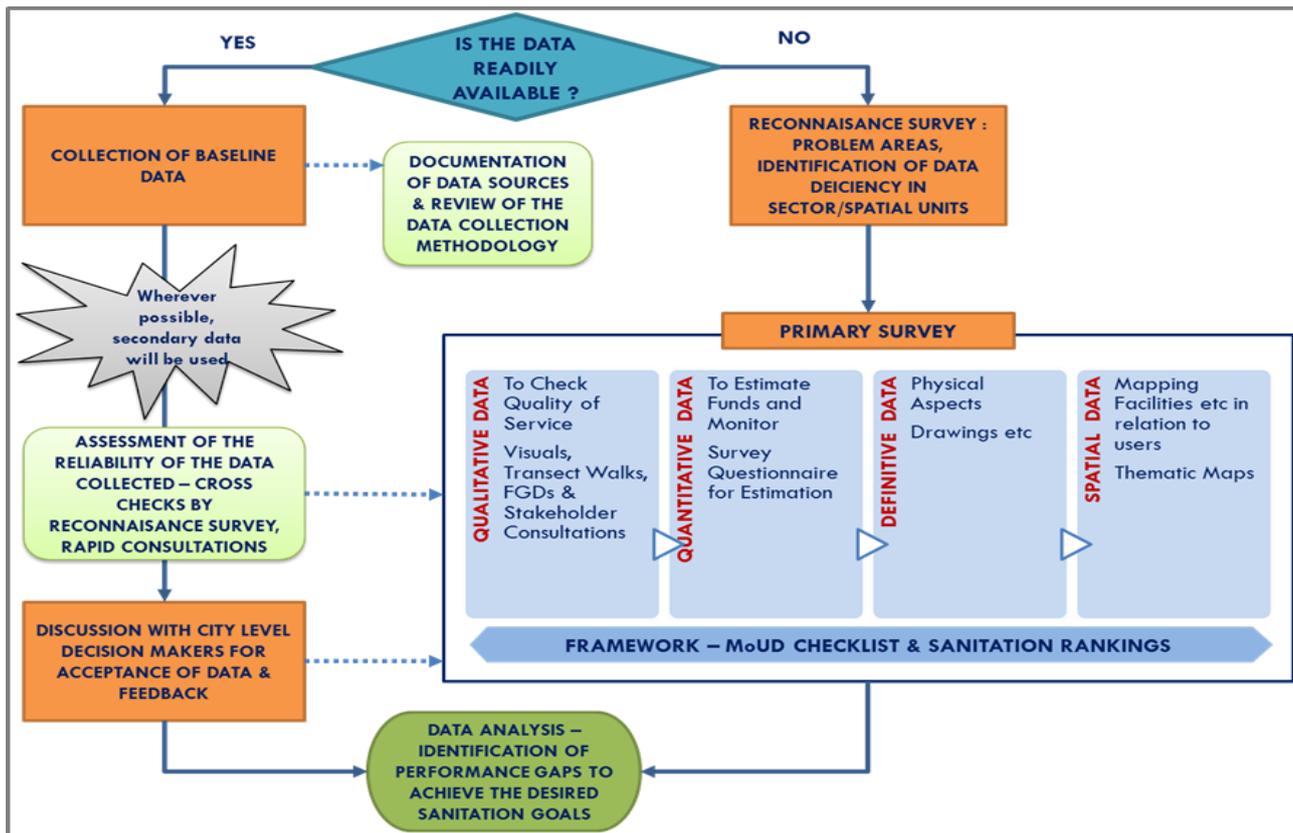
1.4.4 Research Techniques

Table 1-5: Tasks and Related Research Tools

	TASKS	RESEARCH TOOLS
1	Social and environmental issues	<ul style="list-style-type: none"> ✓ Literature Review ✓ Baseline Survey ✓ Case Studies ✓ Consultations/FGDs
2	Policies, acts, operational procedures to address, mitigate and manage the social and environmental issues	<ul style="list-style-type: none"> ✓ Literature Review ✓ Survey/FGDs ✓ Case studies/Discussions ✓ Stakeholder Consultations
3	Perception on sanitation, its maintenance and investment (Analysis of data), mitigate adverse/negative impacts	<ul style="list-style-type: none"> ✓ 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	<ul style="list-style-type: none"> ✓ Literature Review ✓ FGDs Stakeholder Consultations ✓ Survey Data Analysis

Process Followed for Data Assimilation:

Figure 1-3: Data Assimilation Process



1.4.5 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 UNITS	FINANCIAL MECHANISM	INSTITUTIONAL SET-UP
Service levels 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 Drainage	Any town specific areas.		
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 3. 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 4. Communication Gap and Needs Assessment

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

Task 5. 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 NNB legal framework and byelaws, financial analysis of the NNB, data on key public and environmental health, user charges, willingness to pay, etc.

1.4.6 Developing Bareilly 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 6. 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 7. 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

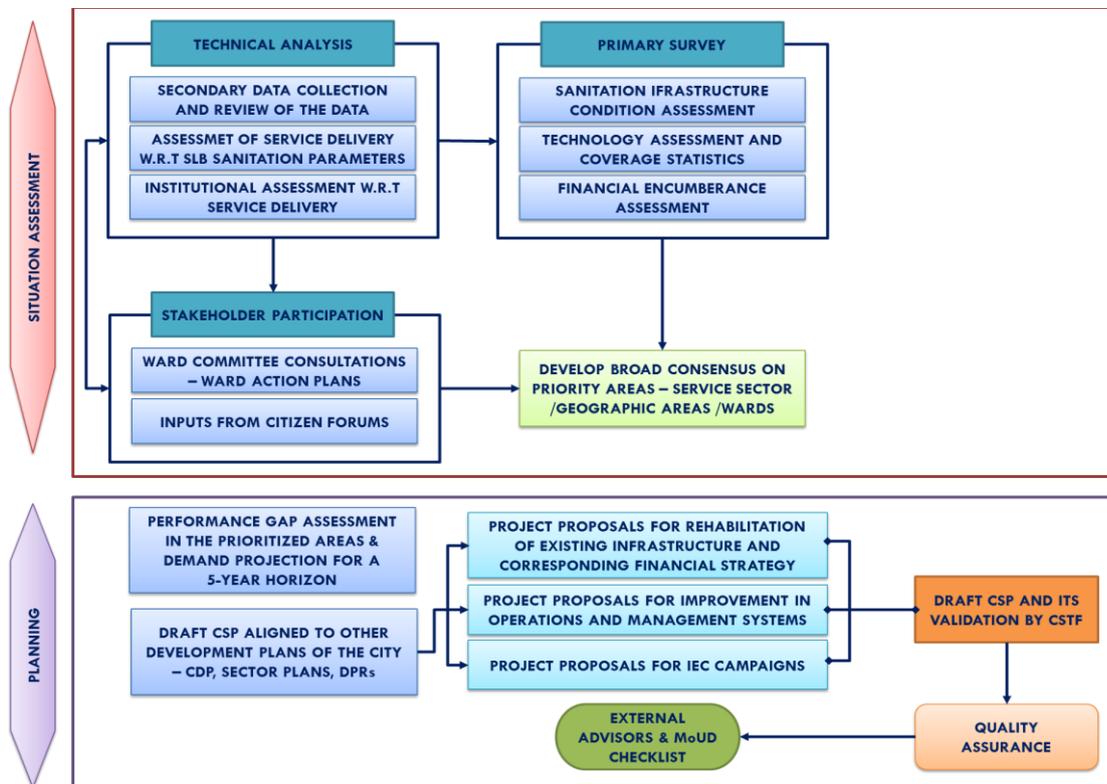
Task 8. Preparation of Draft CSP

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 9. 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 1-4: Essential Components of CSP



1.5 Contents of the Report

The report has two major sections –

- I. The Situational Analysis (**Chapter 1 to Chapter 6**)
- II. The Sanitation Strategies (**Chapter 7**)

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 6.

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 7.

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 NNB 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 covers existing situation, Infrastructure & Services gap assessment and Identification of critical problem areas of Bareilly city.

Chapter 6 identifies the gaps and issues in access, coverage and service delivery within each sector, the problem areas are clearly demarcated. It 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 BAREILLY CITY

Topics of Discussion

- ▣ Location and Regional Linkages
- ▣ Physical Characteristics
- ▣ Demography

2.1 Location and Regional Linkages

2.1.1 Location

Bareilly is located at 28°10'N, 78°23'E, and lies in northern India. It borders Pilibhit and Shahjahanpur on east and Rampur on west, Udham Singh Nagar (Uttarakhand) in north and Badaun in south. Bareilly lies entirely in the Ganges plains. The low-lying Ganges plains provide fertile alluvial soil suitable for agriculture. However, these some lower part of plains is prone to recurrent floods. Bareilly lies on the bank of river Ramganga and there are seven rivers passing through this district. The lower Himalayan range is just 40 km from it and it lies in north of it.

LOCATION MAP

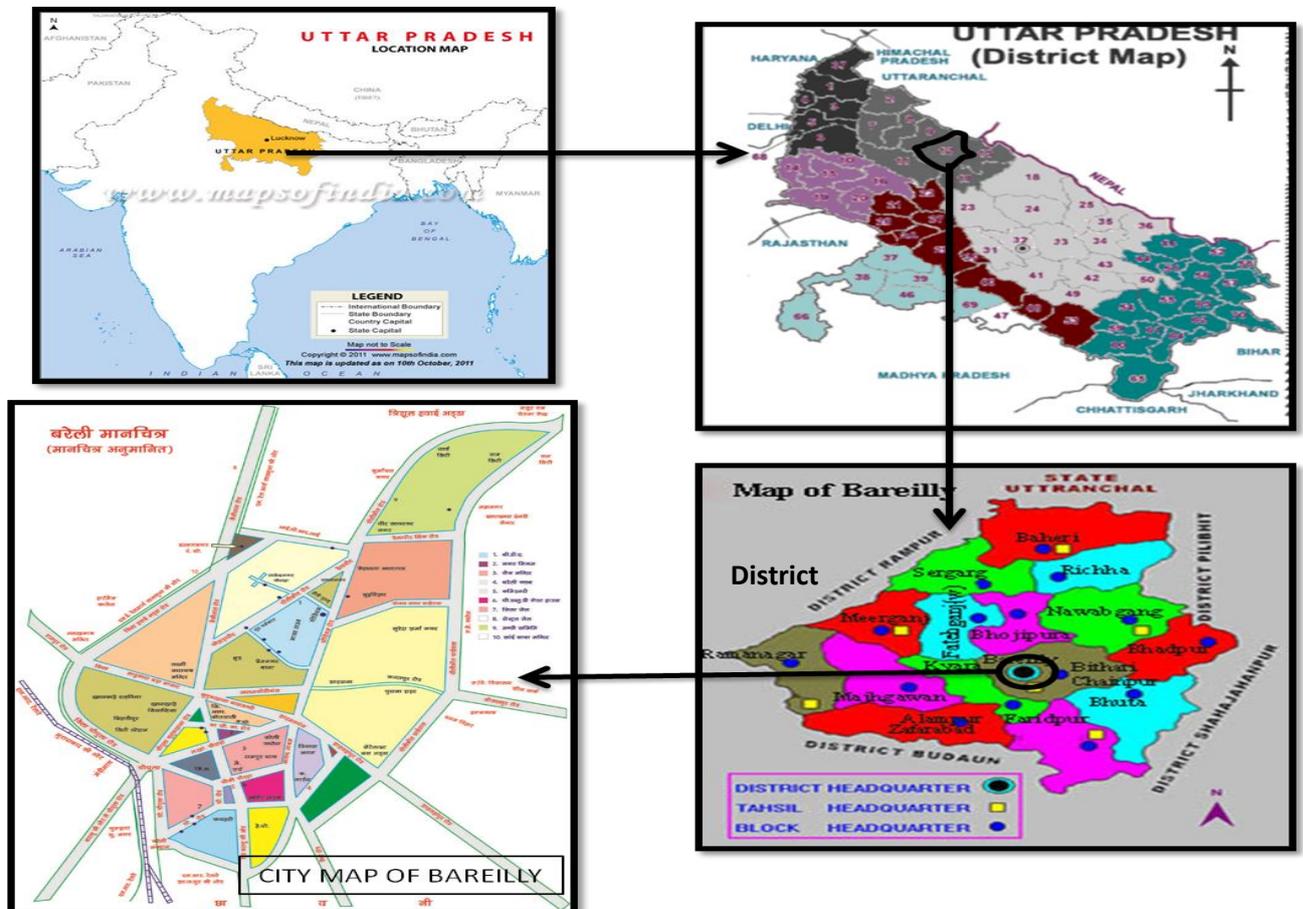


Table 2-1: Summary of Quick facts: BAREILLY City

CATEGORY	YEAR 2001	YEAR 2011	REMARKS
MUNICIPAL WARDS	60	70	<i>Election Wards</i>
POPULATION	720035	898167	<i>% of Population in Slum Areas – 31% % of Population in Non-Slum Areas – 69% (per Census, 2011)</i>
HOUSEHOLDS	67000	115576	<i>No. of Households in Slum Areas – 31850 No. of Households in Non-Slum Areas – 83726 Source: SLB 2012, NNB</i>
FAMILY SIZE (AVG.)	10.7	7.7	<i>Source: SLB 2012, NNB</i>
NO. OF SLUM AREAS	85	85	<i>Source: NNB</i>
AREA(sq.km)	106.42	106.42	
POPULATION DENSITY	6792	8473	
COMMERCIAL & OTHER ESTABLISHMENTS HOTELS & RESTAURANTS	2498	7634	<i>Other establishments include offices, institutions and markets (Source: SLB 2012, NNB)</i>

2.1.2 Economy

Since the period of liberalization in India, Bareilly is one of the fastest growing cities in the region on account of its booming economy. Trade and commerce have flourished in the urban city and followed diversification, though the rural economy of the district is largely Bareillyrian.

Brands:

Following the foray of Multi-national corporations in the city, a significant capital infusion and various investments have occurred throughout the city in different sectors. Bareilly, today, has most of the major global apparel brands including Adidas, Reebok, and Levi's. Reebok has also opened their Factory Outlet in Bareilly which is located at Pilibhit By-Pass Road. Nike is to open an outlet soon. Accompanying these are all other well-known clothing, footwear and accessory brands which have their authorized show-rooms and commercial outlets in the 'Civil Lines areas' and 'D.D.Puram area' of the city.

Industries:

Bareilly houses a lot of Industries in the industrial zone called the Parsakhera Industrial Zone. Major Companies such as Coca- Cola, Camphor & Allied Products Ltd., Paras, Vadilal, Mercury and many others are present in the City.

The Ahmadabad based Ice-cream maker Vadilal has its manufacturing plant in Bareilly. The plant is the sole plant in Northern and Eastern India and caters to both the zones. Vadilal enjoys a 10-12% market share in the Rs 120-crore Delhi market and around 6-8% in the Rs 200-crore eastern market, which comprises territories such as Kolkata, Orissa, Jharkhand and Bihar.

Media:

A lot of Hindi Newspapers including Dainik Jagran, Bareilly; Hindustan, Amar Ujala, Aaj are printed in the city. Various English Newspapers including the Times of India, The Hindu, Hindustan Times, and The Economic Times can be found on the stalls at around 7 a.m. as they are published in the Delhi NCR and sent to the city.

HT Media Ltd has recently come out with a printing facilities in Bareilly, printing of its Hindi newspaper "Hindustan" starting October 10, 2009 and catering to the Rohilkhand area of western Uttar Pradesh comprising of Bareilly, Pilibhit, Shahjahanpur, Lakhimpur and Badaun districts. They also plan to start printing the local edition of their English Daily "The Hindustan Times" very soon.

The city also has its dedicated News Channel called the Alliance News Channel which broadcasts local news at different slots throughout the day.

Agriculture:

Corporate giant Hindustan Unilever has undertaken contract farming of rice in Bareilly and Punjab and its success has ensured low-cost, better-quality produce for its products. The company now plans to extend the experiment but feels an enabling environment in terms of agri-laws and infrastructure facilities is required for the purpose.

Passport Office:

The Passport Office, Bareilly was created in 1983 as a subordinate office of Ministry of External Affairs under the supervision of Central Passport Organization. The issue of passport is a central subject under the Indian Constitution and allotted to the Ministry of External Affairs, Initially Passport Office, Bareilly was catering to the needs of residents of the State of Uttrakhand and 24 Districts of Western Uttar Pradesh. Separate passport Office for the residents of Meerut, Aligarh and Bareilly Division was opened in the year 1997 at Ghaziabad on bifurcation of this office. Again the office bifurcated and another passport office at Dehradun was opened in June 2008 for the residents of the State of Uttrakhand.

Today, this office deals with the issue of passport/travel documents to the citizens of 12 districts of Uttar Pradesh i.e. Bareilly, Shahjahanpur, Pilibhit, Badaun, Bareilly, Rampur, Bijnor, Jyotiba Phule Nagar, Firozabad, Kashi Ram Nagar, Etah & Mainpuri.

