# Final City Sanitation Plan

## Nagar Palika Parishad Loni,

## Ghaziabad, Uttar Pradesh

2014

JT Urja Pvt. Ltd.

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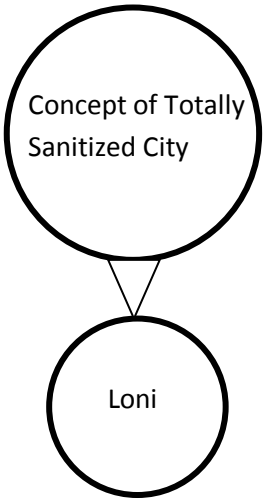
| CSP | City Sanitation Plan |
| NUSP | National Urban Sanitation Policy |
| JNNURM | Jawaharlal Nehru National Urban Renewal Mission |
| MDG | Millennium Developments Goals |
| GOUP | Government of Uttar Pradesh |
| UIDSSMT | Urban Infrastructure Development for Small and Medium Towns |
| NPP | Nagar Palika Parishad |
| ULB | Urban Local Body |
| CSTF | City Sanitation Task Force |
| HUPA | Housing and Urban Poverty Alleviation |
| ILCS | Integrated Low Cost Service |
| IEC | Information Education and Communication |
| DPR | Detailed Project Report |
| O & M | Operation and Maintenance |
| ODF | Open Defecation Fee |
| M & E | Monitoring and Evaluation |
| NGO | Non Government Organization |
| GIS | Geographic Information System |
| VAMBAY | Valmiki Ambedkar Awas Yojna |
| ILCS | Integrated Low Cost Sanitation |
| DFID | Department for International Development |
| ADB | Asian Development Bank |
| PPP | Public Private Partnership |
| TSC | Total Sanitation Campaign |
| AUWSP | Urban Water Sanitation Programme |
| BIA | Bureau of Indian Affairs |
| MOWR | Ministry of Water Resources |
| MOF | Ministry of Finance |
| MOEF | Ministry of Environment and Forests |
| AUSAID-WB | Australian Agency for International Development –World bank Group |

# SECTION I: OVERVIEW



# Chapter 1. INTRODUCTION

## 1.1 Background

The sanitation situation in India depicts a very grim picture as about 30 million* people in urban India do not have adequate sanitation facilities. This problem is compounded by the fact that as high as 70% of the waste water generated in urban areas is not treated find.

Realizing the vastness and implications of this serious environmental and socio economic issue, the Ministry of Urban Development, Government of India (GOI) announced the National Urban Sanitation Policy (NUSP) in December 2008. As directed by the policy, cities are to prepare City Sanitation Plans (CSPs) addressing all aspects of sanitation in the city. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) is another initiative of GOI aiming at better infrastructure service provision in selected Indian cities.

Despite being one of the better served state in terms of sanitation services, according to 2001 Census out of 4,64,213 urban households, 33.07 percent do not have any kind of toilet facilities in the state of Uttar Pradesh. More than 37% of the Human excreta generated in Urban India, is unsafely disposed. The loss due to diseases caused by poor sanitation to children less than 14 years in urban areas amount to Rs. 500 crore are 2001 prices (Planning commission-United Nations International Children's Emergency Fund (UNICEF) , 2006). Discharge of Municipal waste water has resulted in contamination of 70% of all surface water. Signatory nations of Millennium Developments Goals enjoin to extend access to improved sanitation to at least half the urban population by the 2015 and 100% access by 2025. The national urban sanitation policy was launched on November 2008. This policy outlines that each of the states develops its own specific strategy to achieve the policy goals.

JT Urja Pvt. Ltd. has been entrusted with the task of preparation of City Sanitation Plan for Loni. The present report captures the status of sanitation in Loni, which is broadly based on available project reports, studies, databases of Loni Nagar Palika, and field investigations carried out in the course of CSP preparation.

## 1.2 THE NATIONAL URBAN SANITATION POLICY

The National Urban Sanitation Policy (NUSP) seeks to address the gap in sanitation infrastructure and move Indian cities towards "total sanitation through a "systems driven approach". NUSP tries to create a more coordinated institutional roles and responsibilities to reach the poor and the un-served. Under the NUSP, Loni Nagar Palika

has to prepare City Sanitation Plan (CSP), with the active participation of the city level stakeholders.

**VISION OF NUSP**

The NUSP outlines the vision of urban sanitation as **"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."**

**Figure 1: Community Efforts**

**Figure 2: Community Efforts**

1.2.1 *THE OBJECTIVES OF THE POLICY*

The Sanitation Policy aims at providing adequate sanitation coverage for improving the quality of life of the people of Uttar Pradesh and to provide physical environment necessary for healthy life. It also aims

- To ensure an open defecation free environment;
- To facilitate access of all citizens to basic level of services in sanitation, including installation of sanitary latrines in every house-hold, public institutions and important public places and also community latrines in densely populated areas.
- To facilitate access and use of toilets by Urban Poor and other un-served households (including slums) individual and common sanitation facilities.
- To facilitate access and use of toilets for floating and institutional population.
- To achieve no visibility of open defecation.
- To achieve safe collection, and disposed of total human excreta generation.
- To achieve safe collection treatment and disposal of total sewage generated and recycle & reuse to maximum extend.

- To achieve safe collection, transportation, segregation and treatment of Municipal Solid Waste and ensure quantity of refuse for Landfill site should not be more than 20%.

- To ensure city wastes should not cause adverse impact on surrounding areas outside city limit.

- To facilitate the provision of safe drinking water to all citizens.

- To facilitate adequate collection and disposal of storm water.

- To link and integrate sanitation programmes with city and regional planning policies, health, environment, housing and education.

- To develop guidelines for the evolution of an effective institutional and financial framework.

- To enhance capacity building of government agencies and other stakeholders at all levels for better sanitation, particularly avoiding incidents of water borne diseases, industrial, hazardous and hospital and clinical wastes of national, provincial and local levels, and

- To change the attitude and behaviour on the use of sanitation.

- To increase mass awareness on sanitation and community mobilization.

- To improve the 'quality of life' of sanitation workers. Engage civil societies and communities (women in particular) in awareness generation, hygiene education, creation of sanitation infrastructure and its maintenance.

- To strengthen institutional setup and build the capacity of municipal staff for effective programme implementation and meeting the challenges of technology and management.

- To encourage Public Private Partnerships (PPPs) to ensure generation of funds and sustainable programme implementation.

### 1.2.2 *UTTAR PRADESH SANITATION POLICY*

**VISION**

All the cities and towns become totally sanitized healthy and liveable.

**KEY SANITATION ISSUES**

- Poor awareness, sanitation has been given low priority and about its consequent linkage with public health.
- Social and occupational hazard faced by sanitation workers daily.
- Fragmented Institutional roles and responsibilities: - There are considerable gaps and overlaps in the institutional roles and responsibilities at the state and city levels.
- Lack of an integrated city-wide approach: - Sanitation investments are currently planned in a piece-meal and do not take into account the full cycle of safe confinement Treatment and safe disposal.
- Serving the un-served and poor.
- Lack of facilities in slums. There are no provisions for proper defecation.
- Lack of Demand Responsiveness: - sanitation has been provided in a supply manner, with little regard for demands and preferences of households as customer of sanitation services.

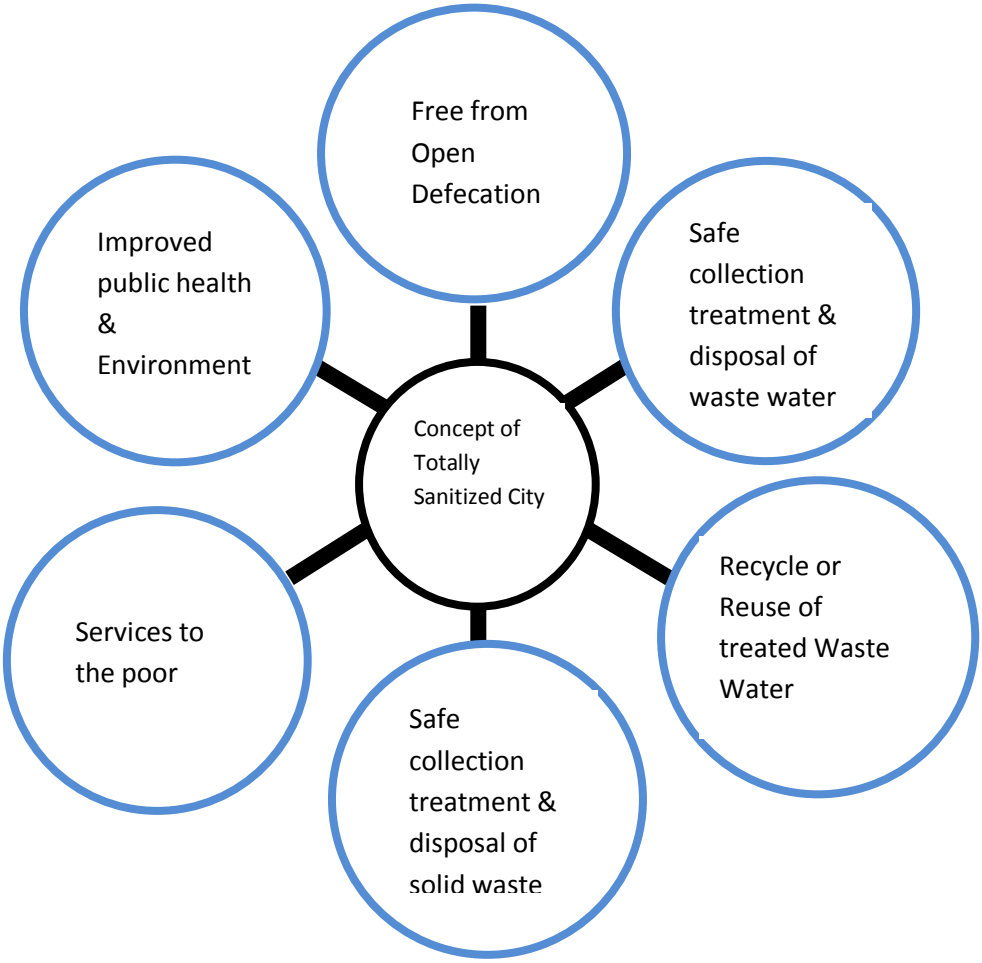


**Figure 3: CSP Goals**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**A. Awareness generation and behaviour change**

- Generating awareness about sanitation and its related hazards amongst the communities and institutions and to encourage behavioural changes for the adoption of healthy practice
- Generating awareness about sanitation and its linkages with public and environmental health.

**B. Open Defecation free cities**

- Achieving open defecation free cities.
- Providing safe sanitation facilities including proper disposal arrangements.

**C. Integrated city - wide sanitation**

- Strengthening city and local institution (Public Private & Community) to accord priority to sanitation provision, including planning, implementation and O&M Management.
- Extending access to proper sanitation facilities for poor communities and other un-served settlement.