Electricity:

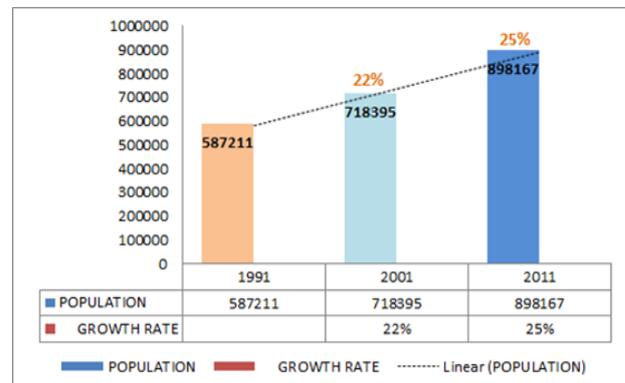
In 2009, Uttar Pradesh Power Corporation Limited (UPPCL) moved a step ahead in implementing the franchisee system in the power sector of the state. Under the new system, private players will be awarded contract to maintain and supply power in nine cities of the state. The same companies will be the outsource points for collecting revenue on behalf of the state government. The system will be

2.3 Demography

According to the 2011 census report of the Government of India, the total population of Bareilly City Region (Bareilly Municipal Corporation and Bareilly Cantt.) is 8, 98,167 having distribution as 53% males and 47% females nearly. The area under the city region is 123.46 km². The density of the population is among the high in the country touching 5000 per km². The main population consists of Jatavs and Balmikis, and other castes such as the Baniyas, Kurmi, Thakurs, Kayasthas & Punjabis Hindus from 62% of population and Muslims 26% mainly Ansari, Behna, Rohilla, Rayeen, Ranghar and Shaikh) of the population, Sikhs form about 10% of population and rest are Jain ,Buddhist and Christians. Bareilly has an average literacy rate of 81%, higher than the national average of 59.5%, with 88% of the males and 65% of females literate making it under top three districts in terms of literacy in Uttar Pradesh . The main languages spoken are Hindi, Urdu, English, Punjabi, and Kumauni. For administrative convenience, the district of Bareilly has been divided into six tehsils namely Aonla, Faridpur, Bareilly, Mirganj, Nawabganj, and Baheri and 14 blocks.

TABLE 2: TREND IN POPULATION GROWTH

YEAR	POPULATION	DECADAL INCREASE	GROWTH RATE
1991	587211		
2001	718395	131184	22%
2011	898167	179772	25%



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 5](#) 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 three standard methods of arithmetic, geometric and incremental increase. Average of all three methods is considered for the further calculations of infrastructure gap and future infrastructure requirements.

TABLE 3: PROJECTED POPULATIONS AND CITY LEVEL INFRASTRUCTURE DEMAND

Projected Projection	2015	2020	2025	2030	2035	2040	2045
Population	1,128,196	1,222,623	1,324,287	1,433,754	1,551,652	1,678,681	1,815,617
Water Demand (MLD) (@ 150 lpcd)	169.23	183.39	198.64	215.06	232.75	251.80	272.34
Sewerage Generation (MLD) @ 80%	135.38	146.71	158.91	172.05	186.20	201.44	217.87
Solid Waste Generation (TRD)(@ 0.45 kg per capita)	507.69	550.18	595.93	645.19	698.24	755.41	817.03

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 5](#) for the assumptions underlying the city level infrastructure demand)

2.3.1 Urban Poor

Though no recent study is available to accurately assess the extent of poverty levels in Bareilly but from the discussions with various stakeholders we understand that poverty levels are quite high in Bareilly.

In addition to this, more than twenty percent of the population in Bareilly 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 is not able to keep pace with the population growth. This has increased the housing stock deficit which has given rise to slum dwellings.

As per the survey conducted by DUDA and documents from NNB, total notified slums in Bareilly are 85. According to census 2001, the slum population was 77109 i.e. 20.5 percent of total Population. As per the survey conducted by S.U.D.A in 2000-01, the population was 77109 and total households were 10050. A large number of below poverty line (BPL) population (about 25%) also live-in slums. The current slum population is about 2.44 lacs with 31850 of households i.e. about 26.47% of the total population.

ULB Profile	Year 2001	Year 2011
Slum Population	77109	278432
Slum Households	10050	31850
No. of Slums	85	85

Source: NNB 2011

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 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**.

SECONDARY DATA ANALYSIS

3.1 Water Supply Management Assessment

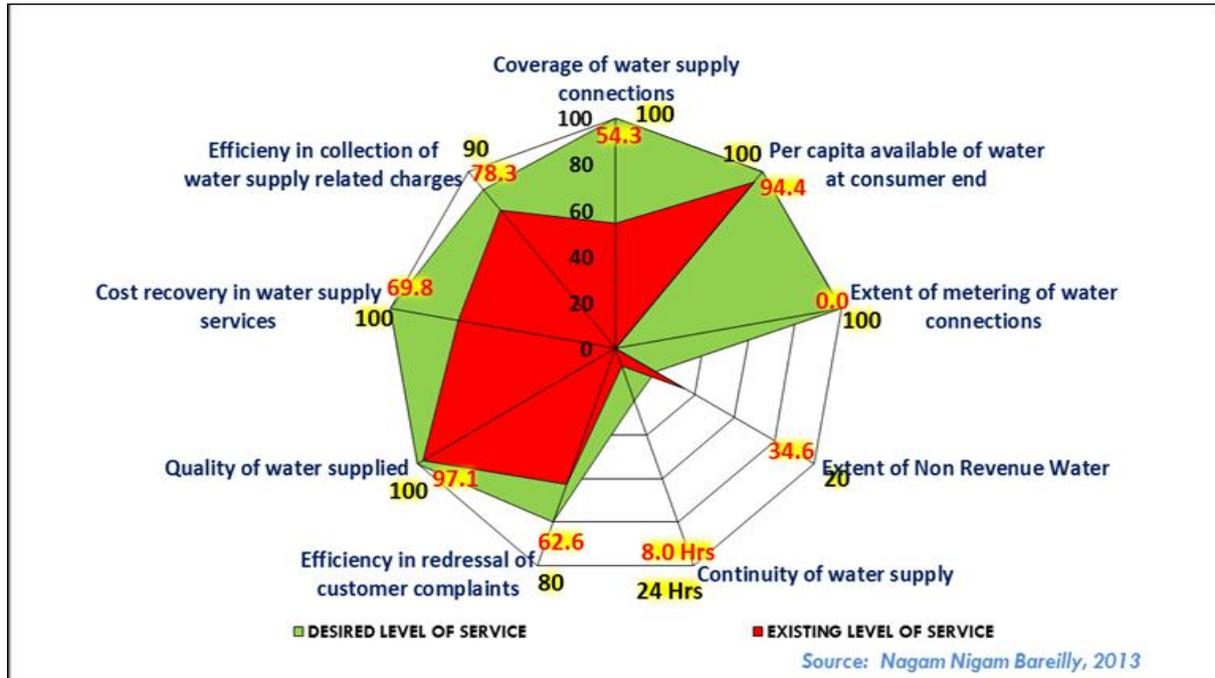


Figure 3-1: SLB for Water Supply Sector – Bareilly City

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 is almost half the desired level. It is however encouraging to keep note of that, the extent of non-revenue water is 34.6 % and the quality of water supplied measures up to the required standards; additionally the ULB has not been successful in its attempts of cost-recovery, it is merely half of the required standards and owing to its inefficient systems for collection of water supply related charges.

3.1.1 Quantitative Statistics- Water Supply and Demand

Section 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 Bareilly and the CPHEEO recommendation, the water demand for the city of Bareilly is estimated at 348.50 MLD, while the supply of water at the consumer end is 285.70 MLD (Source: Nagar Nigam Bareilly) corresponding to a consumption rate of 133 lpcd.

Table 3-1: Water Supply-Demand Statistics - BAREILLY City

WATER DEMAND (MLD)	WATER SUPPLY (MLD)	REMARKS
348.50	285.70	Source for water supply figures is Nagar Nigam Bareilly

Source: NNB 2011

SOURCES OF WATER SUPPLY

The following table illustrates the different sources of water installed and total volume of water generated from different sources. Statistical figures related to sources of water and volume of water generated shows that the total volume of water produced from all different sources together is about 113 MLD and the majority share i.e. about 102 MLD is produced from ground water.

SOURCES OF WATER				
Type of Source	Unit	Installed capacity	Volume	Metered (Y/N)
Ground water (power pumps)	MLD	102.0	102.0	N
Other sources (Hand pump)	MLD	11.00	11.00	N
Total		113.00	113.00	

Source: NNB 2011

COVERAGE OF WATER SUPPLY SERVICES

The total length of distribution network in the city is about 578.20 Km i.e. about 65 sq.km of total area of city is covered with distribution networks. And the total service storage capacity in the network is about 22.975 ML. The following statistical table also illustrates the water storage and distribution network within the city.

WATER STORAGE AND DISTRIBUTION NETWORK		
Length of distribution network	Kilometers	578.20
Average age of distribution	Years	30
Total service storage capacity in network	Million liters	22.975
Tankers Trips	Trips/Month	As required
New connections added in 2008-09	Number	516
Total area covered by distribution network		65 Sq.km

Source: NNB 2011

3.1.2 Qualitative Statistics – Water Supply

The water service quality in Bareilly city is satisfactory. The average duration of water supply is about 6 hours a day. The average pressure in the system is about 4 metres and residual pressure at critical measure point is about only 1.5 meters. There are also leaks reported in the pipe line network and pipe breaks reported which causes hindrance to quality of water supply services. The following table illustrates the water service quality factors.

WATER SERVICE QUALITY		
Average duration of water supply	Hours/day	8.00
Average pressure in the system	Meters	4.00
Residual pressure at critical measurement point	Meters	1.5
Leaks reported in the year	Number	1334
Leaks repaired in the year	Number	835
Pipe breaks repaired in the year	Number	415
Details of Water Quality Lab	Utility/Other	Other

Source: NNB 2012

The following table illustrates the treated water quality surveillance with accordance to number of samples tested for residual chlorine, bacteriological and physical/ chemicals at different points and the number of tests passed.

TREATED WATER QUALITY SURVEILLANCE				
Sample Location	Sampling	Number of Samples Tested For		
		Residual Chlorine	Bacteriological	Physical/ chemical
At the outlet of WTP				
At intermediate points				
At consumer end	4580	4500	36	44
Total	4580		36	44
Total Tests Passed	4580	4500	36	44
Tests required as per standard	NA	NA	NA	NA

Source: NNB 2011

The following table illustrated the customer services from water supply department to general public.

CUSTOMER SERVICES		
Complaints on no water, quality of water during the year 2011	Number	52
Complaints redressed within 24 hrs during the year 2011	Number	48
Other complaints recorded during the year 2011	Number	1125
Other complaints resolved during the year 2011	Number	1112

Source: NNB 2011

3.2 Sewerage Management and Access to Toilets Assessment

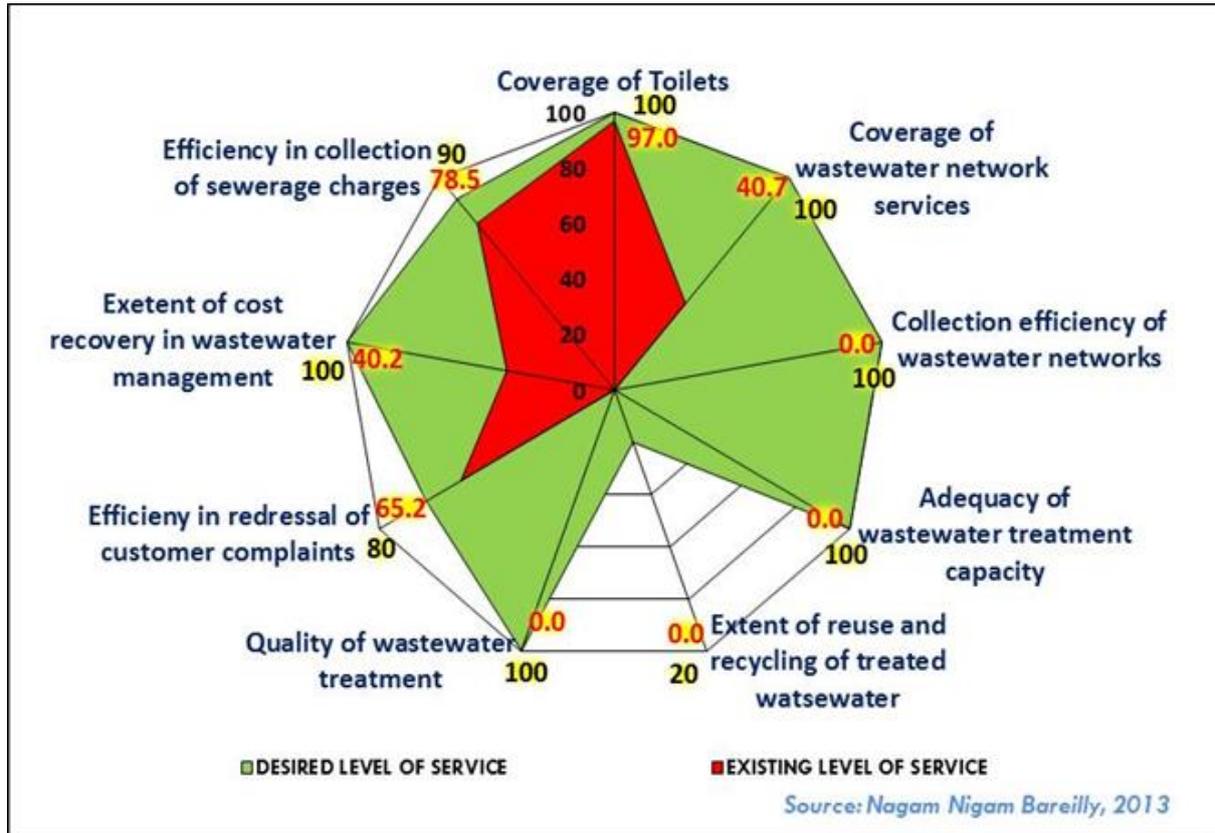


Figure 3-2: SLB for Sewerage Management and Access to Toilets – Bareilly City

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 and access to toilets sector against the nine (9) key parameters vis-à-vis the existing level of service.

The spider chart denotes that the coverage of the waste water network is 40.7 %; however the existing extant of sewerage network in the city has exhibited an optimum collection efficiency charges is (78.5%). The major issue for the NNB is there is no treatment plant for the sewage treatment. It is however not reassuring to note that the NNB has been not successful in its attempts of cost-recovery owing to its well- efficient systems for collection of sewerage charges. Notwithstanding, the redressal of customer complaints is fair enough that is 65.2 %.

The coverage of toilets in the city is a relatively good of the required coverage resulting in a greater percentage of the population (97 %) and open defecation still exists. Stringent measures are solicited to address the grave concern of prevalent open defecation.

3.2.1 Sewerage Generation

The total length of sewerage network pipes in the city is about 206.2 km but, the age of the sewerage network pipes is about 35 years. Further, the total area covered by sewerage network is only about 25 Sq.km. The total municipal water supplied is about 113 MLD and that from other sources is about 11.54 MLD. The total water supplied is about 124.54 MLD of which 99.2 MLD of waste water is being generated from different sources within the city.

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 Nagar Nigam Bareilly to assess sewage generation. Table 3-4 presents the sewage generated in the city considering the water supply/consumption situation at various levels –

TABLE 3-4 SEWAGE GENERATION ESTIMATION - BAREILLY CITY

	VOLUME OF WATER CONSUMED (MLD)	VOLUME OF SEWAGE GENERATED (MLD)
<i>Domestic Connections</i>	144	115.2
<i>Non Domestic Connections</i>	10	8
<i>Public Taps</i>	20	16
<i>Other Connections</i>	40	32
<i>Total</i>	214	171.2

Source: SLB Bareilly 2012

3.2.2 Sewerage Collection and Conveyance

The following table illustrates the length of sewer lines in each zone and the area covered, properties with toilets connected to sewer lines, flood prone areas and water logging areas.

Ward/Zone	Sewer Lines		Properties with toilets connected to			Properties without access to toilets	Stand-alone Sewage w/effluent disposal	Flood Prone Areas (number)	Water-logging Flooding (number)
	Length	Area covered	Sewers lines	Soak pits	Storm drains or canals				
	(km)	(sq. km)							
Zone- 1	43	9.00	1517	N.A.	N.A.	N.A.	N.A.	05	07
Zone -2	71	8.46	4044	N.A.	N.A.	N.A.	N.A.	12	14
Zone -3	59	3.97	4045	N.A.	N.A.	N.A.	N.A.	-	06
Zone -4	33	4.33	2022	N.A.	N.A.	N.A.	N.A.	04	03
Total	206	25.76	11628	N.A.	N.A.	10026	N.A.	21	30

Source: NNB 2011

But, there is no Sewage treatment plant of the waste water that is being generated within the city.