**D. Sanitary and safe disposal**

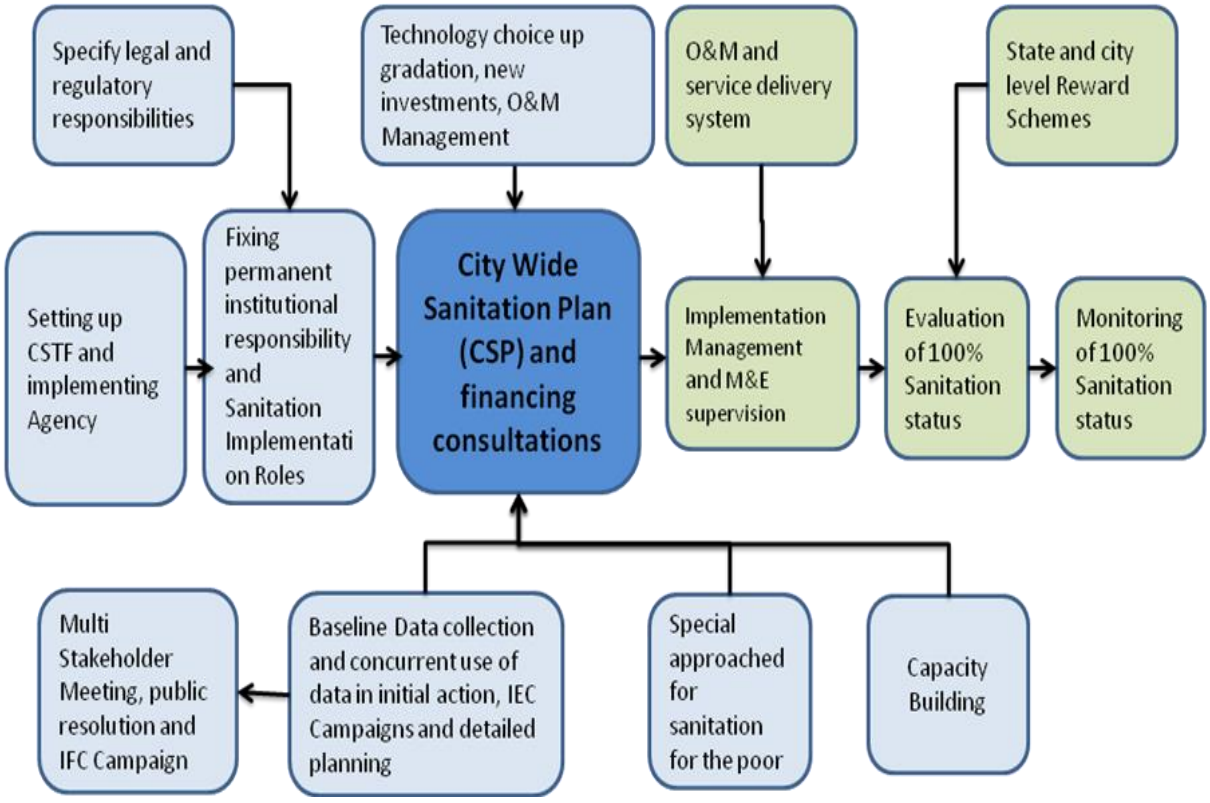
- 100% of human excreta and liquid waste from all sanitation must be disposed of safely.
- Functioning of Sewerage Network, and ensuring connection of households.
- Promoting Recycle & Reuse of treated water.
- Promoting proper disposal and treatment of sludge.

**E. Implementations support strategy**

All the sanitation activities and implementation come under the city level institution and stakeholders. Therefore each city needs to formulate city sanitation plan in conformity to the State Policy.

- Promoting community - planned toilets for group of household having constraint of space and money.
- Adequate availability and 100% up-keep of Public Sanitation Facility

**Figure 4: Generic Elements of Planning, Implementation and M&E of City Wide Sanitation**




In order to achieve the targets specified in NUSP, each city needs to prepare its urban sanitation strategy for management of liquid and solid waste to determine:

- Sanitation plan for achieving 100% sanitation for the city
  Time - frames and deadlines to achieve the goals
- a detailed roadmap, including the incremental targets
- Implementation scheme keeping into consideration the available financial resources and effectiveness of already existing facilities

### 1.2.3 *GOVERNMENT OF INDIA SUPPORT*

Ministry of Housing and Urban Poverty Alleviation (HUPA) is supporting a centrally sponsored scheme for Integrated Low Cost Sanitation (ILCS). Under the scheme Central Subsidy to extent of 75%, State subsidy to the extent of 15 % and beneficiary contribution to the extent of 10% is provided for construction of latrines. The main objective of the scheme is to convert around 6 lakh dry latrines into low cost pour flush latrines by 31st March 2010. 75% of the central allocation will be used for conversion and the remaining 25% will be used for construction of new toilets for EWS households who have no toilets in urban areas. This scheme focuses on the provision of latrines/toilets and the elimination of open defecation and scavenging. It does not cover the problem of inadequate sanitation, including treatment and disposal of sewage and solid waste management, which has considerable environmental and health implications. The scope of urban sanitation is much larger than the issues covered under the Scheme for Integrated Low Cost Sanitation which essentially focuses on provision of latrines to prevent open defecation in order to eliminate manual scavenging.

The sharing of funds would be in the ratio of 80: 20 between Central Government & State Government. Out of 20% of state share 10% will be borne by the ULB which could be raised by the nodal/implementing agencies from the financial institutions or internal resources for funds.

Towards achievement of the Urban Sanitation Policy Goals, the Government of India will support:

- States will be encouraged to prepare State level strategies within a period of 2 years. Chapter on draft framework for developing state level strategies gives an outline of the strategy.

- Identified cities will be urged to prepare model city sanitation plans within a period of 2 years. Chapter on draft framework for a city sanitation plan gives an outline of the plan.
- Providing assistance for the preparation of detailed project report (DPR) as per city sanitation plan as soon as requests for funding are received;
- Promote public-private partnership in respect of key projects/activities identified in the city sanitation plan;
- Provide technical assistance and support for awareness generation and capacity building to states and cities within this financial year.
- Periodic rating of cities in respect of sanitation and recognition of best performers by instituting a National Award within this financial Year.
- Funding projects wherever possible from existing schemes. The Ministry of Urban Development is implementing schemes such as the Jawaharlal Nehru National Urban Renewal Mission (UIDSSMT). These schemes have a time span of 7 years (2005-

2012) with a budget of Rs. 1,00,000 crore of which the share of the central government is Rs. 50,000 crore. Out of 3243 projects sanctioned up to 31.03.08, 125 Pertain to sewerage, storm water drainage & solid waste management.
Government of India will support states in developing and implementing innovative Strategies to accord priority to urban sanitation. **States and cities can explore a number of options in achieving sanitation goals including:**

- Using existing provisions with regard to sanitation in Municipal and other Acts to promote compliance;
- Amending Municipal Acts, Framing of Bye Laws and Regulations (e.g. Building and Construction Bye-Laws) to promote sanitation by Public and Private agencies, prohibit discharge of untreated sewage into open areas wherever possible;
- Create a system of incentives and disincentives including punitive actions and levies and charges on pollutants wherever appropriate;
- Re-orienting policies to ensure that urban poor households or residents in informal settlements obtain access to improved sanitation facilities;
- Ear-marking and making land available for community and public sanitation facilities;
- Promoting partnerships with public, private and non-governmental agencies for improved provision, maintenance and management of sanitation facilities;
- Mainstreaming sanitation in all public activities (e.g. by coordinating with health, education and infrastructure sectors3);
- Taking up sanitation in a mission mode in order to mobilize joint actions from different public and non-government agencies. This can be accomplished by forming an urban sanitation steering committee at the state level and a task force at the city level;
- Exploring other options and innovations that may be suitable locally.

**HOW TO ACHIEVE GOALS**

- As mentioned above Urban local bodies suffer from constraint of finance, staff and face public who has no awareness about sanitation. Therefore, first priority is to make public aware for financial strengthening of Urban Local Bodies.

- Poor sanitation results in many health hazards due to fly, rubbish, human excreta. Public is not aware of these hazard so they never put an effort to strengthen the local bodies. For these different seminars, meeting audio visual documentary should be organized by the ULBs and NGO's.

- Present sanitation situation about the state of Uttar Pradesh indicates that the production of waste water in the state is about 1872.5 million daily. In the entire state only 55 towns have partial sewerage facility; and out of 51 towns

having population of more than one lakh, 14 towns still do not have sewerage system at all. Sewage treatment plants constructed under different River Action Plans are grossly inadequate. The Capacity of these plants is reported to be only 795.54 million litres daily. Thus only two-fifth water generated is being treated before disposal into water bodies. Therefore, every city has to prepare its city sanitation plan and submit the plan to state as an immediate step towards achieving 100% sanitation.

*Hence, a meeting was held on 9.12.2009 of all Nagar Ayuktas in U.P. for formulating City Sanitation policy as desired in State Urban Sanitation policy to achieve goals for making cities open defecation free & better Living conditions of Urban Poor.*

**PREPARATORY ACTIONS**

***City Sanitation Task Force***

**Mobilize Stakeholders** : 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.

1. To achieve the aim constitute a multi-stakeholder city sanitation task force comprising representation from:
    i. Representative from shops and establishments,
    ii. Representative of the large institutions in the city (e.g. Cantonment boards, housing boards, development authority Govt. of India and state Govt. Enterprise campuses, etc.
    iii. NGO's working on water and sanitation, urban development and slums, health and environment,
    iv. Representatives of unions of safai karamcharies, sewerage sanitary workers etc.
    v. Representatives from educational and cultural institution.
    vi. Any other significant or interested stakeholder
    vii. Some of the elected members of the ULB

2. The task force should be headed by the Mayor with the executive head (e.g. Municipal Commissioner) as the convener.

3. Political parties must be involved from all shades and thinking. So that sanitation campaign has the full support of all stakeholders.

4. The task force should appoint preferably ULB, to implement the City Sanitation Plan. For this City Sanitation Implementing Agency will involve NGOs(through Memorandum of Understanding ) Maintaining a comprehensive GIS- based

database, implementing physical works , letting out and supervising O&M management contracts etc.

5. The Implementing agency will examine the laws and rules in this regard and make recommendations for the task force to make rules.

**SPECIFYING LEGAL AND REGULATORY INSTITUTIONAL RESPONSIBILITIES**

Even though many of the Municipal laws refer to sanitation responsibilities of households and ULB etc., these are not clearly laid out or comprehensive. The implementing Agency will examine the laws and rules in this regard and make recommendations for the Task Force to make the rules explicit regarding:

- Safe sanitary arrangements at unit level (household, establishment)
- Design and systems for safe collection
- Norms for transport/conveyance
- Treatment and final disposal

**National Award scheme for sanitation for State Cities (National Rating Scheme for Sanitation)**

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, the Government of India has instituted an annual rating and award scheme for cities. The award (Nirmal Shahar Puraskar) is based on the premise that improved public health and environmental standards are two key outcomes that cities must seek to ensure for their citizens. In doing so, governments in states and urban areas will need to plan and implement holistic citywide sanitation plans, thereby putting in place processes that help achieve outputs pertaining to safe collection, confinement and disposal (including conveyance, treatment, and / or reuse without adverse impacts on the environment in and around the cities) of waste.