3.2.3 Sewerage Treatment and Disposal

- The source of sewer is mostly from domestic households.
- The total length of sewerage network pipes in the city is about 206.2 km but, the age of the sewerage network pipes is only about 35 years.
- The total area covered by sewerage network is only about 25 sq.km
- The thus produced waste water is about 99.2 MLD from all the sources within the city.
- No sewerage treatment plant

3.3 Access to Toilets Assessment

An extensive survey has been conducted, which includes primary household surveys, focused group discussions and field visit surveys - that are primarily conducted to understand the exiting situation of sanitation facilities at household levels both in slum and non-slum areas and identify the key issues and gaps in the sanitary facilities at this level. The present population in total city is about 8.98 lacs with a bifurcation of slum and non-slum population. Statistics show that there is about 31% of the slum population i.e. about 2.78 lacs and the remaining in non-slum areas i.e. about 6.19 lacs. The non-slum population includes HIG, MIG and LIG and also non notified slums that can be categorized into low income population groups. The numbers of slums that are notified are about 85 in number that spread across the city. In addition to these notified slums there are number of unnotified slums and are categorized in low income groups in Bareilly. Further considering the number of households in slum areas – the number of households in slum areas is about 31850 and the number of households in non-slum areas is about 83726. The following table shows the population and household distribution in slum and non-slum areas.

	Non Slum	Slum
Percentage	69%	31%
Population	6.19 lacs	2.78 lacs
Household	83726	31850

Source: Census 2011

Total No. of HH	115576
Slum Population	278432
Non Slum Population	619735
Total	898167
Slum HH	31850
Non slum HH	83726
Total	115576

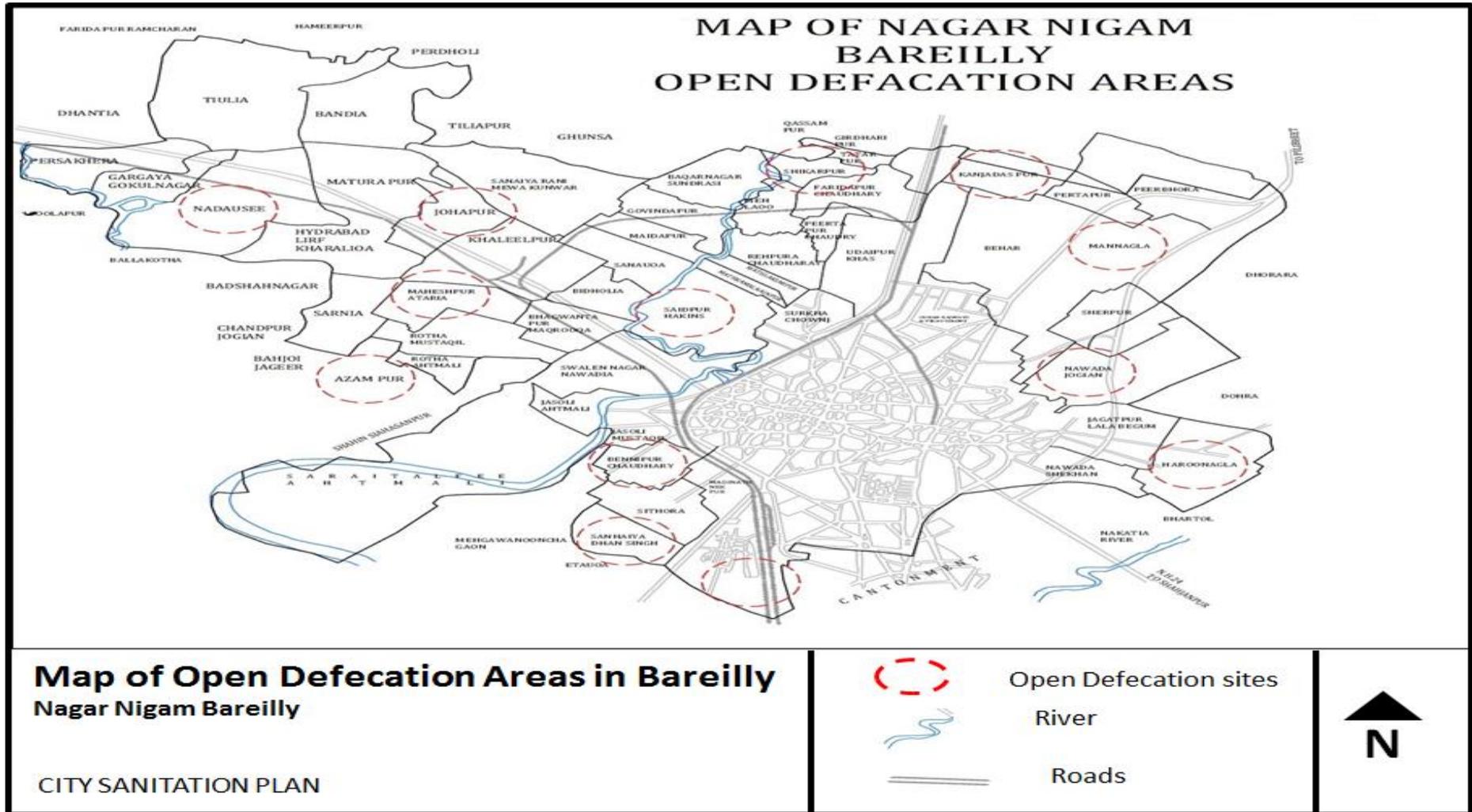
Source: Census 2011 & NNB

	Percentage (%)	No. of HH
Dry Latrine	10.8	12994
Pour Flush	74.2	89274
No Toilets	15	18047
CT	6.37	1150
OD	14.04	16897

Source: Primary Survey NNB

Further considering the different types of individual toilet facilities in Bareilly city are soak pit toilets, pour flush toilets, Kuddi. Kuddi is a small structure built on bricks and is directly connected to an open nalla. This is very prevalent in slum areas. The only difference is that these people don't open defecate rather leaves it directly to drain which is much more dangerous. Gaddewali is also prevalent in places where there is availability of space good enough. A pit like structure is built with admeasuring 4X4 or 4X6 structure closed by a slab. This gets filled generally by a year or two and is cleaned by the municipal vehicle (sludge sucking machine and thrown into a bigger nalas) on the payment basis. From the primary analysis, focused group discussion and stakeholder meetings it is known that about 94% of the non slum households are with household individual toilets – and these household individual toilets include pit latrine, water closet, and septic tank. In addition to the above mentioned households and their access to different types of individual toilets – there is also certain portion of population, i.e. from the primary survey analysis shows that there is about 1% of the total number of households in non slum areas using community toilets.

Map 2: Open Defecation



	Non Slum Population	Total
Total	678968	923138
Access to toilets	638230	784732
No toilets	40738	138406
CT	407	8816
OD	40331	129590
	Non Slum HH	Total
Total	88466	120316
Access to toilets	83158	102268
No toilets	5308	18048
CT	53.08	1150
OD	5255	16898

Source: Primary Survey NNB 2010

The analysis shows that there are about 83158 households have access to individual household toilets i.e. about 6.38 lacs population from non slum areas. There is about 5% of the total number of households do not have any kind of access to toilets i.e. about 5255 households i.e. about 40 thousand of population in non slum areas defecate openly. This is only because of the number of unnotified slums/ low income group households/ population categories into non slum regions and location of low income groups.

Further considering the sanitation facilities in slum areas, the access to individual toilets is very poor. There is more access to community toilets than the individual/ private toilets. The different types of toilets at individual level in slum areas that are most prevalent are pour flush toilets, Kuddi, Gaddewali/ soak pit and community toilets. The usage of community toilets is very prevalent in slum areas. The pour flush type of toilets at individual level includes the individual toilets provided by ILCS i.e. about 5826 HH are constructed mainly in slum areas to reduce the open defecation and improve the sanitary conditions by DUDA.

Further considering the percentage share of households/ population having access to household individual toilets is about 60% of the households and these also include the individual pour flush toilets build by different agencies as mentioned above. These different types of households include pour flush, soak pits, toilets connected to open drain. From the primary survey analysis, focused group discussions and field visits shows that there are about 5% of slum households in addition to the private/ public individual toilets there are also community toilets in the slum areas – which majorly cater to the

certain share of the slum population. There are about 23 community toilets in Bareilly city – of which 21 community toilets are located in slum areas, each catering to about 15 (no. of seats in a community toilet) X 35 (no. of persons per seat per day) i.e. about a total population of 8049 i.e. about 1097 households i.e. about 5% of the total slum populations are dependent on community toilets. This shows that there is about 36.5% of the total slum population are using other options i.e. open defecation is very common i.e. about 11643 slum households i.e. about 89259 of population.

	Slum Population	Total
Total	244170	923138
Access to toilets	146502	784732
No toilets	97668	138406
CT	8409	8816
OD	89259	129590
	Slum HH	Total
Total	31850	120316
Access to toilets	19110	102268
No Toilets	12740	18048
CT	1097	1150
OD	11643	16898

Source: Primary Survey NNB 2010

Finally for the analysis, it is shown that about 5% of the non-slum area population and about 36.5% of the slum area populations do not have any access to toilet facilities and they open defecate. This shows that about 40331 persons in non-slum areas i.e. about 5255 of households defecate openly. And about 89259 persons in slum areas i.e. about 11643 households defecate openly. On the whole there are about 1.29 lacs of total population i.e. about 16898 of households of Bareilly city i.e. about 14.04% of the total population/ households of Bareilly open defecate.

3.3.1 Key Issues

- The present population in total city is about 8.9 lacs with a bifurcation of slum and non-slum population. Statistics show that there is about 31% of the slum population i.e. about 2.75 lacs and the remaining in non-slum areas i.e. about 6.14 lacs.

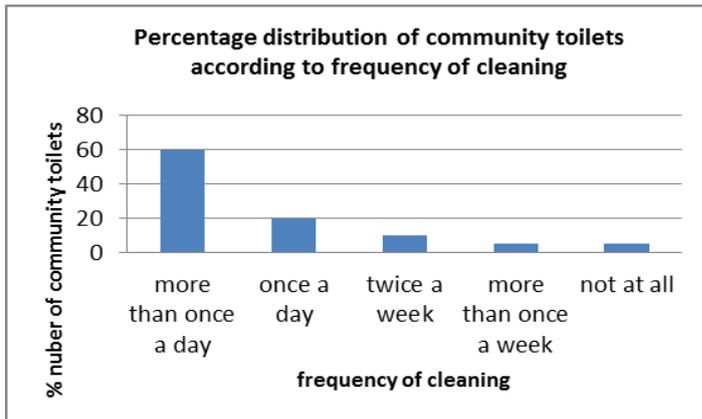
- The numbers of slums that are notified are about 85 in number that spread across the city. In addition to these notified slums there are number of unnotified slums and are categorized in low income groups in Bareilly.
- The different types of individual toilet facilities in Bareilly city are soak pit toilets, WC with septic tanks, pour flush toilets, Kuddi etc.
- About 94% of the non slum households are with household individual toilets – and these household individual toilets include pit latrine, water closet with septic tank.
- There is about 1-2% of the total number of households in non slum areas using community toilets.
- There is about 5% of the total number of households do not have any kind of access to toilets i.e. about 5255 households i.e. about forty thousand of population in non slum areas defecate openly.
- The percentage share of households/ population having access to household individual toilets is about 60% of the households and these also include the individual pour flush toilets build by different agencies as mentioned above.
- There are about 5% of slum households in addition to the private/ public individual toilets there are also community toilets in the slum areas.
- About 89259 persons in slum areas i.e. about 11592 households defecate openly.
- There are about 1.29 lacs of total population i.e. about 16898 of households of Bareilly city i.e. about 14.04% of the total population/ households of Bareilly open defecate.

3.3.2 Sanitation Facilities and Situation at Community Toilets

One of the most dependent sanitary facilities in the city for about 5 – 10% of the total households is community toilets. There are about 23 community toilets with about 21 of them located in slum areas and the rest in non slum regions i.e. in low income group areas. Thus, it is important to analyze the situation of these facilities for any further improvements or to give any proposals for situational development of the existing status. The following table gives the distribution of community toilets according the different development agencies in Bareilly.

Organization	Community Toilets
DUDA	02
NEDA	21
Total	23

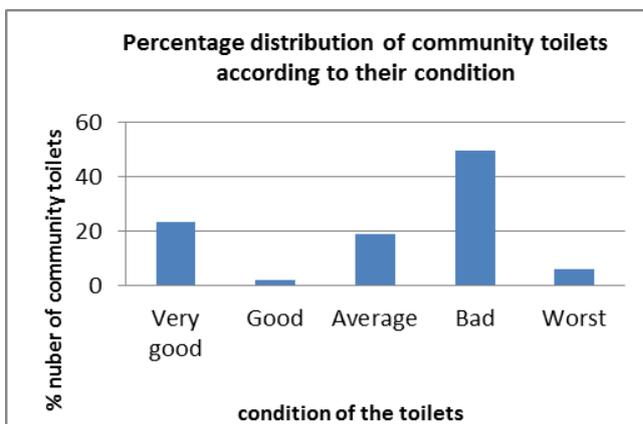
Source: NNB 2011



Further to this, from the primary survey analysis and field verification 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 35 persons. This shows that the total numbers of persons dependent on

Source: Primary Survey 2011-12

community toilets are about 8816 i.e. about 1150 households i.e. about 5-7% of the total population. But, it has been noticed that most of the community toilets available in slum areas are in bad condition. Thus, it is important to analyze the condition of these toilets. The following graph shows the percentage

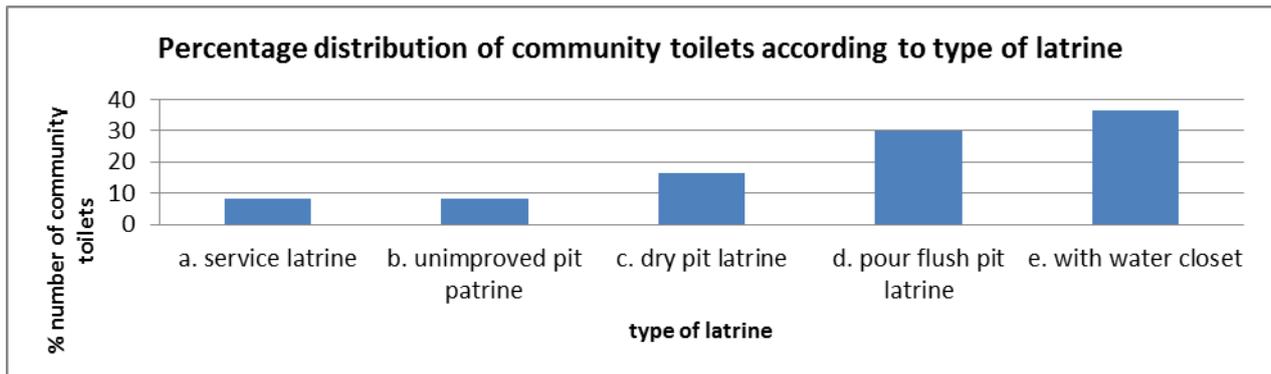


distribution of community toilets according to condition of toilets.

The analysis shows that about 50% of the available community toilets are in bad state. The infrastructure facilities in these toilets are almost broken conditions but even then, the people are still dependent upon these community toilets. But about 6% of the

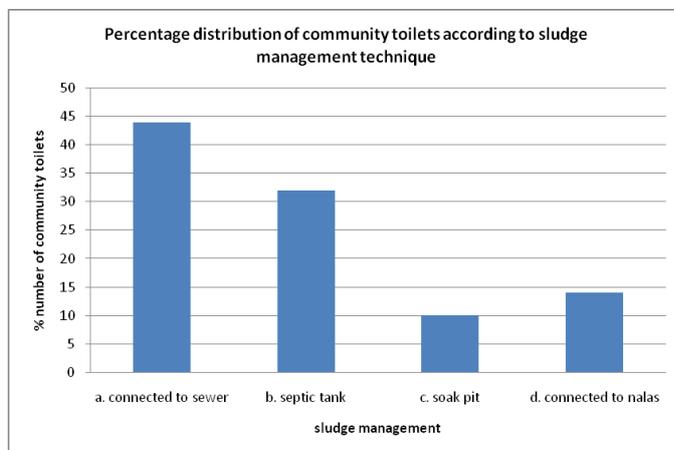
Source: Primary Survey 2011-12

community toilets are not in a usable state. There are few community toilets i.e. only about 2% are in good and 19% are in average conditions. The condition of these community toilets depend upon the maintenance of them. With the same regard, the analysis shows 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. And about 5% of them are not at all cleaned. There are also certain numbers of community toilets i.e. about 15% of them are cleaned at least once in a week. The following graph illustrates the percentage distribution of community toilets according to frequency of cleaning. In addition to the above mentioned analysis, the primary survey results also focused on type of latrine available in these community toilets. This is mainly to analyze how the management of the waste is done. The following graph shows the percentage share of community toilets according to type of latrine.



Source: Primary Survey 2011-12

The analysis shows that about 30% of the community toilets are equipped with pour flush pit latrines and about 37% of them with water closets. There are also about 17% of the community toilets with dry pit latrine and the rest with service and unimproved pit latrines. The type of latrine provided in these community toilets reflect upon the sludge management. The following graph illustrates the percentage distribution of community toilets according to different types of fecal sludge management.

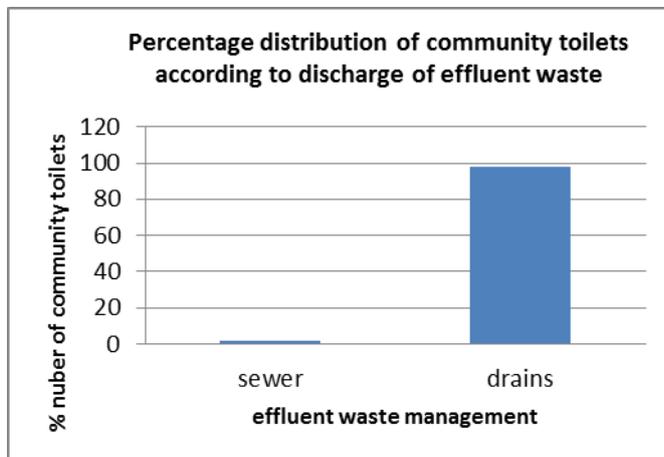


The analysis shows that about 32% of the community toilet facilities are connected to septic tanks and about 44% of them are connected to sewer lines. And the primary survey analysis and field verification shows that there relatively small proportion with manual scavenging. It is also important to

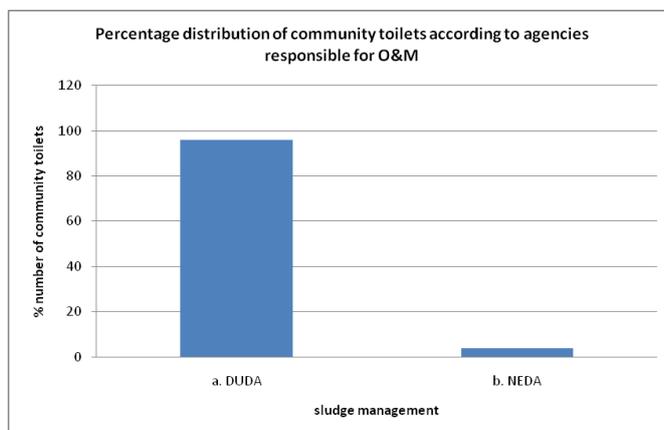
Source: Primary Survey 2011-12

consider – where actually the effluent sludge goes. There are different options such as septic tanks, to sewer and to nalas. The sludge that is collected into septic tanks is disposed-off improperly. And the present conditions of the septic tanks are also bad. From the analysis, about 30% of the community toilets with septic tanks are in broken status or over flowing. This is creating the surrounding areas very unhygienic and with stinking smell – that creates hurdle to most of the usage of community toilets. 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 nalas. This shows that there need to some serious or potential problems in sludge management systems with 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 to soak pits. There are about 15% of the community toilets whose sludge is directly let into open nalas.

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 there is about 98% of the community toilets have no proper effluent waste management. There are all let into open drains. There is only about 2% of the number of community toilets effluent waste disposed/ connected to sewer lines. The following graph shows the percentage share of community toilets according to their discharge mechanism of effluent waste.



In addition to the above mentioned analysis, it is also important to consider who all are responsible for O&M arrangements of these community toilets. There are different government bodies, private agencies and NGOs those are responsible for O&M arrangements of these community toilets. The different organizations those are responsible are Nagar Nigam, DUDA, Jal Nigam, NEDA, Nagla Teja etc. The following graph shows the percentage distribution of community toilets according to O&M arrangements.



The two agencies responsible for the O&M of community toilets in Bareilly city are DUDA and NEDA. There is about 96% of the total number of community toilets whose

Source: Primary Survey 2011-12

O&M is done by DUDA and about 4% of them whose O&M are done by NEDA.

3.3.3 Key issues

1. There are about 23 community toilets with about 96% of them located in slum areas and the rest in non slum regions i.e. in low income group areas.
2. The total numbers of persons dependent on community toilets are 5 – 10% of the total population.
3. No O&M of community toilets and its infrastructure.
4. No proper fecal sludge management.

5. The fecal sludge collected from these septic tanks by the municipalities sludge sucking machine and they dispose it into nearby nallas leading to the rivers.
6. 50% of the available community toilets are in bad state. The infrastructure facilities in these toilets are almost broken conditions but even then, the people are still dependent upon these community toilets.
7. About 6% of the community toilets are not in a usable state
8. About 30% of the communities toilets are equipped with pour flush pit latrines and about 37% of them with water closets. There are also about 17% of the community toilets with dry pit latrine and the rest with service and unimproved pit latrines.
9. About 32% of the community toilet facilities are connected to septic tanks and about 50% of them are connected to sewer lines.
10. 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 lead to Ganga River.
11. In addition to the disposal of sludge produced at community toilets there are also about 10% of the community toilets using the sludge at bio gas treatment.
12. There is about 98% of the community toilets have no proper effluent waste management. There are all let into open drains. There is only about 2% of the number of community toilets effluent waste disposed/ connected to sewer lines.

3.4 Storm Water Management Assessment

- Four zones are having primary, secondary and tertiary drains of different lengths.
- The waste drained into River through these nallas - includes waste water from households, commercial areas, and industrial areas.
- Most of the open/ closed drains are choked with solid waste and sludge.
- There are many flood prone drains within the city.

3.5 Solid Waste Management Assessment

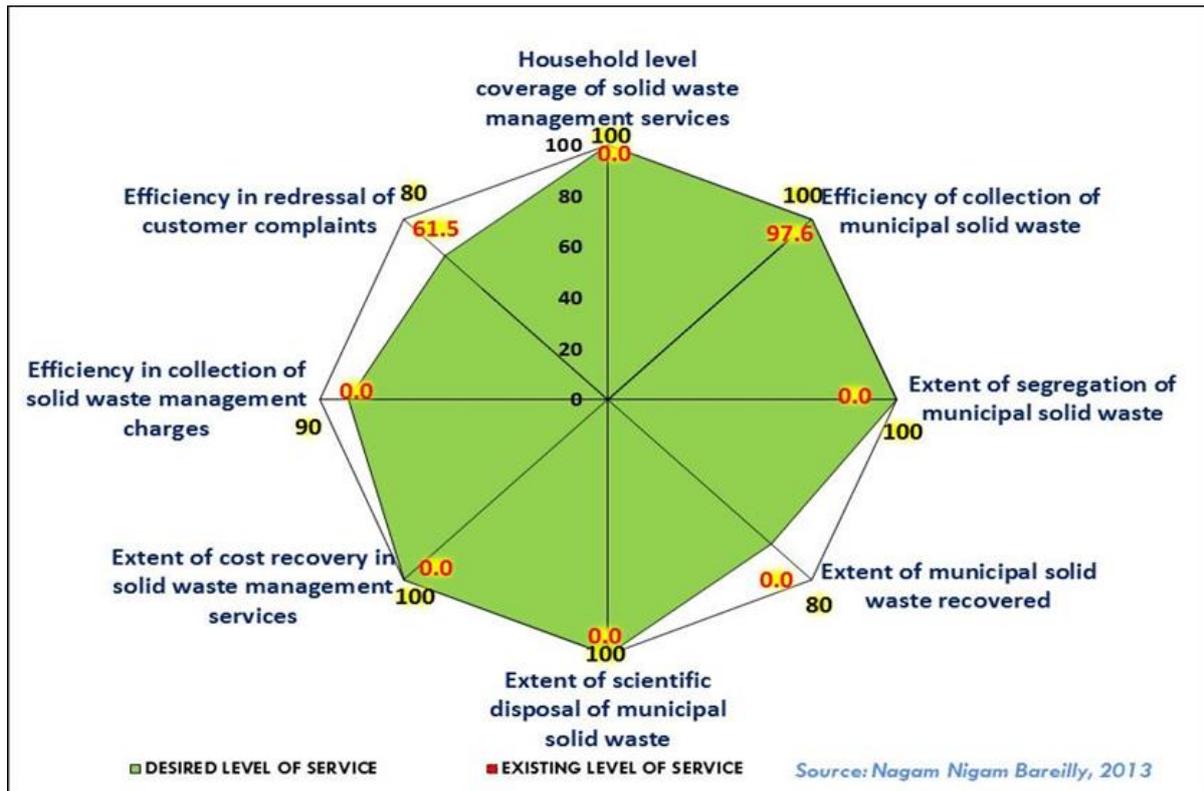


Figure 3-3: SLB for Solid Waste Management assessment– Bareilly City

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 nine (9) key parameters vis-à-vis the existing level of service. The spider chart denotes that while the household 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 area of concern for the city administration is the cost recovery and efficiency in collection of solid waste management charges.

3.5.1 Key Issues

- No processing/ recycling facilities.
- No door to door collection of waste.
- The dumping grounds, by roadside and elsewhere, are unhygienic and have deplorable look.
- Disposal of waste into drains leads to choking of drains
- Rains washed out part of garbage from these depots into drains and Nalas which leads to silting.

- Mixing of Bio-medical and other forms of waste with municipal waste is a serious health hazard.
- Lack of segregation of bio-degradable and non-degradable waste at source
- Large scale public littering leading to inattentiveness of street sweeping and cleaning activities
- Shortage of staff and lack of motivation amongst the existing staff
- Presently there is no waste processing plant at Bareilly and the total waste is taken to disposal size.
- At present waste generation in the city is around 450MT per day.
- For Bareilly, household and organic waste constitutes largest component followed by inert material such as building material and debris etc. in overall composition of waste i.e. waste generated from households, commercial establishments and institutions in Bareilly.
- The main sources of waste generation includes Residential, commercial, industrial establishments, hospital & nursing homes, hotels & restaurants, slaughter houses, street sweeping, sanitary drains and construction and demolition sites.
- Collection is conducted in two stages – primary and secondary collection.
- Total industrial waste generated from the Industries is about 18 tons per day. Out of total industrial waste, the generation of hazardous waste containing chromium is about 10-15 MT per day.
- The quantity of biomedical waste generated from medical institutions is approx. 2.74 tonnes per day.
- Out of total bio -waste generated, only 1350 Kg (about 20 %) is sent to the centralized bio-medical waste management facility. Some estimate that about 30 percent of bio-medical waste is getting mixed up with other type of waste.
- Most of the slaughter house waste is thrown into the bakarmandi nala. Total waste generation is approximately 4-5ton/day.
- A major portion of this waste is generally used in reconstruction activities for filling up of the low-lying areas or kutchra road – i.e. about 20% of this waste is collected at these sites and become a part of MSW.
- There is a heavy waste generated within the city from many sources, but there is no household door to door collection of solid waste management services in the city. The total waste

generated in the city is about 450 metric tons per day. And the majority share of waste that is being generated is from households. There is also relatively high share of waste generation i.e. about 95 MT/day from markets. The following table illustrates the quantity of waste generation from different sources within the city.

WASTE GENERATION	MT/day
Waste Generated by Households	230
Waste Generated by Street Sweeping	39
Waste Generated by Hotels and Restaurants	52
Waste Generated by Markets (Vegetable Markets, Mandis etc.)	95
Waste Generated by Commercial Establishments (Institutions, etc.)	14
Waste Generated by other sources (debris, horticulture waste etc.)	20
Total Estimated Waste Generated	450

Source: NNB 2012

- There is no arrangement of solid waste treatment in the city. Since, there is no processing/recycling unit – the extent of municipal solid waste recovered is nil. The waste that is being collected from the secondary sources of points is being disposed off in the open dump sites. The total waste that is being generated from different sources within the city is about 450 MT/day and the total waste that is being collected and disposed off is about only 420 MT/month. The rest 30 MT is loss due to transportation losses.

3.5.2 Solid Waste Treatment and Disposal

EXTENT OF SCIENTIFIC DISPOSAL OF MUNICIPAL SOLID WASTE		0
Quantity of Waste Disposal		
Quantity of waste disposed in compliant landfill sites	MT/month	0
Quantity of waste disposed in open dump sites	MT/month	420

Source: NNB 2012

- There are many problems raised by public in solid waste management, but the efficiency in redressal of customer complaints is about 61.5%. The following table illustrates the redressal mechanism details of solid waste management.

EFFICIENCY IN REDRESSAL OF CUSTOMER COMPLAINTS		61.50 %
Customer Service		
Complaints received during the year	Number	1065
Complaints resolved within 24 hours during the year	Number	655

Source: NNB 2012

3.5.3 Dairies

In Bareilly city there are about 483 dairies and have no provision of waste (Cow dung) disposal or any Biogas treatment plant. As per Nagar Nigam, City has 10 sanitary wards in 4 zones.

WARD WISE LIST OF DAIRIES IN BAREILLY CITY:

WARD NO.	NUMBER OF DAIRIES
1	44
2	22
3	10
4	33
5	142
6	11
7	78
8	76
9	39
10	28
TOTAL	483

Source: NNB 2012

It is recommend that city should need Biogas plant facility in decentralize manner, like 2 or 3 wards will have one biogas plant and bigger wards would have one.

ONGOING INTERVENTIONS



SWM Treatment Plant in Rajau, Baraspur, Bareilly by AKC Developer

The Solid Waste Treatment plant of 300 MT/day is under PPP model being under construction and will soon commence. AKC Developer (Agra) operates and maintains the treatment plant in partnership with NNB.

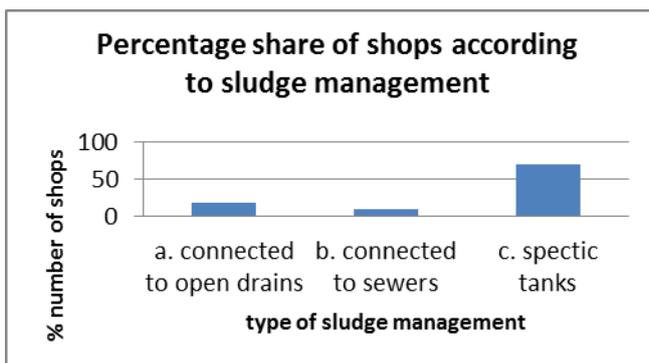
Septage Management

It is also important to consider the Septage management in the city. The sludge and effluent waste that is being collected in the soak pits and septic tanks is being collect by the Septage sucking machines handled by NNB. But the sludge that is being collected, discharged/disposed into open drains. The following table illustrates the Septage management in the city:

SEPTAGE MANAGEMENT		
Does to NNB practice Septage Management	Yes/No	Yes
Septage Sucking Machines available within NNB	Number	2
Private Septage Machine Licensed by NNB	Number	Nil

Source: NNB 2012

Fecal Sludge and Effluent Management



The following graph shows the percentage share of number of toilets (available) at commercial places according to the type of sludge management.

The majority of toilet facilities those are available at the commercial shops i.e. about 70% of them have septic tanks for their

sludge management. The sludge that is accumulated in these tanks is cleared once in every year by the

municipality or private vehicle and the waste is disposed off at the dumping site. But the disposal of the sludge is also not proper. The sludge that is collected from the septic tanks is thrown off into open nallas. Further to this, there also few toilets connected to sewer lines and few directly let into open drains. Hence, there is an urgent need to proper provision of toilets and proper disposal system in these commercial areas and market places. In addition to the waste generation from different commercial shops, the sanitation provision is also creating problems at alarming rate.

Issues in Fecal sludge management

FS management component and aspect	Causes	Problems	Consequences
Emptying + collection			
Technical	<ul style="list-style-type: none"> -Limited or no accessibility to pits -Inappropriate emptying equipment -Manual, non-mechanized emptying 	<ul style="list-style-type: none"> - Overflowing pits _ Emptying frequency often very low _ Informal or emergency emptying of pits and indiscriminate disposal of FS 	<p>At neighbourhood level, mainly</p> <ul style="list-style-type: none"> --Health hazards from openly dumped FS and through use of contaminated water _ Eye and nose sores _ Non-functionality of infrequently emptied septic tanks-solids carry-over
Institutional/Financial	<ul style="list-style-type: none"> -Poor service management -Users. low affordability for pit emptying -Lack of information (e.g. on how septic tanks work) 		
Transport			
Technical	<ul style="list-style-type: none"> -Lack of suitable disposal or treatment sites at short distance from the area of FS collection 	<ul style="list-style-type: none"> -Collectors dump FS in an uncontrolled manner at the shortest possible distance from where FS was collected 	<p>At municipal level, mainly:</p> <ul style="list-style-type: none"> -Pollution of surface and (shallow) Groundwater - Eye and nose sores - Health hazards from use of contaminated surface
Institutional	<ul style="list-style-type: none"> -Lack of urban planning - lack of suitable disposal or treatment sites at short distance from the area of FS collection -Lack of involvement of private sector service Providers -Lack of suitable incentive and 		

	sanctions structure		water (e.g. for vegetable irrigation)
Treatment			
Technical	Lack of proven and appropriate treatment options	FS is dumped untreated	At municipal level, mainly: -Health hazards through use of contaminated water sources and water pollution
Financial/economic	FS treatment exists: private collectors /entrepreneurs avoid the paying of treatment fees		
Institutional/Financial	<ul style="list-style-type: none"> -Lack of political will to invest in treatment - Lack of effective cost recovery - Lack of urban planning -Lack of information 	<ul style="list-style-type: none"> -Non-availability of suitable treatment sites -discharge of untreated FS haphazardly 	
Disposal			
Institutional	<p>Lack of implementation of FS treatment schemes of town planning and designation of suitable treatment sites; lack of adequate fee structure and incentives for transport of FS to treatment sites</p> <ul style="list-style-type: none"> - Indiscriminate dumping of untreated FS - Water pollution and risks to public health -Lack of promotion and marketing of bio-solids produced in FS treatment 	<p>Indiscriminate dumping of untreated FS</p> <p>High-quality bio-solids remain unused and need to be land filled</p>	<p>Water pollution and risks to public health</p> <p>-Depletion of soil organic fraction and deterioration of soil productivity</p>

3.6 Assessment of Water Bodies

This section discusses the impact of urbanization on the natural environment and the resulting deterioration in urban environment quality perceived in the city. The parameters establishing the environmental health of the city is of water bodies.