The exercise rated 423 cities (with population greater than 100,000) for their performance across various aspects of sanitation. This was measured through indicators that included physical infrastructure, systems, processes, and outcomes related to achievement of total sanitation (Refer Box-I). The first national rating was carried out in 2009 and results were published in May, 2010 (See www.urbanindia.nic.in for details.)

The rating exercise was carried out to:

- Compare intra-city and inter-city data on sanitation.

- Monitor and measure improvement of cities against standard indicators over time.
- Generate awareness on the need to create totally sanitized cities.
- Allow states and cities to use the results to identify and address areas of poor performance.
- Enable cities to think city-wide, with an emphasis on smarter planning and investments that lead to improved sanitation in the country.
- Instill a sense of healthy competition amongst cities.
- Motivate and recognize excellent performance in sanitation through national reward

Each city has been scored on 19 indicators which are divided into three categories: Output (50 points), Process (30 points) and Outcome (20 points). The methodology for the exercise was designed incorporating standardized methods for measurement and scoring and was evolved after extensive stakeholder consultations. The rating makes use of both primary data collection during field visits and secondary data from published sources such as census. Each agency was required to follow the prescribed methodology, ensuring uniformity and comparability of data. The data was collected from cities in a consultative and collaborative manner. Based on the scores for output, process and outcome indicators, cities were then classified under four color categories; red, black, blue and green.

The exercise reveals that more than half of the cities are in the Blue or Black categories. There are four cities in the blue category which have scored above 66 but less than 90 marks out of hundred. Almost all cities report complete elimination of manual scavenging. More than 50 cities report 90 percent or above safe collection of human excreta. Twenty four cities collect more than 80 percent of their solid wastes – another six show an outstanding performance of nearly 100 percent primary collection. While treatment is a big challenge for most, 17 cities have achieved treating at least 60 percent of their wastes. Most cities have performed well in the process indicators, especially the larger cities, but results for the output and outcome indicators are mixed.

The exercise also highlights that considerable efforts are required to improve access to community and public toilets for the urban poor and to stop open-defecation. Wastewater treatment poses considerable challenges – 380 cities collect and treat less than 40% of their human excreta, though there are six cities that treat more than 90% of their human excreta.

***Loni city is in red category (Rank 391) with a score of 22.15 out of 423 cities. Among 54 cities of Uttar Pradesh reviewed, Mau ranks 44th.*** *(19 U.P cities are in black category with the score in the range of 33.6-60, remaining cities are in red category with the score in the range of 33.5 and below. Chandigarh ranks first with the score of 73.48.)*

## 1.3 UIDSSMT SHCEME

Urban Infrastructure Development Scheme aims at improvement in urban infrastructure in towns and cities in a planned manner. The scheme seeks to enhance public and private investments in infrastructural development of urban areas.

### 1.3.1 *OBJECTIVES*

The objectives of the scheme are to:

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

b) Enhance public-private partnership in infrastructural development.

c) Decentralize urbanization and promote planned development of towns, cities and metros.

### 1.3.2 *DURATION OF THE SCHEME*

The duration of the Scheme will be for five years beginning from 2005-06. An evaluation of the outcomes of the Scheme will be undertaken before the commencement of the 11th Five Year P\an and, if necessary, the scheme would be suitably calibrated.

### 1.3.3 *COVERAGE*

The scheme will apply to all cities/towns as per 2001 census, excepting cities/towns covered under JNNURM. Allocation of funds among states will be on the basis of the state's urban population to total urban population in the country. States may allocate funds to towns/cities based on similar formula. However, funds would be provided to only those towns and cities where elections to local bodies have been held and elected bodies are in position.

The State Governments may prioritize towns and cities on the basis of their felt-need.

### 1.3.4 *COMPONENTS*

The components for assistance under the scheme will include all urban infrastructure development projects including water supply and sewerage. Cost of land for such infrastructure projects will not be provided under the programme. Admissible Components

i. Urban Renewal i.e. redevelopment of inner (old) city areas (this would include items like widening of narrow streets, shifting of industrial/commercial establishments from non-conforming (inner-city) areas to 'conforming' (outer-city) areas to reduce congestion, replacement of old and worn-out water pipes by new/higher capacity ones, renewal of sewerage/drainage/solid waste disposal systems, etc), land acquisition cost will not be financed under this component of the program me.

ii. Water Supply and sanitation, including setting up de-salination plants, where necessary;

iii. Sewerage and Solid Waste Management

iv. Construction and improvement of drains/storm water drains

v. Laying/improvement /widening of arterial/sub-arterial roads and bridges to remove transport bottlenecks,

vi Construction and development of bus and truck terminals

vi. Environmental improvement and city beautification schemes,

vii. Construction of working women hostels, marriage halls, old age and Destitute Children's homes, night shelters with community toilets, street lighting and Slaughter houses

xi. Civic amenities like playgrounds/stadia, community halls,

xii. Hospital Waste Management

### 1.3.5 *FUNDING PATTERN OF THE SCHEME*

The sharing of funds would be in the ratio of 80: 20 between Central Government & State Government. Out of 20% of state share 10% will be borne by the ULB which could be raised by the nodal/implementing agencies from the financial institutions or internal resources for funds.

## 1.4 OBJECTIVES OF THE CITY SANITATION PLAN IN LONI CITY

- The City Sanitation Plan will be prepared after carrying out a situation analysis and after a structured consultation with stakeholders. The Plan will attempt to achieve the following objectives:

- To adopt locally suitable methods, technology and materials, and provide necessary facilitation support to Nagar Palika Parishad Loni.

- To encourage community and private participation and define their role in creation and maintenance of sanitation infrastructure, thereby ensuring a sense of ownership.

- To ensure coordination between various departments working in the field of water supply and sanitation, such as departments of health, education, public health and engineering, industry, environment, transport, pollution control board, etc.

- To ensure an optimum use of funds allocated by 13th Finance Commissions for solid waste management and other sanitation related projects. To coordinate various externally aided projects for their optimum results.

- To promote novel ideas in mobilization of funds, including reforms in tax regime, public private partnerships, exploring the private market, user charges, beneficiary contribution, etc.

## 1.5 OVERVIEW OF THE SCOPE OF WORK

The overall work is divided into four broad tasks. The following are the broad tasks included in the scope of work:

**Figure 5: Scope of CSP, Loni**

### City-Sanitation Task Force (CTF)

A City Sanitation Task Force (CTF), which is a multi-stakeholder agency having representation from various walks of life, has been formed. CTF will launch the awareness campaign and the 100% sanitation campaign for the city in addition to approving the studies and implementation works to achieve the goals of NUSP. The objectives and participants of the City Sanitation Task Force are discussed in detail in Chapter 2.

### 100% Sanitation Campaign

Sanitation issues and target groups are identified to formulate an action plan on awareness generation. A pilot awareness campaign has to be conducted by the City Sanitation Task Force in Past, similar kind of campaigns would be conducted at regular intervals.

### City Sanitation Plan (CSP)

The sanitation situation of the city is analysed based on the rapid land use survey, secondary data collection and consultations. A Geographic Information System (GIS) based database on sanitation in Loni would be created as part of this plan. The sanitation plan and project proposals will be prepared based on the situation analysis and consultation with CTF

### Capacity Building and Training

The existing human resources and infrastructure of the Nagar Parishad is assessed for its adequateness and capacity. Based on this, training needs will be identified and workshops shall be conducted on a pilot basis.

**THE STEPS TAKEN AND DELIVERABLES AS PER THE ABOVE MENTIONED TASKS IS PROVIDED BELOW**

**Figure 6 : Steps for Deliverables**

***Step 1** - Formation of City-level Implementation Committee/Cell*

A city-level committee consisting of government and private sector stakeholders is to be formed for the purpose of overseeing preparation and implementation of the City Sanitation Plan.

***Step 2** - Conduct 1st Consultation*

A first level consultation is envisaged to orient the city stakeholders on the objectives of the UPSP and NUSP, and on the process and methodology of preparing the City Sanitation Plan. This has been carried out in the form of individual meetings with key stakeholders at the start of this project.

***Step 3** - Reconnaissance Survey (to be carried out by a separate team of NPP).*

A detailed reconnaissance survey to be conducted by a separate team of Motivators and Trainers.

***Step 4** - Preparation of Situation Analysis*

A ward-wise and slum-wise situation analysis report has to be prepared after assessing existing secondary data, outputs of the reconnaissance survey, and additional surveys will be conducted as part of this assignment. The situational analysis report, presented here, details out existing household sanitation arrangements, public sanitary conveniences, waste water disposal, solid waste management and water supply. It highlights the deficiencies in sanitation facilities, which particularly affect women and the urban poor. The analysis also projects the future demand for sanitation services.

***Step 5** - Conduct 2nd Consultation*

A second consultation workshop will be held with the city implementation cell to present the findings of the situation analysis for feedback and suggestions.

***Step 6** - Preparation of Draft City Sanitation Plan*

A draft city sanitation plan will be prepared for Loni Nagar Palika Parishad incorporating assessment of strategies and technology options for safe collection, transportation, treatment and disposal of both solid and liquid wastes in the city. The analysis of options will include costs of capital investment, operation and maintenance, monitoring, and evaluation.

***Step 7** - Preparation of Implementation Plan*

A strategic implementation plan (short-, medium- and long-term) and an immediate action plan (1-3 years) that will include a multi-year financial plan for implementing

the City Sanitation Plan for Loni Nagar Parishad in a time- bound manner will be prepared.

***Step 8 - Conduct 3rd Consultation***

The draft City Sanitation Plan for Loni City for Loni Nagar Palika Parishad and implementation plan will be presented to the city-level implementation committee/cell. The recommendations of the Loni City CSP committee and other stakeholders will be documented for their incorporation into the final version of the City Sanitation Plan for Loni .

***Step 9 - Final City Sanitation Plan***

The final version of the City Sanitation Plan for Loni City will be prepared after appropriately addressing all comments and suggestions of the 3rd consultation meeting of the city-level sanitation committee/cell.

In order to achieve the targets specified in NUSP/UPSP, each city needs to prepare its **urban sanitation strategy for management of liquid and solid waste** to determine:

- Sanitation plan for achieving 100% sanitation for the city
- Time-frames and deadlines to achieve the goals
- A detailed roadmap, including the incremental targets
- Implementation scheme keeping into consideration the available financial resources and effectiveness of already existing facilities

Following are steps followed in the Stakeholder Workshop -
**Stage 1:** To introduce the Concept of CSP with the participation of various stakeholders, as deemed appropriate could also serve as a mean to identify other interested & appropriate stake holders.

Figure 7: Stakeholders Discussion

**Stage 2:** To share the findings of the situation analysis with implementation committee and other stakeholders for validation of findings and for soliciting their suggestions/recommendations etc.