TABLE 3-2: 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

3.7 Ward-wise Analysis

Bareilly city comprises of 70 electoral wards and 4 administrative zones. The given table illustrates the ward wise analysis of Bareilly city, which includes Ward-wise population, Area in sq.km, Density and Number of households.

3.7.1 Population and Density

Ward number	Population 2001	*Population 2011	Zone	Ward area in Sq.km	Calculated Density 2001	Density 2011	Calculated Household 2001	Households 2011
1	2	3	6	7	8	9	10	11
1	9995	12494	2	0.452	22113	27641	909	1562
2	11514	14393	2	0.53	21725	27156	1047	1799
3	9412	11765	3	0.456	20640	25800	856	1471
4	9319	11649	2	0.526	17717	22146	847	1456
5	10968	13710	2	1.485	7386	9232	997	1714
6	10920	13650	2	0.558	19570	24462	993	1706
7	10893	13616	3	5.877	1853	2317	990	1702
8	9035	11294	2	1.224	7382	9227	821	1412
9	11619	14524	3	0.445	26110	32638	1056	1815
10	9532	11915	3	0.305	31252	39066	867	1489
11	11608	14510	3	1.22	9515	11893	1055	1814
12	10254	12818	2	3.679	2787	3484	932	1602
13	9302	11628	4	4.808	1935	2418	846	1453
14	10536	13170	2	0.509	20699	25874	958	1646
15	10763	13454	3	3.226	3336	4170	978	1682
16	11708	14635	3	0.616	19006	23758	1064	1829
17	11748	14685	1	7.8	1506	1883	1068	1836
18	11796	14745	4	1.4	8426	10532	1072	1843
19	9935	12419	1	0.495	20071	25088	903	1552
20	10978	13723	1	0.372	29511	36888	998	1715
21	9395	11744	2	0.488	19252	24065	854	1468
22	8779	10974	4	1.42	6182	7728	798	1372
23	8926	11158	4	3.31	2697	3371	811	1395
24	8800	11000	2	1.992	4418	5522	800	1375
25	10498	13123	1	0.622	16878	21097	954	1640
26	10737	13421	2	0.485	22138	27673	976	1678
27	8807	11009	1	2.977	2958	3698	801	1376
28	8751	10939	1	2.46	3557	4447	796	1367
29	11753	14691	4	0.975	12054	15068	1068	1836
30	11376	14220	1	0.269	42290	52862	1034	1778
31	11687	14609	2	2.081	5616	7020	1062	1826
32	9864	12330	4	1.802	5474	6842	897	1541
33	9172	11465	1	0.258	35550	44438	834	1433
34	10980	13725	1	8.24	1333	1666	998	1716
35	11627	14534	1	0.356	32660	40825	1057	1817

36	8725	10906	2	2.292	3807	4758	793	1363
37	11083	13854	1	0.52	21313	26642	1008	1732
38	9376	11720	4	2.4	3907	4883	852	1465
39	11438	14298	2	0.292	39171	48964	1040	1787
40	11434	14293	1	3.158	3621	4526	1039	1787
41	10491	13114	3	0.906	11579	14474	954	1639
42	9263	11579	2	0.458	20225	25281	842	1447
43	9809	12261	4	1.496	6557	8196	892	1533
44	10146	12683	4	1.34	7572	9465	922	1585
45	9068	11335	1	4.54	1997	2497	824	1417
46	10841	13551	3	2.304	4705	5882	986	1694
47	8961	11201	4	0.611	14666	18333	815	1400
48	9642	12053	4	1.69	5705	7132	877	1507
49	8746	10933	4	1.86	4702	5878	795	1367
50	11589	14486	3	0.46	25193	31492	1054	1811
51	10226	12783	2	0.41	24941	31177	930	1598
52	10344	12930	1	3.07	3369	4212	940	1616
53	10396	12995	1	0.405	25669	32086	945	1624
54	9102	11378	3	0.38	23953	29941	827	1422
55	9382	11728	1	0.342	27433	34291	853	1466
56	9693	12116	2	0.428	22647	28309	881	1515
57	10737	13421	1	6.86	1565	1956	976	1678
58	11171	13964	2	0.488	22891	28614	1016	1745
59	11283	14104	2	0.469	24058	30072	1026	1763
60	9654	12068	3	0.373	25882	32353	878	1508
61	9246	11558	3	0.456	20276	25345	841	1445
62	11743	14679	2	0.415	28296	35370	1068	1835
63	9747	12184	2	0.413	23600	29501	886	1523
64	10528	13160	3	0.712	14787	18483	957	1645
65	9459	11824	1	0.39	24254	30317	860	1478
66	11294	14118	2	0.424	26637	33296	1027	1765
67	10490	13113	3	1.052	9971	12464	954	1639
68	9320	11650	3	0.46	20261	25326	847	1456
69	11631	14539	1	0.428	27175	33969	1057	1817
70	9350	11688	3	0.41	22805	28506	850	1461
Total	718395	897994		106	6750	8437	65309	112249

(* Ward-wise Population for 2011 is extrapolated as per the previous decadal growth)

- The Bareilly city comprises of 8, 97,994 population with an area 106.43 sq.km and total no households are 1, 12,249 with an average household size of 8. Ward 18 having highest population i.e., 14,745 and ward 49 having lowest population i.e., 10,933.
- The Density of city is 8437 per sq. km which is higher than national average 324 per sq. km.

Zone	Population 2001	*Population 2011	Ward area in Sq.km	Density 2001	Density 2011	Household 2001	Households 2011
1	197406	246758	43.562	322711	403389	17946	30845
2	227743	284679	20.098	407076	508845	20704	35585
3	176146	220183	19.658	291127	363909	16013	27523
4	117100	146375	23.112	79876	99846	10645	18297
Total	718395	897995	106.46	6748	8435	65309	112249

- The above analysis indicates that zone 2 having the highest population and density comparatively zone 4 has least percentile of population.

3.7.2 Status of Sewer Line Coverage

Zone	*Population 2011	Ward area in Sq.km	Density 2011	Household 2011	Length of Sewer line(km)
1	246758	43.562	403389	30845	43
2	284679	20.098	508845	35585	71
3	220183	19.658	363909	27523	59
4	146375	23.112	99846	18297	33
Total	897995	106.46	8435	112249	206

- The above analysis indicates that percentage of sewer line coverage is more in zone 2 to comparatively zone 4 has least coverage which indicates that access to public toilets / community toilets/individual toilets is inadequate.

3.7.3 Status of Water Supply Coverage

Zone	*Population2011	Ward area in Sq.km	Projected Density 2011	Projected Household 2011	Length of Water Pipeline in kms
1	246758	43.562	403389	30845	151
2	284679	20.098	508845	35585	203
3	220183	19.658	363909	27523	160
4	146375	23.112	99846	18297	64
Total	897995	106.46	8435	112249	578

3.7.4 Status of Sources of Water Supply

Zone	Projected 2011 Population	Ward area in Sq.Km	Projected Density 2011	Projected Household 2011	Sources of water supply			
					Tap	Hand pump	Public tap	Overhead tank
1	246758	43.562	403389	30845	7	607	133	2
2	284679	20.098	508845	35585	21	880	217	6
3	220183	19.658	363909	27523	10	598	112	6
4	146375	23.112	99846	18297	10	525	50	7
Total	897995	106.46	8435	112249	48	2610	512	21

(* Ward-wise Population for 2011 is extrapolated as per the previous decadal growth)

3.7.5 Water Supply - Service Level

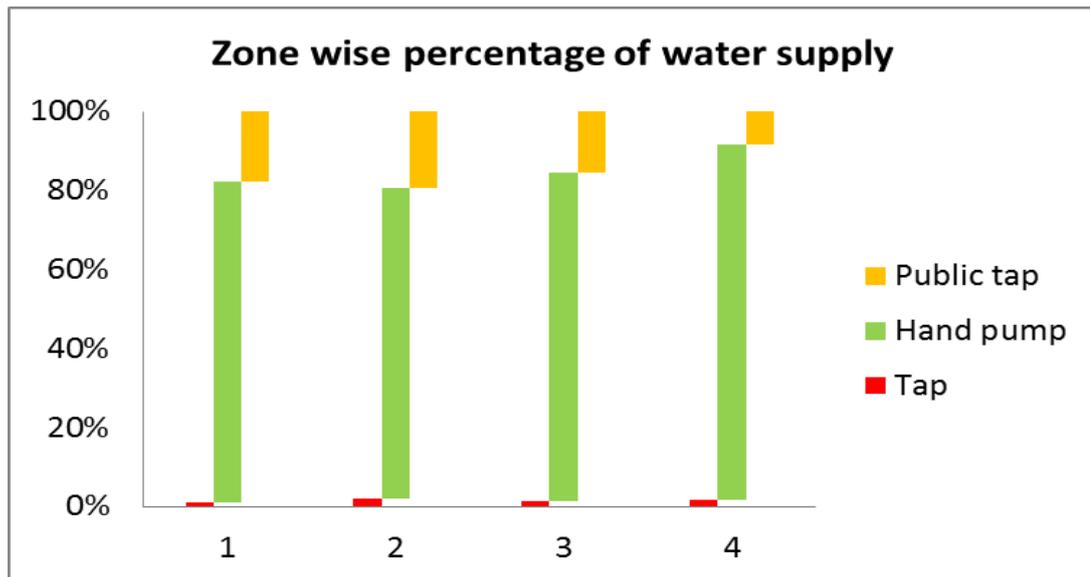


Fig 3-4 Zone-wise Percentage of Water Supply

- The main source of water supply is through hand pumps which are clearly not enough for the population. However there are few community taps as well, but they are far from being sufficient for the entire population.

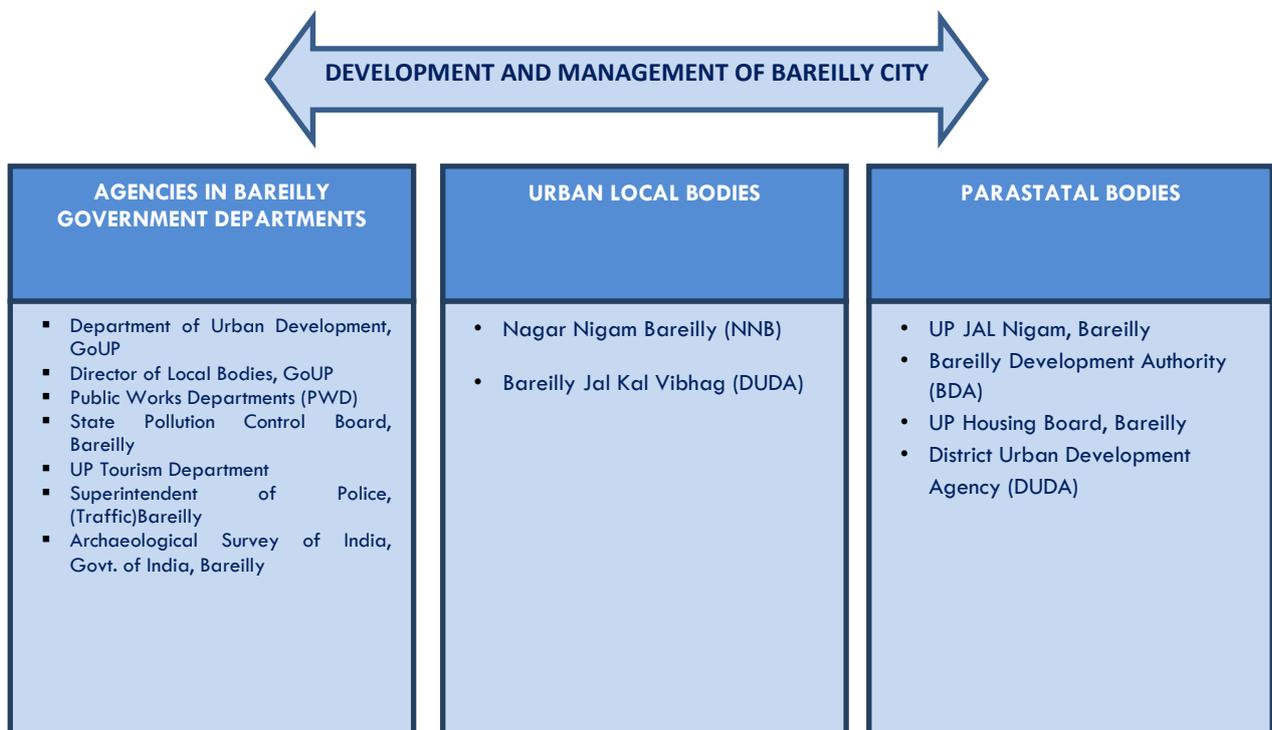
CHAPTER 4. INSTITUTIONAL AND FINANCIAL ANALYSIS

Topics of Discussion

- ▣ Institutional Capacity Assessment
- ▣ Financial Assessment

4.1 Institutional Capacity Assessment

In Bareilly, steep growth (24.74 percent) in population from 2001-2011 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 Bareilly 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. Bareilly Jal Nigam (JN) deals with water supply projects and operations while Nagar Nigam Bareilly (NNB) deals water supply and sewerage system 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
- Roads and bridges
- 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

4.1.2 Nagar Nigam BAREILLY (NNB)

NNB 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 and incorporates the amendments made in 74th CAA, 1992 including the functions given in 12th schedule of the constitution. Functions such as regulation of land-use and fire service are still not transferred to the municipal corporation. The main organization which is responsible for urban governance and civic management is the Nagar Nigam Bareilly.

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

4.1.3 Functions of NNB

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 NNB 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 Bareilly they are looked after by Jal Kal Vibhag (NNB)

4.1.4 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.*

4.1.5 Bareilly Development Authority (BDA)

The State Government established the Bareilly Development Authority (BDA) in 1974. It's the largest Bareilly Development Authority or BDA was formed by the government of Uttar Pradesh in order to meet the growing housing needs of the people of Bareilly and its nearby areas.

The main aim of the Bareilly Development Authority was to reform the growing real estate business in the city. This has in turn resulted in complete transformation of the landscape of the city. With well-planned and organized development projects, the BDA Bareilly was successful in achieving a decent infrastructural set up for the city. Bareilly Development Authority Bareilly has provided a uniform structure to the constructions of residential flats, luxurious bungalows and duplexes. The BDA is not only engaged in building economical residential projects in Bareilly but also undertakes construction of commercial as well as office spaces, which will further help in boosting the Bareilly property market .

The major functions of BDA are summarized below –

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

4.1.6 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.

4.1.7 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 Bareilly city.

Figure 4-1: Overlap of Institutional Responsibilities - BAREILLY City

SECTOR	PLANNING	IMPLEMENTATION	OPERATION AND MAINTENANCE
LAND USE/ MASTER PLAN/ BUILDING BYELAWS	BDA	BDA	BDA
WATER SUPPLY	UPJN/ BDA/ UPHB for colonies developed by them/ DUDA for slum areas	BJK/ UPJN/ DUDA for slum areas	BJK/ UPJN
SEWERAGE		BJK/ UPJN	BJK/ UPJN
ROADS/BRIDGES/FLYOVERS/RO B	PWD,BDA,NNB	NNB/BDA/PWD/ Housing Board/UPSIDC	NNB/BDA/PWD/ Housing Board/UPSIDC
MULTILEVEL PARKING		NNB/Traffic Police	NNB/Traffic Police/RTO
TRAFFIC CONTROL AND MANAGEMENT SYSTEMS CITY PUBLIC TRANSPORTATION	SP Traffic, RTA, NNB		
STREET LIGHTING	NNB	NNB	NNB
STORM WATER DRAINAGE	NNB	NNB	NNB
SOLID WASTE MANAGEMENT	NNB	NNB	NNB
PARKS/PLAYGROUND/GOLF COURSE/BEAUTIFICATION OF ROAD INTERSECTIONS/URBAN FOREST	NNB, Forest ,BDA,UPHB	NNB /BDA/Housing Board/Forest	NNB/BDA/Housing Board/Forest
AIR, WATER AND NOISE POLLUTION CONTROL	SPCB	Pollution Control Board	Pollution Control Board
SLUM DEVELOPMENT	CDO,NNB,DUDA	DUDA/BDA	DUDA
URBAN POVERTY PROGRAMME	NNB,DUDA	DUDA	DUDA
HOUSING OR EWS		BDA/Housing Board, DUDA	BDA/Housing Board, DUDA
PUBLIC CONVEYANCE		R.T.O	R.T.O
HERITAGE BUILDING CONSERVATION	NNB, Archaeological Department	Archaeological Department/NNB	Archaeological Department/NNB

Source: NNB 2012

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.