**Figure 8: Stakeholders Discussion**

**Stage 3:** For presenting the Draft City Sanitation Plan and Implementation Plan to the Implementation Committee covering the feasibilty & appropiateness of the proposals from the point of view of their implementation in a time – bound manner.

**Figure 9: Stakeholders Discussion**

## 1.6 PROGRESS UPDATE

The activities carried out as part of CSP preparation and their overall progress is mentioned in table below:

**Table 1: Progress CSP, Loni**

| S.No. | Activity | Date | Remarks |
|---|---|---|---|
| 1 | Reconnaissance Study and Stakeholder Consultation | 27th Jan,14 | Reconnaissance visit was conducted by the team to understand the city - terrain, extent and type of development, growth pattern and direction. Consultation meetings conducted with Loni Nagar Palika Parishad officials including Commissioner, Municipal Engineer, Health Officer, I&PH Dept., Urban Development Dept., Town Planning Dept., associations, media officials etc. Sanitation issues, capacity requirements of Loni Nagar Parishad and the awareness issues and target groups were also discussed with the stakeholders. |
| 2 | Secondary Data Collection | 13 Feb,13 | Following set of data has been collected from secondary sources: List of wards, list of public toilets, basic water supply details, below poverty line population, Detailed Project Report (DPR) (water supply), Service level Benchmarking Report, Annual report. During this period meetings with prospective CTF members was also conducted. |
| 3 | CTF Formation Meeting | Jan,13 | CTF formation workshop was conducted by Loni Nagar Palika Parishad in Loni in the month of January 2014.About 50 participants attended the meeting. The members of CTF were identified by Loni Nagar Palika Parishad. List of CSTF members is provided in Annexure-1. Through this meeting the sanitation issues in Loni were identified and time frame to achieve 100% sanitation status was agreed upon. |

| | | | |
|---|---|---|---|
| 4 | Primary Survey at Ward level | Jan,14 | For the assessment of sanitation situation at disaggregate level (ward-wise), a detailed primary survey was conducted within the city boundary falling under Nagar Palika Parishad limit. Orientation on conducting the survey was given to the surveyor team by the key sanitation experts & urban planners of JT Urja team. Loni was divided into survey blocks and based on the survey building blocks with similar land uses were demarcated. Data on each building block with respect to size of dwelling unit, typical size of a family, predominant water sources, secondary water sources, quality perceptions, mode of sewage disposal, mode of solid waste disposal, etc was collected through random questionnaire based survey. The data has been plotted on GIS platform for situation analysis |
| 5 | Stakeholder Workshop (2nd meeting) | March,14 | The stakeholder workshop was conducted in Loni, in which the status of CSP work progress and situation analysis of the city and various possible options for city sanitation were presented to the CTF members. The meeting was chaired by the Chairman, NPP, Loni. The minutes of the meeting are provided in the Annexure-2 |

# Chapter 2. THE APPROACH & METHODOLOGY

## 2.1 KEY ASPECTS OF THE APPROACH

### 2.1.1 *ACHIEVING 100% SANITATION*

The goal of the exercise is to achieve 100% sanitation in the project cities. The following are the indicators of 100% sanitation in a city:

***Primary Indicators As Mandated By National Urban Sanitation Policy***

- Every citizen has access to a toilet & the city is "Open Defecation Free (ODF)"
- All the sewage generated is collected, treated, and disposed off safely

***Secondary Indicators***

Secondary indicators are optional and are not mandated by the NUSP. However, for holistic sanitation in a city it is important that the following indicators are also addressed. We will advocate for the inclusion of these indicators into the city sanitation planning

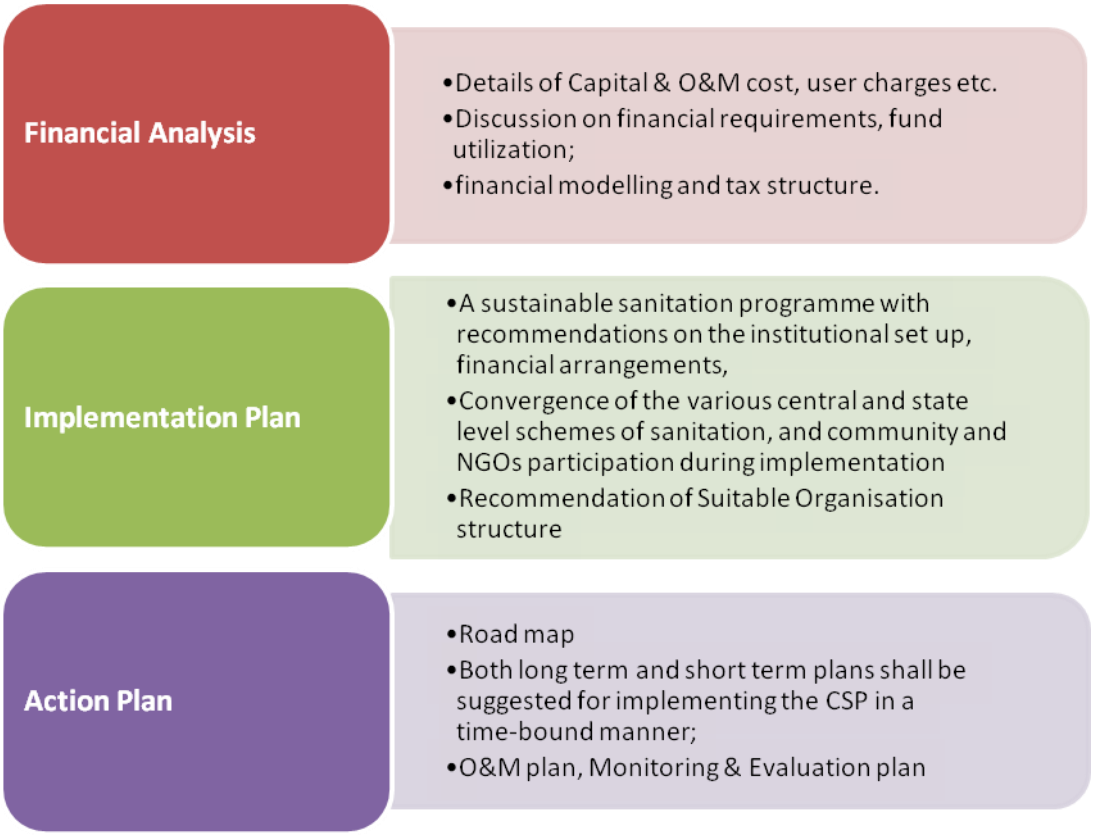
- All the solid waste generated is collected, treated, and disposed off safely
- All water bodies and drainages are preserved and kept clean
- All the storm water drains are kept clean

Every aspect of the process and infrastructure provision must integrate community participation and must be inclusive. In addition, water and wastewater management must be carried out in an environmentally sustainable manner, thus recycling and reusing the by-products as far as possible.

***Implementation Strategy***

- There should be complete financial analysis of all sectors like water, access to toilet, sewerage network, solid waste management etc which will also include details of operation and maintenance charges, funds required and sources of fund. Then for implementation of plan recommendations on its institutional framework is necessary to analyse additional fund arrangement. This would include Convergence of the various central and state level schemes of sanitation, and community and NGOs participation during implementation. This would lead to action plan.

**Figure 10: Implementing Strategies**




### 2.1.2 *BUILDING LOCAL INSTITUTIONS AND COMMUNITY PARTICIPATION*

The creation of the city sanitation task force, the 100% sanitation campaign (pilots), an integrated City Sanitation Plan, and capacity building and training are seen as the Four key services to be provided by the consortium. The city sanitation task force is the institutional structure that will hold the vision of "Total sanitation" for the project cities. Within this context it shall ensure the successful implementation of the 100% sanitation campaign as well as oversee the plan and project formulation, implementation and operations. The four key tasks are divided into sub-components as follows -

**Figure 11 : Pillars Supporting Inclusive Sanitation**


### 2.1.3 *METHODOLOGY*

Each of the key services has been broken down into a series of executable tasks as follows. These tasks are not linear and many of the activities are happening in a parallel and iterative manner. The entire CSP formulation exercise is an effort to generate much-needed momentum, both within government and civil society, in a segment of urban infrastructure that requires demand-led planning and renewed attention. To this end, a structured, participatory and multi-stakeholder engaging consultative process was adopted to create a City Task Force (CTF) and engage different stakeholders including staff of the NPP departments, para statal agencies and other state and local institutions, policy makers and citizens.

### 2.1.4 *THE CITY SANITATION TASK FORCE*

To achieve the goals of NUSP, the government encourages cities to introduce a CTF at city level. The CTF is conceptualised as a multi stakeholder platform for monitoring and evaluation of the interventions pertaining to city sanitation. The process of setting up a CTF and aspects required for institutional functioning are described in this section:

- Stakeholder mapping and Interaction
- Defining agenda, institutional structure, roles and responsibilities for the CTF
- Conducting the CTF formation meeting
- Preparing the Operations Manual
    - ✓ Detailed roles and responsibilities of the various entities involved
    - ✓ Standard operating procedures for meetings, decision making, carrying out of other functions etc.
- Preparation of Guidelines
    - ✓ For updating city sanitation GIS and data base
    - ✓ For facilitating and overseeing the implementation of awareness generation programs and meeting relevant stakeholders from time to time
    - ✓ For facilitating and overseeing implementation of CSP proposals, managing bids and selection of consultants and contractors
    - ✓ For facilitating and overseeing periodic capacity building activities
- Preparing the Monitoring and Evaluation (M & E) Manual
    - ✓ Procedures for evaluating CSP proposal
    - ✓ Procedures for periodically evaluating 100% sanitation status based on set of objective indicators of outputs, processes and outcomes
    - ✓ Procedures for monitoring sanitation status from time to time based on similar indicators in addition to preparing the material required for functioning of the CTF

#### 2.1.5 *THE 100% SANITATION CAMPAIGN*

- Mapping of sanitation issues & target groups
- Formulating an action plan for awareness generation
- Preparation of target specific Information and Education Campaign (IEC) material
- Conducting awareness generation programs
- Formulation of community based information system

## 2.2 CITY SANITATION PLAN

#### 2.2.1 *PREPARATION OF BASE MAP*

A good base map is required for effective representation of the ground situation and subsequent planning and implementation of infrastructure interventions. The base map of Loni City has been prepared using satellite images and maps as provided by the Nagar Palika Parishad. The mapping is done on GIS platform. This helps in overlaying multiple layers of information and conducting a detailed analysis. The following layers have been digitized for preparing the base map.

- Administrative boundaries – Nagar Palika Parishad boundary and ward boundaries
- Transportation network – roads and railways
- Building foot print
- Water bodies and natural drainage
- Contours
- Green belt – forest, cultivation, orchard

The following maps provided by the Corporation have been extensively used for preparation of the base map:

- Nagar Parishad boundary and ward boundary map
- Proposed land use map (image) provided by Town Planning Department
- Survey of India topo-sheets

Based on the above information and considering the revised corporation/ward boundaries (finalised in consultation with ward councillors and city officials) the final base map of Loni City was prepared. This base map has been taken as base for the preparation of CSP for Loni City.