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

COMPONENT	NORM/SPECIFICATION/ASSUMPTION	REMARKS
Sewerage Management System		
Coverage	100%	SLB, MoUD, Gol
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	1 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, Gol
Quality of waste water treatment	100%	SLB, MoUD, Gol
Extent of reuse and recycling of waste water	20%	SLB, MoUD, Gol

COMPONENT	NORM/SPECIFICATION/ ASSUMPTION	REMARKS
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 5oC above 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 NH ₃), 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

COLLECTION OF WASTE WATER

Interpretation: It is evident that the present central collection system does not serve the entire area; only Forty (40%) percent of the total area of city is served by this system. It is roughly estimated that only 28 % of the properties are connected to the system.

TREATMENT AND DISPOSAL OF WASTE WATER

Interpretation: The city lacks treatment and ultimate disposal system. The non-availability of treatment and disposal system has resulted in pollution of land, natural water bodies and ground water.

INSTITUTIONAL ASSESSMENT

Organizational Structure

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

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 NNB to meet the challenges posed by the system;

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

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

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

Figure 5-1: 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	40 % of City Area
Household Connection to Network	100%	28%
Compliance of Septic Tanks to CPHEEO Standards	100%	Nil
Conveyance of Waste Water	100%	0%
Treatment Capacity of STPs	100%	34%

5.1.3 Identification of Critical Problem Areas

CRITICAL PROBLEM AREA 1 – Adverse risk to public health due to non-existence of STPs and septage management leading to contamination of water bodies/water supply distribution system and incidences of water borne diseases

CRITICAL PROBLEM AREA 2 – Marginal network of sewer in the city and sub-standard operation & maintenance of the sewer network results in the deterioration of condition of the sewer lines and hence their efficiencies. This also translates into high O&M expenditures

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 –

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

COVERAGE

Interpretation: It is established that in Bareilly city, 97 % of population has access to individual toilets. However, only 2 % out of the 3% of the population without individual toilets has access to community toilets.

Only 35% of the market/commercial areas having some kind of toilet facilities within the complex; i.e. 65 % of them is having no toilet facilities and Almost 95% of the schools have toilet facilities.

Open Defecation

Interpretation: It is established that in Bareilly city, 14.04 % of the total population defecates in the open.

INSTITUTIONAL ASSESSMENT

Organizational Structure

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

FUNCTIONAL ASSESSMENT

Inadequacy of Qualified Staff

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

Overlap of Responsibilities

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

Limited Community Engagement

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

REGULATORY AND GOVERNANCE ASSESSMENT

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 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 – Open Defecation with adverse impacts on health and environment despite 97% coverage of toilets (individual toilets) and 2% out of 3% of the population's access to community toilets. The poor operation and maintenance has been the underlying cause.

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 5-3: LIST OF NORMS, SPECIFICATIONS & STANDARDS - STORM WATER MANAGEMENT

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

5.3.2 Existing Situation of Service Delivery and Gap Assessment

COVERAGE

***Interpretation:** The storm water drainage network coverage in the city is 71.01 % and the length of the network in the city measures to 591.6 km and the total length of the pucca covered drains is 420.1 km.*

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.*

INCIDENCES OF WATER LOGGING/FLOODING

Interpretation: 60 incidences of water logging / flooding are observed in the entire city.

INSTITUTIONAL ASSESSMENT

Organizational Structure

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

FUNCTIONAL ASSESSMENT

Inadequacy of Qualified Staff

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

Limited Community Engagement

Interpretation: the public outreach and education programs are deficient.

REGULATORY AND GOVERNANCE ASSESSMENT

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!

Figure 5-2: Overview of Performance Gap Assessment – Storm Water Management

COMPONENT OF SERVICE	DESIRED SERVICE DELIVERY	EXISTING SERVICE DELIVERY
Coverage of Drainage Network	100%	71%
Incidences of Water Logging / Flooding	0	60

Identification of Critical Problem Areas

CRITICAL PROBLEM AREA 5 – Kutcha and inadequate drainage system in the city and dumping of solid/ liquid waste into drains is leading to water logging;

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 5-4: 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, Gol
Efficiency of collection of municipal solid waste	100%	Service Level Benchmarking, MoUD, Gol

COMPONENT	NORM / SPECIFICATION / ASSUMPTION	REMARKS
Extent of segregation of municipal solid waste	100%	Service Level Benchmarking, MoUD, Gol
Extent of municipal solid waste recovered/recycled	80%	Service Level Benchmarking, MoUD, Gol
Extent of scientific disposal of municipal solid waste	100%	Service Level Benchmarking, MoUD, Gol
Extend of processing and treatment of MSW	100%	Service Level Benchmarking, MoUD, Gol
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, Gol
Efficiency in collection of SWM charges	90%	Service Level Benchmarking, MoUD, Gol
CUSTOMER SERVICE		
Efficiency in redressal of customer complaints	80%	Service Level Benchmarking, MoUD, Gol

5.4.2 Existing Situation of Service Delivery and Gap Assessment

SEGREGATION OF WASTE

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

HOUSEHOLD COVERAGE

Interpretation: None of the households are covered by the solid waste management services

Primary Collection

Interpretation: None of the households are covered by the door-to-door collection service

Secondary Collection

Interpretation: 51% of the households dispose their waste in the designated secondary collection bins which are lifted by the NNB.

COLLECTION EFFICIENCY OF THE WASTE

Interpretation: 97.6% collection efficiency is reported for the city of Bareilly

INSTITUTIONAL ASSESSMENT

Organizational Structure

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

FUNCTIONAL ASSESSMENT

Inadequacy of Qualified Staff

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

Limited Community Engagement

Interpretation: the public outreach and education programs are deficient.

REGULATORY AND GOVERNANCE ASSESSMENT

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;

Figure 5-3: Overview of Performance Gap Assessment – Solid Waste Management

COMPONENT OF SERVICE	DESIRED SERVICE DELIVERY	EXISTING SERVICE DELIVERY
Household Coverage	100%	0%
Segregation at Source	100%	0%
Collection Efficiency	100%	97.6%
Extent of Reuse and Recovery	80%	0 %
Extent of Treatment	100%	0%
Extent of Scientific Disposal	100%	0 %
Cost Recovery		
Extent of Cost Recovery	100%	0%
Efficiency of Collection of Charges	90%	0%
Customer Service		
Efficiency in redressal of customer complaints	80%	61.5%

Source: Service Level Benchmarking, Bareilly

5.4.3 Identification of Critical Problem Areas

CRITICAL PROBLEM AREA 6 – The Municipal solid waste is not scientifically disposed off;

CRITICAL PROBLEM AREA 7- The household coverage of solid waste management services as well as the overall collection efficiency and door to door collection is inadequate and deficient;

CRITICAL PROBLEM AREA 8 – The solid waste management services are inadequate in the urban poor areas as well as the public areas resulting in adverse health and environmental impacts;

CHAPTER 6. IEC AND AWARENESS GENERATION

IEC campaign and awareness programmes can influence the public behavioral change. A sustained grassroots campaign coupled with adequate mass media exposure is a mix that will deliver the required results. Community participation backed by improved civic services can help Bareilly gain open defecation free status. Neighborhood groups such as women's self- help groups (SHGs) and school children can be sensitized to the issue of open defecation. Having a community monitoring system has been found to be very effective in several cities of southern India. A community level group can be formed to dissuade open defecation. For instance, a group of school children armed with vigils can alert the community to anyone trying to defecate in open. NNB sanitary inspectors and safai karamcharies can patrol marked open defecation areas to arrest the practice. Making random visits by NNB officials to open defecation areas early in the morning can be institutionalized to arrest open defecation.

The City Sanitation Ranking methodology has given weight to reducing water-borne diseases. Reduction in water borne diseases is another key area of focus for the communication strategy. About half of those we polled said they suffered from water-borne disease in past six months. IEC can help in generating awareness required to bring down the incidence of water borne diseases. The IEC campaign can take up personal and community hygiene as key themes. These would include water-borne diseases, other communicable ailments including skin diseases to make it more comprehensive.

In addition an integrated communication campaign to promote awareness and seek participation will comprehensively tackle the issue of sanitation. This campaign will include community participation in O&M of community toilets, segregation of solid waste at source etc. NNB would be well served with a computerized public complaints resolution system. Citizens could use various means to communicate their grievances and complaints such as phone, internet etc. As of now most citizens said they complained directly through face to face interactions. Computerized complaint resolution system will keep all the records of public complaints. This can be an effective tool for the NNB to monitor trends of complaints and find out the gaps in service delivery and weak areas. Moreover the robust grievances redressal mechanism will improve the extent of public satisfaction.

6.1 Elements of IEC and Awareness Generation

6.1.1 Communication Channels

The various communication channels used for the awareness campaign can be mass media, newspapers, posters, FM radio, local cable TV channels etc. This campaign should be conducted ward wise in the city under the overall coordination of NNB.

6.1.2 Campaign Partners

NNB should conduct the awareness campaign in consultation and partnership with NGOs,, print media like Dainik Bareilly and other vernacular newspapers, local cable TV channels etc.

6.1.3 Public Participation

ADVISORY COMMITTEES:

These are constituted to ensure multi-stakeholder involvement in sanitation projects. Members of such bodies can include prominent personalities from academia, arts, culture, social sector, media etc. representatives of donor agencies, relevant heads of departments of NNB, and even leaders of sanitation workers union. City Sanitation Task Force (CSTF) is one such body which has been constituted as per the guidelines of NUSP at the city level. Another innovative idea gaining traction is of Ward Level Sanitation Action Committees or Ward Committees are to be constituted as per the UP Municipal Corporation (Ward Committees) Rules, 1995. For Bareilly city such a committee can be constituted at ward level to monitor and oversee the progress of sanitation projects. This will ensure the effective public consultations and community participation. A ward level body can be headed by Corporator and comprise of ward members, Safai karamcharies, representatives, officials from NNB/JK, CBOs, RWAs, NGOs, SHGs etc.

PUBLIC HEARINGS:

The system of public hearing is considered to be effective in monitoring the progress of projects and resolving citizen grievances. What we propose here is that public consultation is essential during designing of projects. The chances of success of a project are enhanced, as this makes sure the project is designed to benefit as many people as possible. Seeking inputs from people will make them believe that the NNB is concerned about their sanitary problems.

NATIONAL SCHOOL SANITATION INITIATIVE

Ministry of Urban Development (MoUD), with support from Ministry of Human Resource Development (MoHRD) in collaboration with CBSE and GTZ India initiated the National Urban School Sanitation Initiative project. The countrywide programme was launched on 27 April 2011 at New Delhi. The initiative is aimed at using "Children as agents of change" philosophy and addressing the water, sanitation and hygiene issues in urban schools, who can potentially take back the lessons home and trigger a behavioral change. Government and Municipal Schools of Bareilly city truly have the potential to herald a big behavioral change.

6.2 Action Plan

The timeframe of the recommended communication strategy is relevant for a period of two to three years from the beginning of implementation. The process can evolve with the scope to incorporate any mid-course changes and improvements, if required. Once initiated, it can take up a wide range of

other issues as per the requirements of the city. There is every likelihood of such a process be institutionalized with Public Relations officer positioned at NNB.

Given the growth and rapidly changing social and economic environment of the cities, it would be imperative for NNB to develop capacity to assess changes in the situation and adapt strategies accordingly. Timely implementation of the recommendations made in this document will ensure that desired results flow in a sustained manner.

Keeping in view the problems faced by urban poor of the city and scope of city sanitation plan, it is opined that less emphasized area of communication holds a vast potential. There are three important components to the communication strategy:

- Inter-personal communications: Using opinion leaders
- Engaging media and NGOs as partners in promoting sanitation consciousness
- Adapting and developing multimedia IEC materials for sanitation campaigns

Interpersonal means are known to be very effective in behavior change communications. These are tedious processes to carry out but offer better returns. It is important to understand the needs of the local community and select opinion leaders who could influence the community to further sanitation

TABLE 6-1: ACTION PLAN FOR IEC CAMPAIGN & COMMUNICATION STRATEGY

PHASE 1 (1-6 MONTHS) 'AWARENESS RAISING PHASE'	PHASE 2 (1-12 MONTHS) 'FEEDBACK PHASE'	PHASE 3 (12-24 MONTHS) 'COMPLIANCE PHASE'
<i>Short (1 to 2 month) phase aimed at generating high awareness and taking steps to build trust among stakeholders.</i>	<i>3-4 month phase to enhance trust between stakeholders</i>	<i>Consolidating gains and sustaining behaviour change</i>
<ol style="list-style-type: none"> 1. Health & Hygiene and Government programmes and processes-Goals of City Sanitation Plans etc. for all stake holders 2. Status of community toilets, solid waste management, water supply and drain cleaning. 3. Setting out goals and exploring all avenues of improvement including community participation and consultation with officials. 4. Industries and slaughterhouses be made aware of the importance for compliance of waste management. 	<p>Information and educational approaches are employed to stress the importance, among other things, of properly designed community toilets, septic tanks and periodic septic tank inspections and dislodging every 3-5 years. Seeking feedback from the residents on status of community toilets their design, solid waste management practices etc. Imposition of user fee on commercial establishments for improved municipal services.</p>	<p>Offering awards and imposing penalties for undesirable behaviours. This phase is a continuing education and promotional phase. Mobilized public opinion is important to push for compliance. Continue promotional activities to trigger the actual adoption of the practices being marketed. Building sustaining process to open channels of communication between NNB and citizens. Compliance should be sought from industries and slaughterhouses. Imposition of user fee on commercial establishments for improved municipal services. Cleanliness drives targeting non-compliers.</p>
<ul style="list-style-type: none"> • Organize walk to the wards with local corporators or NNB officials, meeting/workshop with stakeholders, shopkeepers, RWA, SHG etc. 	<ul style="list-style-type: none"> • Organize walk in the wards with local corporators or NNB officials, meeting with stakeholders, shopkeepers, RWA, SHG etc to monitor the progress made. 	<ul style="list-style-type: none"> • Organize walk in wards with local corporators or NNB officials, meetings with stakeholders, Shopkeepers, RWA, SHG etc. for sustaining the progress made.

<ul style="list-style-type: none"> • Making use of the municipal council to further goals of city sanitation plan, discussion between various departments for increased co-ordination. Exploring institutional arrangements for such co-ordination. 	<ul style="list-style-type: none"> • Seeking feedback from corporators to help effective implementation. 	<ul style="list-style-type: none"> • Encouraging further discussion between municipal administration and elected representatives to, furthering co-ordination between various departments for better attainment of CSP goals.
<p>Media options:</p> <ul style="list-style-type: none"> • Local Cable TV ads (30 secs) • Local newspaper ads • Billboards • Tarpaulin posters mounted on mobile vans • Leaflets for those attending meetings • News releases in print, radio and TV • Discussions on radio 	<p>Media options:</p> <ul style="list-style-type: none"> • Local newspaper advertisements • House-to-house visits • Radio/ local cable TV public affairs show • Short film/video showing in theatres • Continuing billboards/tarpaulin posters • Continuing news releases in print, radio and cable TV • Feature articles in media 	<p>Media options:</p> <ul style="list-style-type: none"> • Continuing radio, TV, print ads • Continuing house to house visits • Continuing short film showing in theatres • Continuing billboards but less frequent • Continuing news releases on all platforms • Continuing feature articles

consciousness. These opinion leaders could be local NGOs, corporators, school teachers or any other respected elder. A newspaper advertisement or a public service message on TV without ground level work through opinion leaders will fail to be sustainable in the long run.

It is important to understand that several recommendations require institutional reforms. There are complex ways in which institutions work including overlapping responsibilities and a lack of mutual co-ordination. Success in the long run will also depend on furthering such reforms. Communications can help identify potential bottlenecks to service delivery

TABLE 6-2: ADVOCACY ACTION PLAN

STAKEHOLDER GROUPS	SOCIO-CULTURAL/BEHAVIOURAL PATTERNS
SLUM INNER CITY	<p>This area is having community toilets with several operation and maintenance challenges</p> <p>Children do not prefer to enter the community toilets; Open defecation by children in drains and open spaces is common.</p> <p>Water Scarcity and poor state of community toilets forces elders also to defecate in open but, it is not very common.</p> <p>People are in some ways constrained in going out to defecate in the inner city areas.</p> <p>Open areas such as vacant plots have become open defecation spots.</p> <p>Most of community toilets discharge their waste into open nallas/drains</p>
SHOPKEEPERS	<p>Bareilly city has a vibrant commercial area</p> <p>General hygiene & sanitation awareness is far below among the shopkeepers; particularly meat, milk products, vegetables/fruits or eatable shops.</p> <p>Most of the shopkeepers throw their waste on the road/street side or in nallas.</p>

	<p>The nallas get clogged and cleaned at irregular intervals by Nagar Nigam.</p> <p>No provision of dustbins in the commercial areas and markets.</p> <p>Very few public toilets and urinals in the market areas</p>
HIGHER INCOME GROUP RESIDENTS	<p>Door to door collection have started in some areas but not city wide</p> <p>Kuchha open drains are present in many area</p> <p>Sewage lines are not cleaned at regular intervals</p>
LOW INCOME GROUP RESIDENTS	<p>Irregular sweeping of street occasional clearing of drains.</p> <p>Irregular water supply</p> <p>Dumping of solid waste in open on roadside</p>
MUNICIPAL OFFICIALS	<p>Officials should call meetings of shopkeepers specially butchers/eatable vendors to raise their awareness about hygiene and to promote safe practices of waste disposal</p> <p>Nagar Nigam officials need help to enhance their capacities for better implementation of sanitation projects</p> <p>A better co-ordination between various departments such as JalKal, ADA is required</p> <p>Nagar Nigam should look into operational as well as maintenance aspects of community toilets</p>

6.2.1 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. Eminent persons from the city (from fields of academics, NGOs, media, art, business etc.) are included into this task force. At a more micro level, creation of Ward Sanitation Action Committee headed by Corporator of the concerned wards and comprising members from NNB, Safai Karamcharies commended.

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 as follows:

TABLE 6-3 : MESSAGES AND DIFFERENT CHANNELS OF COMMUNICATIONS TO VARIOUS TARGET AUDIENCES

TARGET AUDIENCE	MESSAGES/THEMES	CHANNELS OF COMMUNICATION
Corporator, Commissioner, Engineers	Seeking community inputs for building and repairing community and individual toilets, toilets should be designed for social acceptance.	Training Programs for officials from NNB, Jal Kal Vibhag, DUDA
	Anti- open defecation and sanitation campaigns	Participation in interactive programmes such as heritage walks etc. to promote city sanitation,
	How to ensure compliance from people through rewards/Punishments	Council meeting, CSP workshops,
	Better co-ordination between various departments including Water Board for implementation of City Sanitation Plan	Newspaper advertisement calling for meeting/seeking participation in walks
	Safe handling of garbage by Sanitation workers	Press Conference-sharing the goals and

TARGET AUDIENCE	MESSAGES/THEMES	CHANNELS OF COMMUNICATION
	Promoting source segregation at source and dump yards	plan of action for CSP with press persons Videos on best practices and their impact
Corporator, NNB office bearers, Slum residents representing inner city	Consultations on preventing open defecation Consultation seeking inputs of residents on improving community toilets and their usage Safe disposal of Human Excreta Contamination due to Faecal Matter Do not burn garbage Segregation of household waste, and disposal in designated bins Education on Health and hygiene to prevent diseases such as Diarrhoea, 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	Organize transect walk with local Corporator or officials, RWA Meeting (with the local Corporator) Door to door campaign Newspaper Advertisement calling for meeting Press Conference Short Films on best practices
Corporator, NNB office bearers, Slum resident representing slum of 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	Organize transect walk with local Corporator or officials RWA Meeting with local corporators and NNB zonal officials Door to door campaign Newspaper Advertisements/ calling for meeting/ seeking participation in the transect 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 Advertisement calling for meeting Press Conference Short educational videos etc.
Water and sanitation officials	Display numbers of responsible officials; Sanitation Inspectors prominently in their Zones Establish grievance redressal mechanism. Emphasis on time bound resolution of public grievances	Printed pamphlets given with newspapers, newspaper advertisements, painting on 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 of Municipal workers

TARGET AUDIENCE	MESSAGES/THEMES	CHANNELS OF COMMUNICATION
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 consulations	Meeting of the local shopkeeper associations to sort out the problems among themselves, meeting with municipal officials and corporators.
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 Newspaper, radio and TV Ads City Cable Press conference Know your city and transect walks etc. Short films for screening in Theatres etc.

CHAPTER 7. SECTOR SPECIFIC STRATEGIES

Topics of Discussion

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

The key challenge looming large at the cities is devising an implementation strategy for the City Sanitation Plan (CSP). 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, ownership and leadership. The prime responsibility of implementation of the CSP rests with Nagar Nigam Bareilly (NNB), however, it is imperative that NNB 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 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 have helped identify the level of deficiency in respect of sanitation in Bareilly.

A broad city level strategy for implementation of the City Sanitation Plan for Bareilly is outlined along the five strategic intervention domains 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 City-Level Vision and Goals of Bareilly CSP

Vision Statement - “Bareilly shall be environmentally safe and totally sanitized & livable city so as to ensure good public health standards, human dignity, and privacy for all citizens”

The broad goals for Bareilly 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 2015
- **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 2015;
- **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 2014;
- **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 2014;
- **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;

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 Health
- 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.

TABLE 7-1: ASSUMPTIONS FOR STRATEGIC PLANNING

INDICATORS AS PER NUSP	GUIDELINES FOR CSP
OUTPUT RELATED	<input type="checkbox"/> Proposals to provide safe access to household sanitation and serve entire population by toilets <input type="checkbox"/> Proposals for safe disposal of waste water, storm water and solid waste <input type="checkbox"/> Proposals to meet the national standards for safe disposal of liquid and solid wastes
PROCESS RELATED	<input type="checkbox"/> Proposals to ensure the efficient design of the system in conformity with applicable rules and regulations <input type="checkbox"/> Proposals to ensure clear devolution of responsibility and accountability in the institutional system <input type="checkbox"/> Proposals to ensure competent documentation of the operational and monitoring systems <input type="checkbox"/> 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	<input type="checkbox"/> 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 7-2: ASSUMPTIONS FOR STRATEGIC PLANNING

PHASE	YEAR
IMMEDIATE-TERM	2013 – 2015
SHORT-TERM	2013 – 2018
MID-TERM	2013 – 2033
LONG-TERM	2013 – 2043

TABLE 7-3: Phases and Timelines for City Sanitation Strategy

	PHASE/YEAR		
	SHORT-TERM 2013 - 2018	MID-TERM 2019 - 2033	LONG-TERM 2034 - 2043
ASSUMPTIONS	Initiate efforts to eradicate slums and award land tenure and achievement of eradication of slums and award of land-tenure - regular small houses replace slum settlements	Regular Houses for all	Regular Houses for all
	Initiate efforts towards public outreach and education and 80% Literacy rate is achieved	90% Literacy rate is achieved	95% Literacy rate is achieved
	Initiate efforts 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
	Initiate efforts to regularize the participatory planning and budgeting and participatory planning institutionalized	Participatory planning institutionalized	Participatory planning institutionalized
	Initiate efforts to enhance employment 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
	Initiate efforts 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 Mechanisms are regularized; Reduction/Reuse/Recycle of liquid/solid waste is achieved	Water Conservation practices are prevalent; Storm Water Source Control mechanisms 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

CRITICAL PROBLEM AREAS

- **CRITICAL PROBLEM AREA 1**– Marginal network of sewer (only 40%) in the city and sub-standard operation & maintenance of the sewer network results in the deterioration of condition of the sewer lines and hence their efficiencies. This also translates into high O&M expenditures;
- **CRITICAL PROBLEM AREA 2** - Adverse risk to public health due to non-existence of STPs and septage management leading to contamination of water bodies/water supply distribution system and incidences of water borne diseases;

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 years. 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 NNB, the targets are set as given in table 7-4 for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

TABLE 7-4: 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 2013-2015	SHORT-TERM 2013-2018	MID-TERM 2013-2030	LONG-TERM 2013-2043
Collection of Waste Water						
Coverage of Sewer Network (% of city area)	100%	40%	50%	100% (Demand until 2018)	100% (Demand until 2030)	100% (Demand until 2043)
Properties Connection to Network	100%	40.66%	50%	100% (Demand until 2018)	100% (Demand until 2030)	100% (Demand until 2043)
Compliance of Septic Tanks to CPHEEO Standards	100%	0%	50%	100% (Demand until 2018)	100% (Demand until 2030)	100% (Demand until 2043)
Conveyance of Waste Water	100%	80%	90%	100% (Demand until 2018)	100% (Demand until 2030)	100% (Demand until 2043)
Treatment Capacity of STPs	100%	0%	25%	50% (Demand until 2018)	100% (Demand until 2030)	100% (Demand until 2043)
Cost Recovery						
Extent of Cost Recovery	100%	40.2%	50%	100%	100%	100%

Efficiency in Collection of Sewage Charges	100%	78.5%	90%	100%	100%	100%
Customer Service						
Efficiency in redressal of customer complaints	80%	65.2%	80%	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 12 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 NNB. The service delivery options shall enmesh the community participation and NGO involvement to complement NNB 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 these 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
- Projected Households
- Existing Situation vis-à-vis the Key Issues at Ward Level
- Projected Sewerage Generation¹
- Existing Institutional Capacities
- Existing Financial Capacities

¹ 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.

TABLE 7-5: DESIGN INPUTS - SEWERAGE MANAGEMENT SYSTEM

<i>Year</i>	<i>Projected Population</i>	<i>Water Demand (MLD) (@ 150 lpcd)</i>	<i>Sewerage Generation (MLD) @ 80%</i>	<i>Solid Waste Generation (TPD)(@ 0.45 kg per capita)</i>
2015	1,109,798	166.47	133.18	499.41
2020	1,201,170	180.18	144.14	540.53
2025	1,302,173	195.33	156.26	585.98
2030	1,413,795	212.07	169.66	636.21
2035	1,537,152	230.57	184.46	691.72
2040	1,673,509	251.03	200.82	753.08
2045	1,824,299	273.64	218.92	820.93

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

TABLE 7-6: ASSESSMENT OF SEPTAGE COLLECTION VEHICLE REQUIREMENT

No. of Households Connected to Septic Tanks	102372
Septage Clearance Frequency	Once in 2 years (Once in 5 yrs. as per CPHEEO Norms)
No. of Septic Tanks To Be Cleared Every Year	51186
No. of Operation Days in a Year	300
Septage Generation @ 2 cum/septic Tank/pit /year	102372
Daily Septage Generation (cum)	280
Total No. of Septic Tanks to be Cleared Every Day	171
CPHEEO Norm for Requirement of Septage Collection Vehicle	1 Vehicle for Clearing 3 Septic Tanks in a Day
Total No. of Septage Collection Vehicles Required	57

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 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 (2013-2015)	<input type="checkbox"/> Initiate primary collection and conveyance system ; <input type="checkbox"/> Initiate septage management system <input type="checkbox"/> Feasibility study for decentralized waste water treatment systems as a permanent solution <input type="checkbox"/> Connections to the households;
SHORT-TERM (2013-2018)	<input type="checkbox"/> Finalize collections to households and the conveyance system <input type="checkbox"/> Intermittent decentralized waste water treatment systems for existing waste generation; <input type="checkbox"/> Finalize decentralized waste water treatment systems if found feasible <input type="checkbox"/> Treatment and Disposal <input type="checkbox"/> Septage Treatment & Disposal
MID-TERM (2013-2030)	<input type="checkbox"/> Augmentation of the system to meet the demands of the growing population <input type="checkbox"/> Replacements of components and operation & maintenance
LONG-TERM (2013-2043)	<input type="checkbox"/> Augmentation of the system to meet the demands of the growing population <input type="checkbox"/> Replacements of components and operation & maintenance

RECOMMENDATIONS

Solution for the Critical Problem 1 – ‘The coverage of sewerage network in the city is grossly deficient and the operation & maintenance drawbacks’**Immediate Action Directives**

- As an immediate measure it is recommended that NNB & Jal Kal release a 'tender' requesting expression of interest and subsequent award of the contract of operation and maintenance (O&M) of the existing sewerage network and pumping stations to a **Private Service Provider** (PSP) on Rehabilitate, Operate and Transfer (**ROT**) basis until the new system is in place. The scope of the PSP shall include – (1) rehabilitate and maintain the existing sewer drains and sewer lines, (2) rehabilitation and O&M of the existing pumping stations

The PSP shall undertake the following study as part of the contract – (1) status of the trunk main, branch mains & laterals (2) status of manholes, (3) status of pumping stations, (4) size, material and age of pipes, (5) number and status of grease/silt traps, and (6) identification of the households without connections. A GIS based information system shall be created awarding unique IDs to all assets in consultation with NNB.

DPR

- Based on the findings of the feasibility study, NNB may release a notice to invite expression of interest to prepare a DPR or modify the existing DPR to conceptualize and design the decentralized systems in the sewerage zones which shall also include - (1) design of streamlined connection mechanism , along with the master map of the conveyance system, supporting reliable collection service (2) development of capacity management, operation & maintenance program (CMOM) and Sewer Connection Assessment Program (SCAP)

Administrative and Regulatory Measures

- Institutionalizing of the Household Connection Mechanism**—The connection will be undertaken by certified plumber, who is authorized by NNB. Training courses for the plumber is to be organized by NNB 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 NNB 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 NNB 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, NNB 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.

Solution for the Critical Problem 2 – 'Due to non-existence of STPs and lacking proper 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 NNB procure 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.
- NNB 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 NNB 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' – The septage 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, NNB 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 system² that shall integrate the septage 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 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 NNB 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

² Annexure 13 provides literature on septage management practices and design guidelines

(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

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.
- **CRITICAL PROBLEM AREA 4** - Open Defecation with adverse impacts on health and environment despite 97% coverage of toilets (individual toilets) and 2% out of 3% of the population's access to community toilets. The poor operation and maintenance has been the underlying cause.

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 NNB, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

TABLE 7-7: 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 2013-2014	SHORT-TERM 2013-2018	MID-TERM 2013-2033	LONG-TERM 2013-2043
Coverage of Toilets						
<i>Individual Toilets (toilets per every household)</i>	1	0.54	0.75	1	1	1
<i>Community Toilets (seat per every user)</i>	1 in 35	1 in 150	1 in 75	1 in 35	1 in 35	1 in 35
<i>Public Toilets (seat per every user)</i>	1 in 100	1 in 320	1 in 175	1 in 100	1 in 100	1 in 100
Condition of Toilets						
<i>Individual Toilets (% in working condition)</i>	100%		100%	100%	100%	100%
<i>Community Toilets (% in working condition)</i>	100%	50%	75%	100%	100%	100%
<i>Public Toilets in (% in working condition)</i>	100%	50%	75%	100%	100%	100%
<i>Toilets in Schools (% in working condition)</i>	100%	85%	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 the individual 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 these masses. This approach shall ensure sustainability of the proposed systems. (Please refer to Chapter 6 for awareness generation strategy)

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 7-8: 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 Bareilly are presented in Table 6-7. Zone-wise strategy

TABLE 7-9: DESIGN INPUTS - ACCESS TO TOILETS STRATEGY

	NON-SLUM AREAS	SLUM AREAS
Population	619736	278432
Households	83726	31850
Households without access to toilets	2736	1230
No. of individual toilets required	414	186
No. of shared toilets required	276	124
No. of CTCs required	NA	22

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

Design Phases

TABLE 7-10: DESIGN PHASES - ACCESS TO TOILETS SECTOR

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

RECOMMENDATIONS

Solution for the Critical Problem 3 & 4 – ‘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 & The poor operation and maintenance has been the underlying cause.’

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 (PPPP3) mode in the immediate phase with a horizon of year 2014 in the wards listed below. 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 location for rehabilitation and upgradation sanitation facilities
- 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 and will provide (A) a need assessment at the outset (B) develops an Operator model and a Financial Model for the capital investment as well as O&M cost, (C) prepares a septage management plan (if direct connection to the sewerage system is not given) and (D) implements the Ward level pilot project.

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

³In 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 enhanced sense of ownership and ultimate sustainability. The capital investment may also be in the form of labor, material as well.

DPR

- Based on the findings of the feasibility study, NNB 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 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 (b) Design the fecal sludge management system including clearance & treatment gradually integrating into the future/proposed off-site sewerage system(s) (c) 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 NNB 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 composting, food hygiene and creation, and conservation of green spaces. Schools shall be adopted as the prime media for the campaign;
- **Regularize Municipal Bye-Laws and Building Codes**– Municipal bye-laws 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;
- **Develop and Institutionalize MIS System**– NNB 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;
- NNB 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

CRITICAL PROBLEM AREAS

- **CRITICAL PROBLEM AREA 5** – Kutcha and inadequate drainage system in the city results into the dumping of solid and liquid waste leading to water logging areas;
- **CRITICAL PROBLEM AREA 6** – Inadequate coverage and standardized operation and maintenance procedures;

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 NNB, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

TABLE 7-11: 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 2013-2014	SHORT-TERM 2013-2018	MID-TERM 2013-2033	LONG-TERM 2013-2043
Coverage of Drainage Network	100%	-	50%	70%	90%	100%
Incidences of Water Logging / Flooding	0	63	30	18	6	0

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'⁴, 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) 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. 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 build out
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 storm water 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 storm water and reduction in run-off
Porous Concrete Sidewalk	Porous pavement on publicly-owned parking lots	Retention of storm water and reduction in run-off

⁴ 'Source Controls' is the term used to emphasize their location at the place where runoff is generated.