**Table 2: Layers Used In Map Preparation**

| S. No. | Layers | Source | Data Type |
|---|---|---|---|
| 1 | Locations | Landmarks have been extracted from NPP, satellite data, Survey of India Map and identified locations during survey. | Point |
| 2 | Loni Municipal Boundary | Municipal boundary has been extracted from NPP Loni administration. | Polygon |
| 3 | Ward boundaries | Ward boundaries have been digitized according to Ward councillors and existing maps from NPP Loni. | Polygon |
| 4 | National and State Highways | Existing Highways have been extracted from NPP, Survey of India Map and NPP Loni administration map | Line |

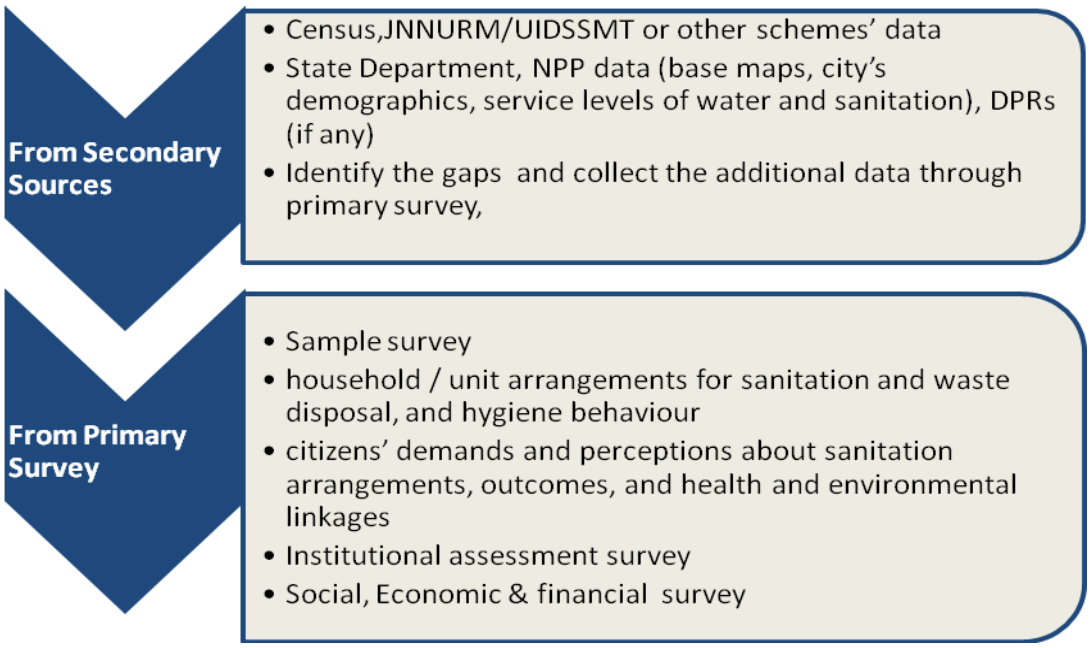
| | | | |
|---|---|---|---|
| 5 | Major District Road, City Main Road and Streets, Rail road | Existing District roads have been extracted from NPP, satellite data, Survey of India Map and NPP Loni administration map. | Line |
| 6 | Nallah / water bodies / drains / ponds | Existing Nallah/water bodies/drains/ponds have been extracted from NPP, jal nigam, Survey of India Map and identified from satellite image. | Line |
| 7 | Building Footprints | Existing building footprints have been digitized from satellite image | Polygon |
| 8 | Landuse map | Landuse map has been extracted from prescribed govt. authority of the state of U.P. | Polygon |
| 9 | Handpump/ Overhead tank | Existing locations and number of Handpump / Overhead tanks have been extracted from NPP / jalnigam of Loni city | Point |

### 2.2.2 *OVERLAYING SECONDARY INFORMATION ON THE BASE MAP*

For the preparation of sanitation maps (including water supply, sewerage system, solid waste management and public sanitation) various primary (collected through field surveys) and secondary data has been collected and overlapped on the base map in GIS platform. The following layers of information have been added to the base map for the purpose of preparing thematic sanitation maps and thereafter demand supply gap analysis:

- Sewerage network – existing and proposed sewer lines (diameter and length), sewerage zones, location of existing and proposed Sewage Treatment Plant (STP)
- Storm water drainage network and natural drains
- Water supply network – existing and proposed water supply network, water supply zones, rising main and feeder network, storage reservoirs
- Location of public toilets
- Location of dumper containers (for solid was collection)

Figure 12: Situation Analysis from Primary & Secondary Data



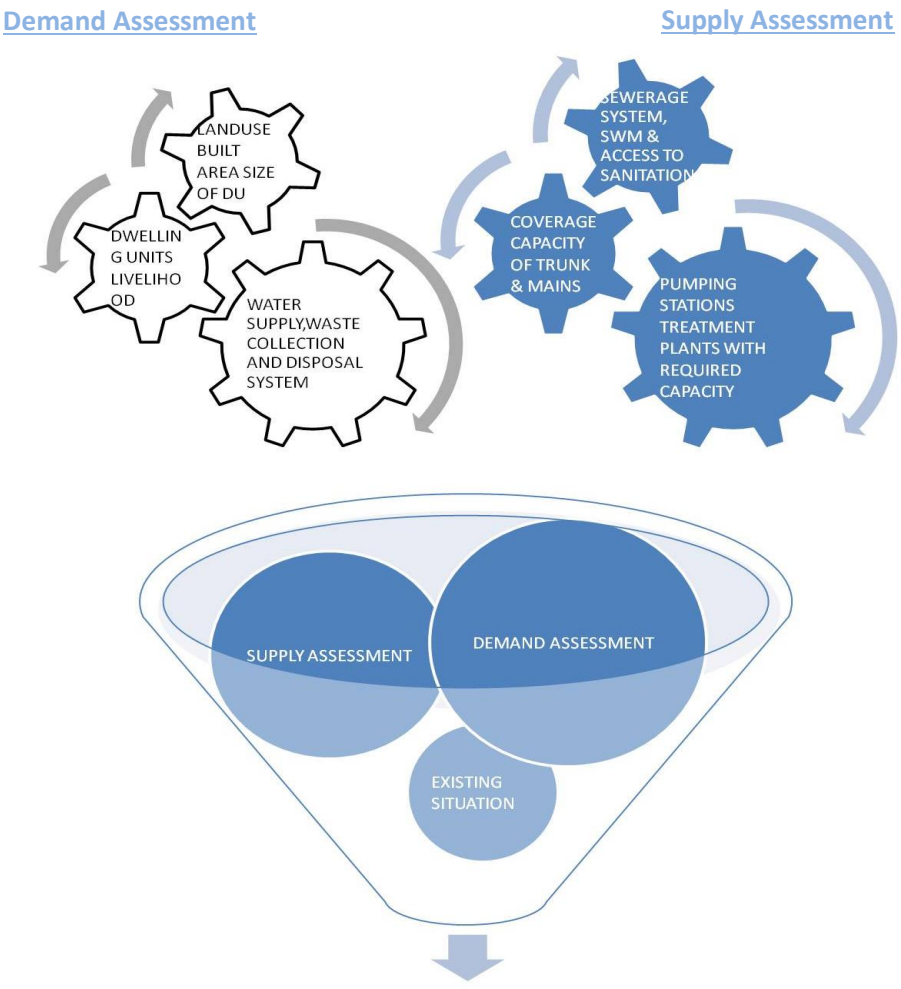

### 2.2.3 *LAND-USE AND SANITATION SURVEY*

The data available from the city authorities regarding existing water supply system, sewerage system, solid waste management system and public sanitation is mostly at the ward level. For more accurate assessment of the ground situation and effective planning thereafter, it is necessary to have data at sub ward level .To this determining the existing sanitation condition at disaggregate level survey was conducted to know the existing land use pattern, built up density in different areas and the urban form, current sanitation condition, and infrastructure facilities available for sanitation. A detailed questionnaire (Annexure-3) was designed to capture information on access to water supply, access to sewerage system, solid waste management, access to public sanitation, willingness to pay for the basic services etc. The surveyors were oriented on the need and purpose of the survey and the methodology of conducting the same. Maps and the questionnaires were used to conduct the survey. The city was divided into several survey blocks based on the road and ward boundaries. The surveyors went through the area to understand the various land uses. Each survey block is further divided into building blocks demonstrating homogeneous land use and built typology. The survey was conducted in each building block capturing the land use and sanitation information. The homogeneous land uses were identified based on use (e.g. residential, commercial etc.), built characteristics (e.g. number of floors, type of construction), and socio-economic characteristics (e.g. Middle Income Group (MIG) residential apartments, residential villas, slums etc.).Open land parcels and water bodies are also marked on the map and information was entered in the questionnaire. The information collected from the survey is entered in a structured format. The homogeneous land use parcels are digitised. The field data and the map are linked on the GIS platform for further analysis.

### 2.2.4 *DEMAND – SUPPLY GAP ASSESSMENT*

This includes the assessment of the demand for sanitation infrastructure which is determined by the extent of water required for daily activities, waste water and solid waste generated. The assessment of the supply of sanitation infrastructure is determined by the aggregate of Sewage and Solid Waste collected, transported and safely disposed.

**Figure 13 : Gap Analysis**




### 2.2.5 *CONSULTATION WITH THE CTF*

After the assessment of demand supply situation and the gap analysis, a consultation meeting shall be organised with the CTF members to share the findings.

#### 2.2.6 *ASSESSING TECHNOLOGY OPTIONS*

Based on the situation analysis an internal workshop will be organised to discuss possible strategies and approaches for solving the sanitation issues. Here technology options will be discussed and decided upon by the experts in the team. Based on this discussion, schematic designs will be prepared.

#### 2.2.7 *STRATEGIES AND PROJECT FORMULATION*

Strategies and solutions shall be prepared for all the un-served areas in the city. In addition, a strategy to address the sanitation needs of future population growth shall also be formulated through project solutions as well as recommendations to policy and legislation.

#### 2.2.8 *DRAFT CITY SANITATION PLAN*

Based on the situation analysis, strategy formulation and technology selection, a draft city sanitation plan shall be prepared for Loni. This shall include schematic designs, broad cost estimates and an implementation strategy.

#### 2.2.9 *FINAL CITY SANITATION PLAN*

In consultation with the CTF, the city sanitation plan will be finalised.

### 2.3 CAPACITY BUILDING & TRAINING NEEDS ASSESSMENT

- Benchmarking of capacities of the Nagar Palika Parishad
- Training needs Assessment
- Formation of a Technical Core Group & Training Workshop Series

# Chapter 3. AN INTRODUCTION TO LONI

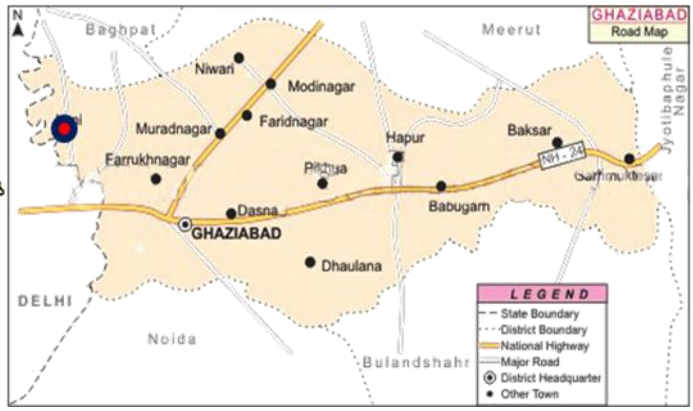
## 3.1 LOCATION AND KEY CHARACTERISTICS

Loni town in situated on the National Highway from Delhi to Saharanpur at a distance of 9 kms from National Capital Delhi, 69 kms from Meerut, 19 kms from district headquarter Ghaziabad and 499 kms. from State Capital Lucknow. It is just 8 KM from Shahdara Metro Station (Delhi) and 12 km from ISBT Kashmiri Gate and Anand Vihar Terminal. After third phase expansion of Delhi Metro, the DMRC has a station within Loni at Johari Enclave, which is proposed to be built on a 3km extension of the Yamuna Vihar line to Shiv Vihar in the third phase of expansion of the Metro network It is very well connected with all the neighboring towns by all weather motorable roads.

Loni Assembly comes under Ghaziabad (Lok Sabha constituency).As per the notification No. 282/UP/2006 Loni also become a separate Assembly Constituency as 53-loni .Loni has its own independent urban local body (Nagar Palika Parishad) and this town is also head quarter of block Loni of district Ghaziabad.

**Map 1: Ghaziabad, Loni Location**


**Map 2: NCR, Ghaziabad Location**



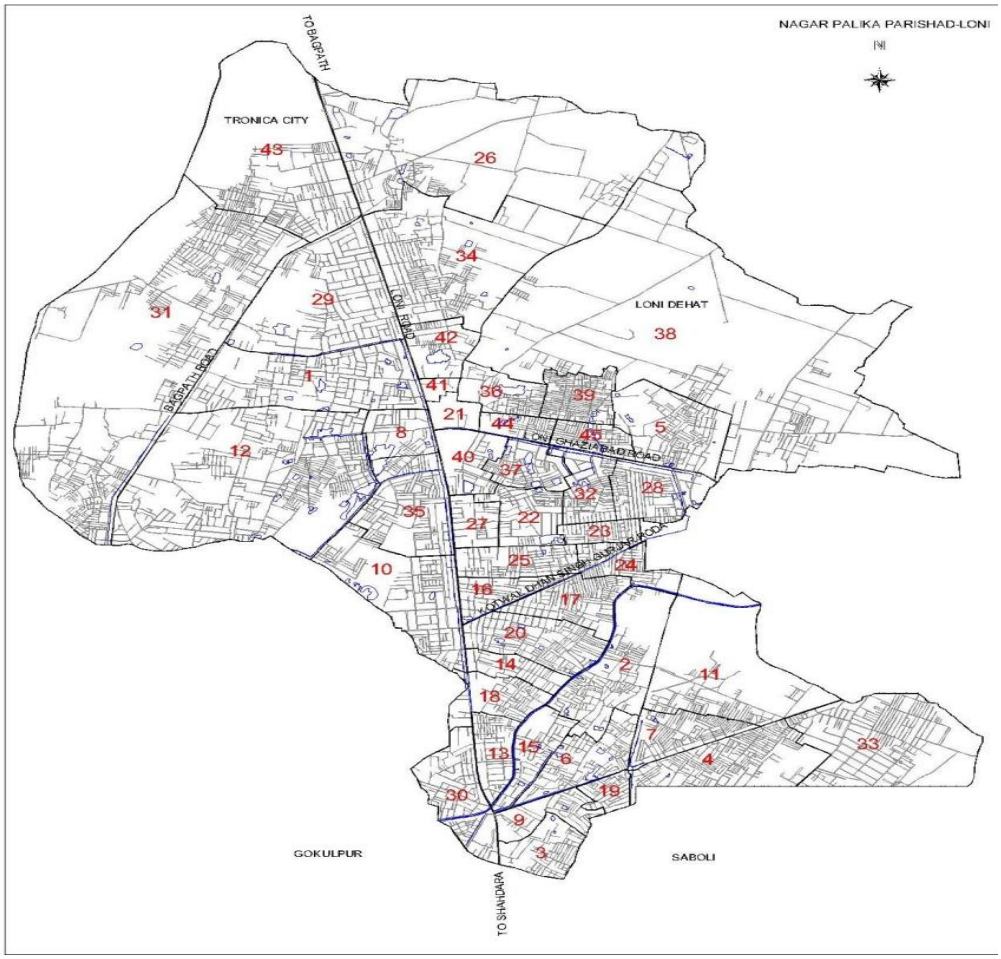

### 3.1.1 *Topography*

The old town, which is central part, is situated on a hillock with a level variation from 206 to 224 m above m.s.l. The topography of the old town is very undulating, while the other parts, of the town have quite flat topography. The sub soil water level is 7.0 to 10.0 m below ground level.

**Socio – Economic Condition**

Loni is an important commercial center of district Ghaziabad. There are a number of cottage industries in the town, where handloom cloth is dyed and printed. These cottage industries are increasing rapidly due to the demand of handloom cloth in the National Capital Delhi from where a large quantity of this cloth is being exported to other countries. Loni is surrounded by many villages hence a lot of people are engaged in agriculture or agro based activities. The majority of the population in the town is service class, working in various industries, state and central Govt, offices and many commercial institutions. Economic condition of the people is generally satisfactory. There exists, all modern amenities like transportation, electricity, telephone -landline as well as mobile,- water supply and medical facilities. The town has many primary schools, middle level schools and three no. Intermediate colleges, one primary health center and a few private nursing homes, telephone exchange and two no. cinema halls. A police station also exists in the town. Loni being very near to Delhi, the students get their higher and professional education from Institutes of Delhi or Ghaziabad and a sizable number of residents get their marketing needs or healthcare from Delhi or Ghaziabad

**Figure 14: Loni, Connectivity with Surrounding Areas**



Being in close proximity of Delhi, this town is one of the important urban center of National Capital Region (N.C.R.). Tronica city, an industrial area, has been developed by U.P. Industrial Development Corporation, (UPSIDC) which is about 6 km from the town.

Housing Development Schemes in Loni are controlled by GDA (Ghaziabad Development authority).Indrapuri (ABCD Blocks) is the largest and one of the oldest residential colony approved by GDA in Loni. Some GDA approved colonies are best to live in Loni. Famous colonies in Loni include Lal Bagh /(best in loni), Balram Nagar,Laxmi Garden, Paramhans Vihar, Khanna Nagar, Ram Park, Rameshwar Park, SLF Vihar and DLF Ankur Vihar and 80% population lives in colonies,20% population lives in village. It is situated on the main State Highway 57 (Delhi Yamunotri Marg). The colonies are mostly inhabited by a large number of retired/serving Government Employees and private sector employees. Here most amenities are within walking distance, such as The State Bank of India, Balram Nagar & Telephone Exchange office, Electric Power House, Punjab National Bank, Community Health Center and Police Station.SLF Ved Vihar and DLF Ankur Vihar are located along the Khajuri pusta road and the Delhi border.The periphery of the colony touches Shiv Vihar and Shanti Nagar area of Delhi. DLF Ankur Vihar is one of residential colony situated near to Delhi Karawal Nagar.

In Loni, GAIL commissioned world's longest and India's first Cross Country LPG Transmission Pipeline from Jamnagar to Loni in 2001.GAIL's LPG transmission business includes the 1927-km LPG pipeline networks that connect the Western, Northern and Southern part of India. These include the world's longest exclusive LPG pipeline from Jamnagar, Gujarat, to Loni, near Delhi (another 70 km has been added to this system between Kandla and Samakhiali, in Gujarat, to facilitate the transportation of LPG imported at Kandla port).

Thus, due to all the reasons mentioned above, Loni has become a fast growing town in all spheres and all round development is taking place at a faster pace. There is no sewerage system in the town so far, but the projects for sewerage system, proper drainage system and municipal solid waste management are being prepared under UIDSSMT programme and it is expected that the town will be having sewerage, drainage and organized municipal solid waste management system in near future.

Before 1968, Loni was a Gram Sabha comprising of villages Vikas Nagar, Sale Nagar and Sadullabad. In the year 1968, Loni was notified as a town area committee. Village Vikas Nagar and Sadullabad were not included in Loni TAC. The colonies included in the town area were old Loni town on hillock, Balram Nagar, Lalbagh, Indrapuri, Naipura and Industrial Estate. In due course of time, it was upgraded as Nagar Palika Parishad due to increase in size and population.

There has been a rapid development of this town during the past decades. Due to its proximity from the National capital Delhi, there has been a large shifting of population from Delhi in this town resulting in abnormal increase in population of the town. Some small industries have also shifted from Delhi. The population of the town in the year 198land 1991 was only 14317 and 36561 respectively, which has increased to 120659 in the year 2001. In November 2005, many villages namely Behta Hazipur, Mandola, Loni Dehat and Pabi Sadikpur etc. have been merged in Nagar Palika Parishad, Loni, resulting in a large increase in its Municipal boundary. These villages are also on the peripheral boundary of Delhi and population of these villages has also increased rapidly during past two decades. Prior to merging of these villages in Nagar Palika Parishad, Loni, the area of the town with in old municipal boundary was divided in 18 wards. Now after inclusion of the above villages in Nagar Palika Parishad, Loni and due to development of various new colonies beyond the old municipal boundary of the town, the area within the recently extended municipal boundary has now been divided into 45 wards. The total population of all the 45 wards has been finalized as 5,12,296 by the Nagar Palika Parishad, Loni, as approved by the Nagar Vikas Vibhag of the State Government.