Green Street	New zoning amendment requires street tree planting	Cost-effective infiltration of street storm water
Permeable Pavements	Install and monitor porous pavement on publicly-owned lots and new construction of roads	Retention of storm water and reduction in run-off

RECOMMENDATIONS

Solution for the Critical Problem 5 & 6– ‘Inadequate storm water drainage network along with poor maintenance and non-integration of source control measures with the existing old storm water drainage network leading to a considerable number of water logging areas and ultimately unhygienic condition’

Immediate Action Directives

- It is recommended that NNB 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 NNB release a notice to invite EoI for the protective works of the storm water drains.
- It is recommended that NNB implement a pilot project to promote low impact development (LID) and ‘wet weather green infrastructure’⁵. 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, NNB needs to consider resilient and affordable solutions that meet many objectives at once and green infrastructure is one such solution. ***(Please refer to Annexure 10 for case studies and literature on green infrastructure and storm water management)***

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;

⁵ 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)

- 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 bodies and 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 Bareilly as a strategic tourist location

DPR

- Based on the findings of the feasibility study, NNB 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 **(b)** Design and construction works of recreational facilities – water bodies **(c)** 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;
- NNB 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

CRITICAL PROBLEM AREAS

- **CRITICAL PROBLEM AREA 7** - Municipal solid waste is not been scientifically disposed off, which may cause environmental and health problems;
- **CRITICAL PROBLEM AREA 8** - The household coverage of solid waste management services as well as the overall collection efficiency is inadequate and deficient;

STRATEGY

Based on the comprehensive situation analysis executed for the city within the solid waste 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 NNB, the targets are set for the immediate, short-term, mid-term and long-term phases of the city sanitation planning.

TABLE 14: TARGETS FOR SERVICE DELIVERY LEVELS IN SOLID WASTE MANAGEMENT SECTOR

COMPONENT OF SERVICE	DESIRED SERVICE DELIVERY	EXISTING SERVICE DELIVERY	TARGETS FOR SERVICE DELIVERY LEVELS			
			IMMEDIATE-TERM 2013-2015	SHORT-TERM 2013-2018	MID-TERM 2013-2030	LONG-TERM 2013-2043
Household level Coverage of Solid Waste Management Services	100%	0%	50%	100%	100%	100%
Efficiency of collection of municipal solid waste	100%	97.6%	100%	100%	100%	100%
Extent of segregation of municipal solid waste	100%	0%	20%	50%	100%	100%
Extent of municipal solid waste recovered	80%	0%	50%	80%	80%	80%
Extent of Scientific disposal of municipal solid waste	100%	0%	50%	80%	100%	100%
Extent of cost recovery in solid waste management services	100%	0%	50%	75%	100%	100%

Efficiency in collection of solid waste management charges	90%	0%	40%	90%	100%	100%
Efficiency in redressal of customer complaints	80%	61.5%	70%	80%	80%	80%

RECOMMENDATIONS

Solution for the Critical Problem 7 & 8– ‘Integrated solid waste plant should be started in all respect at the earliest and NNB should work on cost recovery option which has been observed very low & 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

- Integrated Solid Waste plant work has to be started at the earliest in all aspects.
- Cost recovery has been observed to be very low, for which the local body has to be more proactive in collection of charges from the community for more efficient services.
- 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 & Regulatory Measures

- It is recommended to establish a dedicated unit for Solid Waste Management 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.

Financial Mechanism Interventions

- It is recommended to initiate incentives for adopting a regular & timely payment of waste charges.
- Sector specific budgets shall be established; and the dedicated Solid Waste Management 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.

7.3 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 NNB. The service delivery options shall enmesh the community participation and NGO involvement to complement the NNB capacities.

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 NNB and the Uttar Pradesh State Government budgets; however, it shall also access the funds from the 13th Finance Commission and other Center and State schemes for sanitation improvement.

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; 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 7-13: CAPITAL INVESTMENT PLAN

		SHORT-TERM ACTION PLAN (2012-2017)	MID-TERM ACTION PLAN (2018-2030)	LONG-TERM ACTION PLAN (2031-2041)
	Population	1109798	1302173	1673509
	Incremental Population		192375	371336
	Households	170738	200334	257463
	Incremental Households		29148	56263
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	600	8744	16879
	Shared Toilets	400	5830	11253
	Capital Investment Estimate	10000000	145738636	281315152
2	Community Toilets			
	Strategy	Address the deficiency	Address the requirement for	Address the requirement for

			the incremental population	the incremental population
	Community Toilets	22	25	48
	Capital Investment Estimate	8702000	9968523	19241956
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	45	5	5
	Capital Investment Estimate	17955000	1795500	1975050
	TOTAL CAPITAL INVESTMENT-TOILETS	36,657,000	157,502,659	302,532,158
4	Centralized Sewerage System			
	Strategy	Address the deficiency	Address the additional requirement for the incremental population	Address the additional requirement for the incremental population
a	Household Connections	108372	29148	56263
	Capital Investment Estimate	433488000	116590909	225052121
5	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	57		
	Capital Investment Estimate	4560000		
b	Septage Sludge Drying Beds			
	Capital Investment Estimate			
c	Office and Ancillary Units	Lumpsum	Lumpsum	Lumpsum
	Capital Investment Estimate			
	TOTAL CAPITAL INVESTMENT-WASTE WATER	4560000		
	TOTAL CAPITAL INVESTMENT	41,217,000	157,502,659	302,532,158

[Note: In this current capital investment plan the investments for short term plan is starting from the fy 2012-13, which means the grant of the fy2012-13 will be forfeited to the release of the grant, this grant is to be invested on the short term plan of the current year including the previous financial year plan.]

TABLE 7-14: OPERATION & MAINTENANCE PLAN

	SHORT-TERM ACTION PLAN (2012-2017)	MID-TERM ACTION PLAN (2018-2030)	LONG-TERM ACTION PLAN (2031-2041)
Population	1109798	1302173	1673509
Incremental population		192375	371336
Households	170738	200334	257463
Incremental households		29148	56263
1 Community Toilets			
Total Capital Investment Estimate	8702000	9968523	19241956
Total O&M Expenditure Estimate	1962857	4211396	8551687
2 Public Toilets			
Total Capital Investment Estimate	17955000	1795500	1975050
Total O&M Expenditure Estimate	4050000	4455000	4900500
GRAND TOTAL O&M EXPENDITURE ESTIMATE - TOILETS	6012857	8666396	13452187
3 Centralized Sewerage System			
Total Capital Investment Estimate	433488000	116590909	225052121
Total O&M Expenditure Estimate	26009280	33004735	46507862
GRAND TOTAL O&M EXPENDITURE ESTIMATE – WASTE WATER	26009280	33004735	46507862

[Note: In this current capital investment plan the investments for short term plan is starting from the financial year 2012-13, which means the grant of the financial year 2012-13 will be forfeited to the release of the grant, this grant is to be invested on the short term plan of the current year including the previous financial year plan.]

As can be assessed from the above table, O&M expenditure for Centralized Sewer System and MSW Management System would be a significant burden on NNB's finances. It is evident that NNB 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.

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 (*Please refer to Annexure 14 for Water Tariff across India*), i.e., a set percentage of the water charge that has typically varied between 50-80% of user water charges. It is proposed that NNB shall levy a 50% sewage disposal surcharge to the user water charges. As regards MSW services, it is recommended that NNB 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

Bareilly's citizens have witnessed a significant improvement in waste water disposal services. With the above indicated user charges, NNB would generate substantial revenue per annum, which shall enable NNB to undertake capital expenditure programs. The suggestions for the Cost-Recovery Mechanisms are presented in the table below –

TABLE 7-15: TARRIF STRUCTURE OPTIONS

	CATEGORY			MONTHLY FEE						ANNUAL FEE						ANNUAL TARIFF REVENUE					
	ID	PERCENTAGE OF TOTAL NUMBER IN CATEGORY	QUANTITY	SOLID WASTE		SEWERAGE		STORM WATER		SOLID WASTE		SEWERAGE		STORM WATER		SOLID WASTE		SEWERAGE		STORM WATER	
				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 %	277451 ²																		
	Urban Poor	40%	110980 ⁵	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																		

	CATEGORY			MONTHLY FEE						ANNUAL FEE						ANNUAL TARIFF REVENUE					
	ID	PERCENTAGE OF TOTAL NUMBER IN CATEGORY	QUANTITY	SOLID WASTE		SEWERAGE		STORM WATER		SOLID WASTE		SEWERAGE		STORM WATER		SOLID WASTE		SEWERAGE		STORM WATER	
				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
	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 –BAREILLY CITY																6047	8045	17209	21870	13501	15831

It is further proposed that NNB 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 7-16: PROPERTY BASED TAX OPTIONS

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

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 7-15: 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.
URBAN INFRASTRUCTURE DEVELOPMENT OF SCHEME FOR SMALL AND MEDIUM TOWN (UIDSSMT)	The funding supports infrastructure development for water supply, sanitation and solid waste management.
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 Bareilly'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.
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

FINANCING SOURCE	OPTIONS
	sanitation cess as part of the property tax; the user charges and the sanitation cess revenues shall be directed to the sanitation department for utilization for funding sanitation improving projects in the long-term besides tackling the O&M 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 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 7-1: Broad Instrumental Outcomes - Institutional & Governance Action Plan

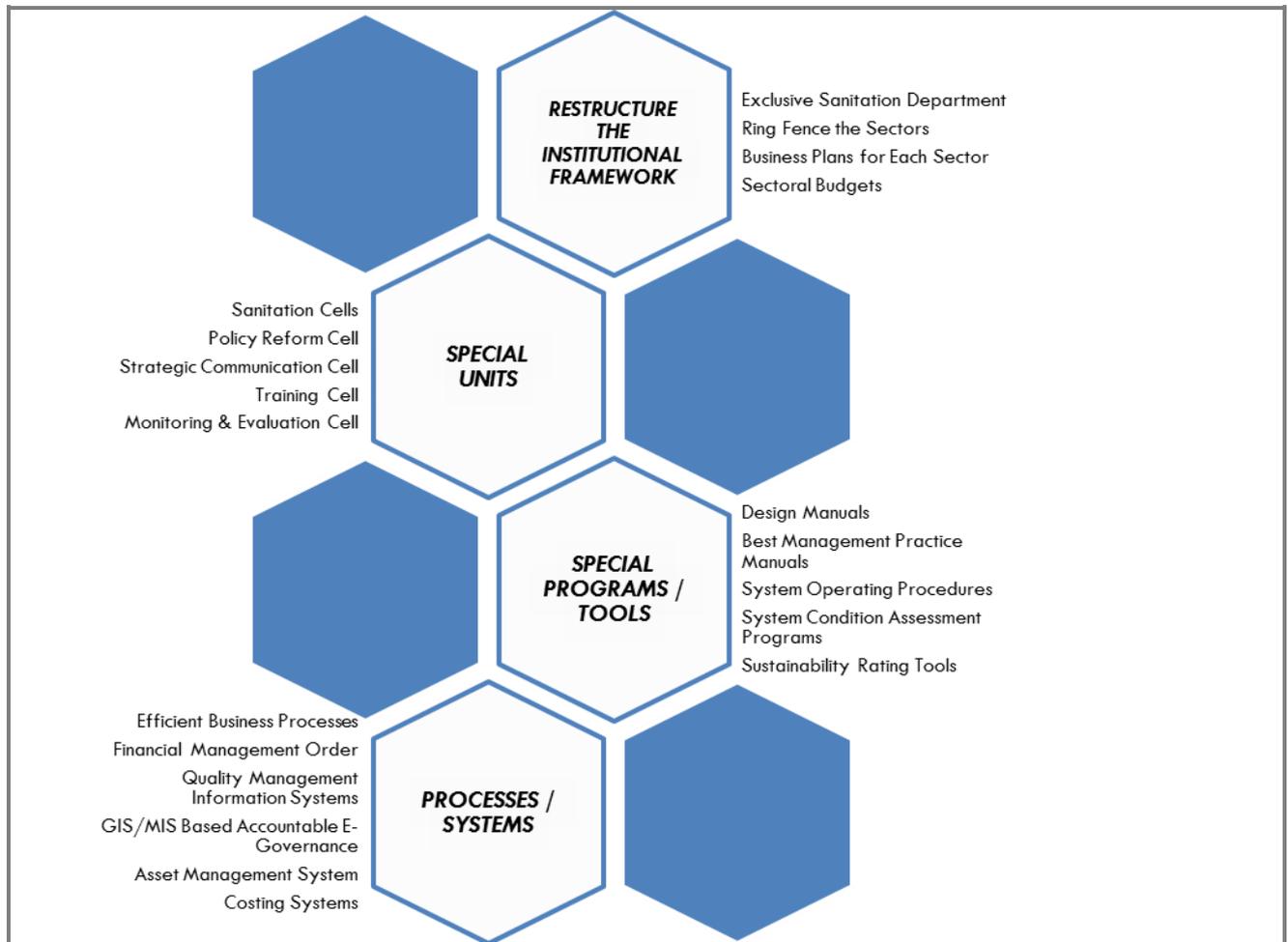


TABLE 7-16: INSTITUTIONAL AND GOVERNANCE ACTION PLAN

PHASE	COMPONENTS
Short-Term 2012-2017	<ul style="list-style-type: none"> ❑ 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 ❑ 'Ring Fence' the sectors (Water Supply & Sewerage, Solid Waste and Toilets) with supporting technical services and O&M units <ul style="list-style-type: none"> ✓ Establish Sectoral Budgets ✓ Create Business Plans for each sector ✓ Develop Costing systems (costs & tariff structures) in collaboration with the Finance & Accounts Department, Strategic 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 <ul style="list-style-type: none"> ✓ Achieve the objectives of Model Municipal Law through incentivized transition plan resulting in devolution of fiscal powers and authority

PHASE	COMPONENTS
	<ul style="list-style-type: none"> ✓ Achieve the E-Governance using GIS/MIS ✓ Sector Regulations – Quality & Fiscal Standards ✓ Enforcement Mechanisms - of rules, by-laws, municipal codes & building codes ■ 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' <ul style="list-style-type: none"> ✓ 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 – <ul style="list-style-type: none"> ✓ Confederated 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 <ul style="list-style-type: none"> ✓ 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 – <ul style="list-style-type: none"> ✓ 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 – <ul style="list-style-type: none"> ✓ Financial Analyst ✓ 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 – <ul style="list-style-type: none"> ✓ Social Development Experts ✓ Community Organizers ■ Finalize the staffing plan for the Policy Reform unit – <ul style="list-style-type: none"> ✓ Planners ✓ Policy Advisors ✓ Legal Advisors / Retired Judges / Policy Analysts

PHASE	COMPONENTS
	<ul style="list-style-type: none"> ❑ 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	<ul style="list-style-type: none"> ❑ 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	<ul style="list-style-type: none"> ❑ 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 NNB 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 NNB.

Participation from stakeholders throughout the city ensures good governance by augmenting the limited capacity of NNB 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 7-19: CAPACITY ENHANCEMENT ACTION PLAN

PHASE	CAPACITY ENHANCEMENT
Short-term 2012-2017	<ul style="list-style-type: none"> ❑ Establish HR Working Group and a State Level Steering Committee on Human Resource Development (HRD) <ul style="list-style-type: none"> ✓ 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 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; ✓ To implement an internal and external communication protocol and train the ULB staff in accordance to the plan; ❑ Initiate the development of Knowledge Exchange Mechanism among cities using the web based knowledge platform

PHASE	CAPACITY ENHANCEMENT
	<ul style="list-style-type: none"> ❑ Environmental Awareness Workshop for the ULB staff and elected representatives resulting in identification and prioritisation of all environmental aspects; ❑ Prepare a City level Urban Management Plan; <ul style="list-style-type: none"> ✓ Training Programme and training on Urban Management for the ULB ✓ Establishment of a State level Urban Management Institute ❑ Monitoring of cities with the ICD
Mid-Term 2018 - 2030	<ul style="list-style-type: none"> ❑ 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
Long-Term 2031 - 2041	<ul style="list-style-type: none"> ❑ 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

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 7-17: INCLUSIVE APPROACH ACTION PLAN

PHASE	COMPONENTS
SHORT-TERM 2012-2017	<ul style="list-style-type: none"> ❑ Community Mobilization Strategy shall be defined by the Strategic Communication Cell, NNB; ❑ Implement the Community Mobilization Mechanism to enable the inclusion of the needs & demands of the community in the CSP – <ul style="list-style-type: none"> ✓ Transect Walks, Social Mapping and Ward & Slum Profiling; ✓ Social and Gender Audits; ✓ Confederating Community Groups & Linking to Ward Committees ✓ Development of a SHG for each ward ✓ 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; <ul style="list-style-type: none"> ✓ 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

PHASE	COMPONENTS
	<p>and establish contracting mechanism to institutionalize their participation;</p> <ul style="list-style-type: none"> ❑ Establish guidelines to translate the community participation into budget allocations and formalize the participatory budgeting; <ul style="list-style-type: none"> ✓ Allocate budgets to implement pilot scale projects with Community based organizations; ✓ Allocate budgets to establish and institutionalize CBOs' ❑ Initiate the development of microfinance model to enable the urban poor to extend services within their areas; ❑ Awareness Campaign to encourage households to invest in connections and in-situ work of basic services; ❑ SHG to help with group loans and savings accounts of individuals that serve as collaterals; ❑ 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; <ul style="list-style-type: none"> ✓ Establish Guidelines and Initiate the Microenterprise Models in the service delivery ✓ Provide Basic Services as microenterprises ❑ O&M shall be the SHG/CBO's responsibility - 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;
<p>Short-Term</p> <p>2014 - 2021</p>	<ul style="list-style-type: none"> ❑ 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
<p>Mid-Term</p> <p>2022 - 2031</p>	<ul style="list-style-type: none"> ❑ 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;
<p>Long-Term</p> <p>2032 - 2041</p>	<ul style="list-style-type: none"> ❑ 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