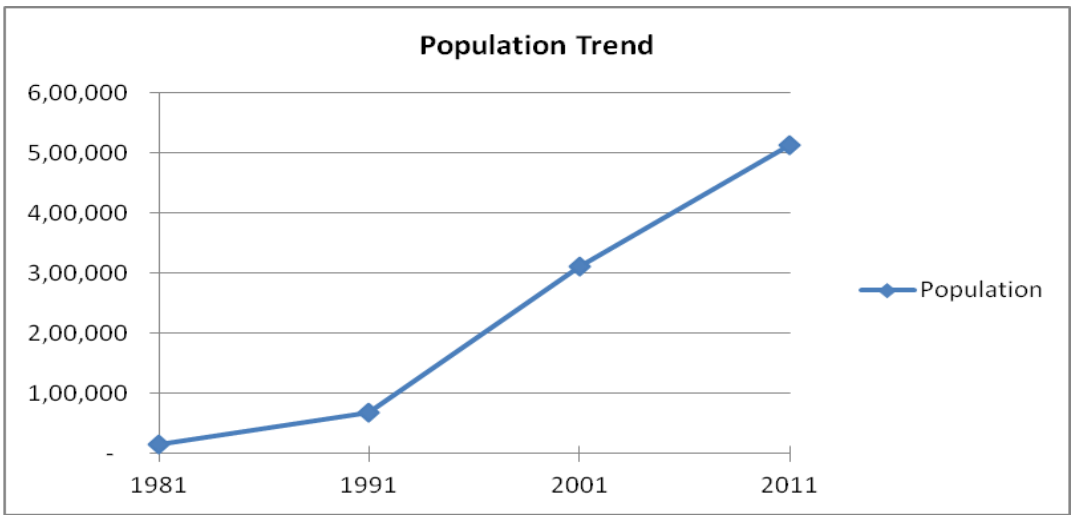
## 3.2 DEMOGRAPHY

The total population of Loni Nagar Palika Parishad during Census 2001 was counted as 3,10,328 persons, which increased to 5, 12,296 persons during Census 2011. Thus there is a net accretion of 2,01,968 persons during 2001 -11 decades, which is about 65% during the decade.

### 3.2.1 *Population Trend*

The figure below shows the considerable growth of population in Loni Town.

**Figure 15: Population Trend (1981 -2011)**



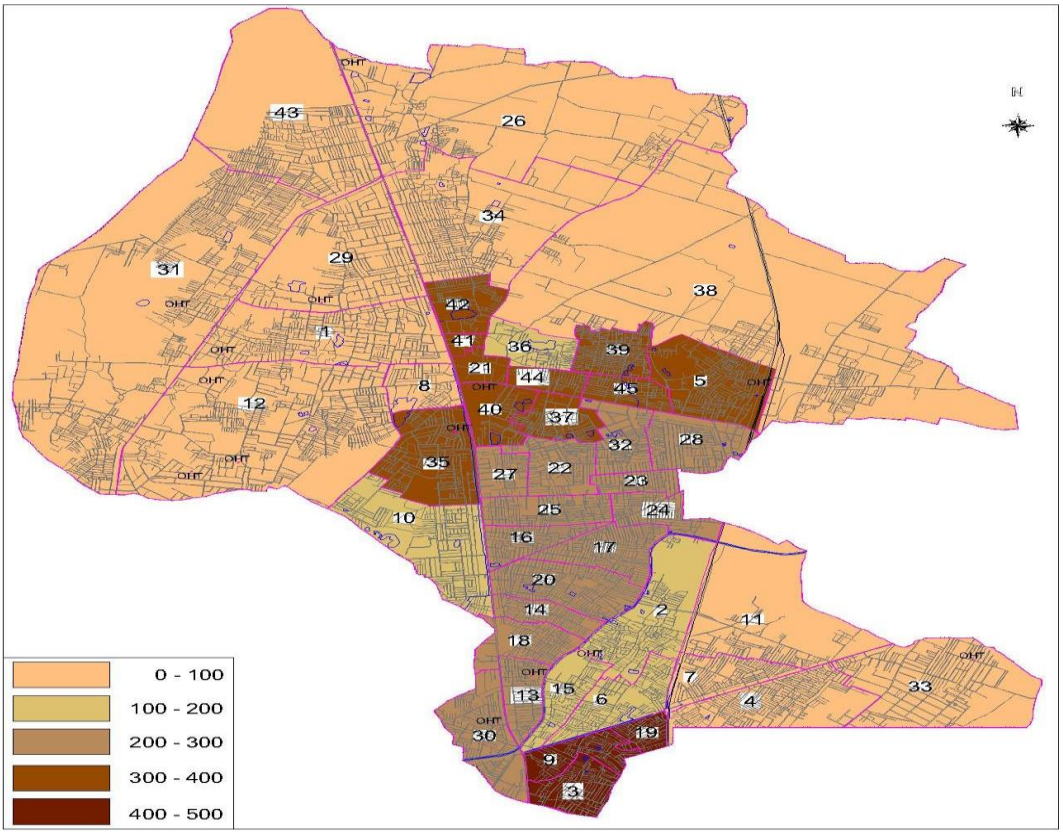
### 3.2.2 *Population Density*

The population density of Loni during 2011 has been observed to be about 14673 PPH, which was about 8866 PPH during the year 2001. The increase in density of population has been observed to be about 5807 pph with respect to the year 2001which indicates that 5807 persons have been added on 1 hectare of an area during 2001 – 2011 decade. The population density trend for Loni during the last 50 years has been presented in figure given below.

**Table 3 : Population Trend (1981 -2011)**

| Year | Population | Population Density | Decadal Growth |
|---|---|---|---|
| 1981 | 14,317 | 410 | |
| 1991 | 66,921 | 1,917 | 52,604 |
| 2001 | 3,10,328 | 8,889 | 2,43,407 |
| 2011 | 5,12,296 | 14,675 | 2,01,968 |
| | | **Avg. Decadal Growth** | **1,65,993** |

**Map 3: Ward Wise Population Density, 2001**




Source: Nagar Palika Parishad

### 3.2.3 *SEX RATIO*

Sex ratio denotes the number of females per 1000 males. As of 2011 India census, Loni had a population of 5,12,296. Males constitute 2,75,000 (52.8%) of the population and females 2,45,000(47.2%).So, there is 853 females per thousand males.But its urban / metropolitan population is 2,358,525 of which 1,256,783 are males and 1,101,742 are females.

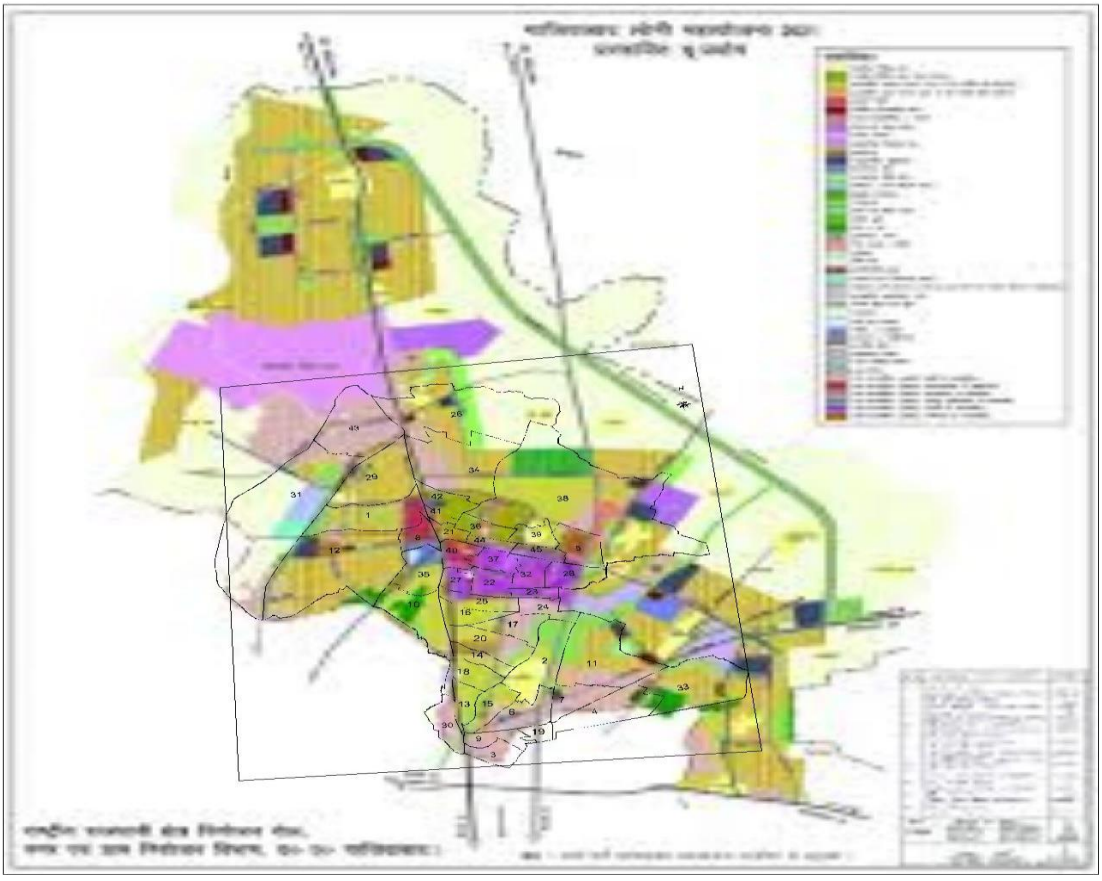
### 3.2.4 *LITERACY*

Literacy is one of the important social indicators to measure the development of its inhabitants. It affects the different population dynamics. Loni has an average literacy rate of 71.02 %, male literacy is 83.14%, and female literacy is 66.15%. In Loni, 20% of the population is under 6 years of age.Rise in female literacy is a healthy phenomenon for the society and city.

### 3.2.5 *EXISTING LAND USE IN THE CITY*

It is very much evident that the predominant land use in the city is Residential in nature 79% followed by 21% commercial

**Map 4: Master Plan, Loni Ghaziabad**



Source: GDA, Master Plan

### 3.2.6 *OVERALL CITY and INFRASTRUCTURE STATUS*

**Table 4: City Status**

| Parameters | Value and Ranges |
|---|---|
| Municipal Area | 34.68 sq km |
| Population, (2011) | 5,12,296 |
| No. of Election Wards | 45 |
| House Holds | 9,1220 |
| Slum House Hold Population | 1,06,148 |
| Literacy Rate | 71.02% |
| Literacy Growth Rate | 1.247% |
| No. of Sabzi Mandi | 2 |
| No. of Bus Terminus | 2 |
| No. of Railway Stations | 1 |
| Gov. Hospital | 1 ( 100 Bed) |
| Nursing Home | 41 (80 Bed) & 22 Pathology Centre |
| No. of Pvt. Schools and Institutions | 120 |
| No. of Degree Collage | 1 |

*Source: Nagar Palika Parishad*

## 3.3 CITY LEVEL POPULATION PROJECTIONS

The population is one of the major factors in determining future patterns of progress and development of the city. As per Census 2011 Loni has population of 5,12,296 persons. The population of Loni has increased from 3,10,328 persons in 2001 to 5,12,296 in 2011, recording a decadal growth rate of 65 percent.

There are 3 commonly used methods to assess population projection namely, Arithmetic Increase method, Geometric increase method and Incremental increase method.

### 3.3.1 *ARITHMETIC INCREASE METHOD:*

In this method, the rate of growth of population is assumed to be constant. This method a low estimate, and can be adopted for forecasting populations of large cities which have achieved saturation conditions. The average decadal increase in population as forms the basis of projections.

**Pn =** P (last year known) + n*x where Pn, Population of the year to be known
**n =** number of decades
**x =** average arithmetic increase per decade

### 3.3.2 *GEOMETRIC INCREASE METHOD:*

This method assumes that the percentage of increase in population from decade to decade is constant. This method gives high results, as the percentage increase gradually drops when the growth of the cities reach the saturation point. This method is useful for cities which have unlimited scope for expansion and where a constant rate of growth is anticipated.

Geometric mean, rg =3.66
Population, $Pn = P_{\text{year known}}(1+rg)^n$

### 3.3.3 *INCREMENTAL INCREASE METHOD: (METHOD OF VARYING INCREMENT)*

In this technique, the average of the increase in the population is taken as per arithmetic method and to this, is added the average of the net incremental increase, one for every future decade whose population figure is to be estimated. In this method, a progressive increasing or decreasing rate rather than constant rate is adopted.

$P\ n=P1+ n*x+ \{n\ (n+1)/2\}\ x\ y$

where **Pn** = population of the year to be known

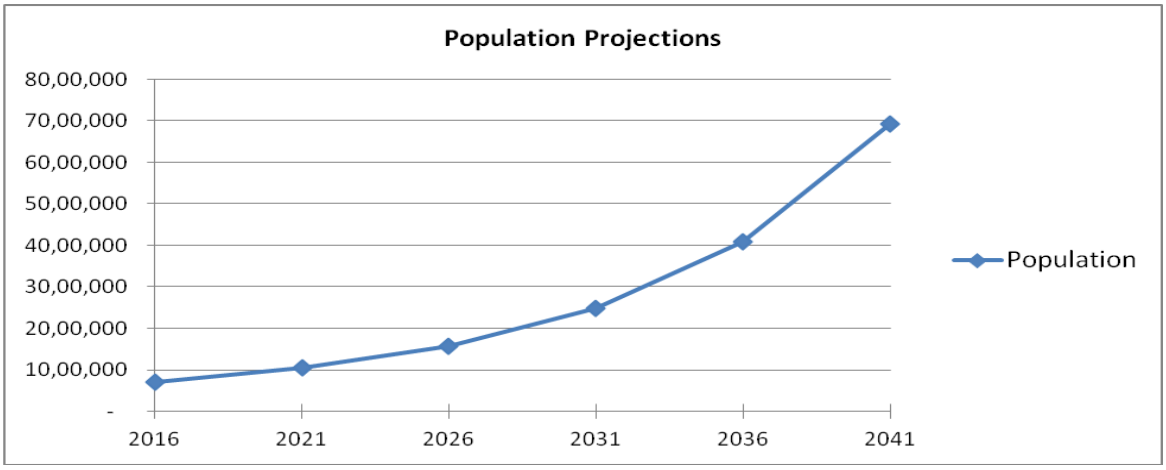
**n** = number of decades
**x** = average arithmetic increase per decade
**y** = average incremental increase per decade

The population projection for Loni has been carried out for 30 years at an interval of 5 years and result are summarized in Table below -

**Table 5: City Wise Projected Population (2016-2041)**

| Year | Arithmetic | Geometric | Incremental | Average | Population Density |
|---|---|---|---|---|---|
| **2011** | 5,12,296 | 5,12,296 | 5,12,296 | 5,12,296 | 14,675 |
| **2016** | 5,95,293 | 9,29,963 | 6,23,298 | 7,16,185 | 20,515 |
| **2021** | 6,78,289 | 16,88,148 | 7,52,971 | 10,39,803 | 29,785 |
| **2026** | 7,61,286 | 30,64,470 | 9,01,314 | 15,75,690 | 45,136 |
| **2031** | 8,44,282 | 55,62,887 | 10,68,328 | 24,91,832 | 71,379 |
| **2036** | 9,27,279 | 1,00,98,226 | 12,54,012 | 40,93,172 | 1,17,249 |
| **2041** | 10,10,275 | 1,83,31,158 | 14,58,367 | 69,33,267 | 1,98,604 |

**Figure 16: City Wise Projected Population (2016-2041) using Average Deduced Projections**




## 3.4 WARD WISE POPULATION PROJECTIONS

Ward wise population projection is calculated based on share of ward population in total city population as per 2011 census. The results are provided in Table below.

**Table 6: Ward Wise Projected Population**

| Total Population | 3,10,328 | | 5,12,296 | 7,16,185 | 10,39,803 | 15,75,690 | 24,91,832 | 40,93,172 | 69,33,267 |
|---|---|---|---|---|---|---|---|---|---|
| **Ward No.** | **2001** | **% of Population** | **2011** | **2016** | **2021** | **2026** | **2031** | **2036** | **2041** |
| **1** | 7,900 | 2.55% | 13,041 | 18,232 | 26,470 | 40,112 | 63,434 | 1,04,200 | 1,76,500 |
| **2** | 7,635 | 2.46% | 12,604 | 17,620 | 25,582 | 38,767 | 61,307 | 1,00,704 | 1,70,579 |
| **3** | 7,925 | 2.55% | 13,083 | 18,290 | 26,554 | 40,239 | 63,635 | 1,04,529 | 1,77,058 |
| **4** | 6,910 | 2.23% | 11,407 | 15,947 | 23,153 | 35,086 | 55,485 | 91,142 | 1,54,381 |
| **5** | 7,920 | 2.55% | 13,075 | 18,278 | 26,537 | 40,214 | 63,595 | 1,04,463 | 1,76,947 |
| **6** | 6,415 | 2.07% | 10,590 | 14,805 | 21,494 | 32,572 | 51,510 | 84,613 | 1,43,322 |
| **7** | 6,175 | 1.99% | 10,194 | 14,251 | 20,690 | 31,354 | 49,583 | 81,447 | 1,37,960 |
| **8** | 7,690 | 2.48% | 12,695 | 17,747 | 25,767 | 39,046 | 61,748 | 1,01,430 | 1,71,808 |
| **9** | 7,779 | 2.51% | 12,842 | 17,953 | 26,065 | 39,498 | 62,463 | 1,02,604 | 1,73,796 |
| **10** | 7,910 | 2.55% | 13,058 | 18,255 | 26,504 | 40,163 | 63,515 | 1,04,332 | 1,76,723 |
| **11** | 6,555 | 2.11% | 10,821 | 15,128 | 21,964 | 33,283 | 52,635 | 86,459 | 1,46,450 |
| **12** | 7,910 | 2.55% | 13,058 | 18,255 | 26,504 | 40,163 | 63,515 | 1,04,332 | 1,76,723 |
| **13** | 7,890 | 2.54% | 13,025 | 18,209 | 26,437 | 40,061 | 63,354 | 1,04,068 | 1,76,276 |
| **14** | 6,250 | 2.01% | 10,318 | 14,424 | 20,942 | 31,734 | 50,185 | 82,436 | 1,39,636 |
| **15** | 6,320 | 2.04% | 10,433 | 14,585 | 21,176 | 32,090 | 50,748 | 83,360 | 1,41,200 |
| **16** | 6,100 | 1.97% | 10,070 | 14,078 | 20,439 | 30,973 | 48,981 | 80,458 | 1,36,285 |

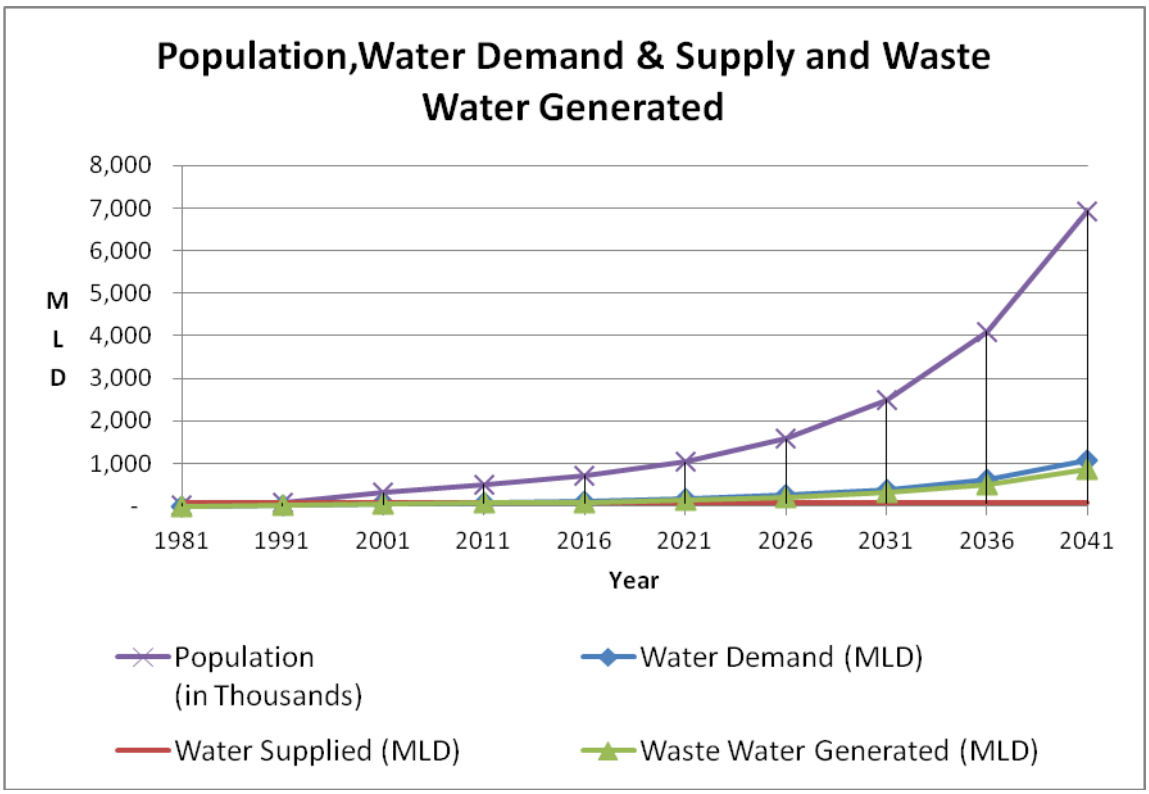
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **17** | 7,900 | 2.55% | 13,041 | 18,232 | 26,470 | 40,112 | 63,434 | 1,04,200 | 1,76,500 |
| **18** | 7,141 | 2.30% | 11,789 | 16,480 | 23,927 | 36,258 | 57,340 | 94,189 | 1,59,542 |
| **19** | 5,895 | 1.90% | 9,732 | 13,605 | 19,752 | 29,932 | 47,335 | 77,754 | 1,31,705 |
| **20** | 7,920 | 2.55% | 13,075 | 18,278 | 26,537 | 40,214 | 63,595 | 1,04,463 | 1,76,947 |
| **21** | 6,020 | 1.94% | 9,938 | 13,893 | 20,171 | 30,567 | 48,339 | 79,403 | 1,34,497 |
| **22** | 6,560 | 2.11% | 10,829 | 15,139 | 21,980 | 33,308 | 52,675 | 86,525 | 1,46,562 |
| **23** | 6,144 | 1.98% | 10,143 | 14,179 | 20,586 | 31,196 | 49,334 | 81,038 | 1,37,268 |
| **24** | 6,910 | 2.23% | 11,407 | 15,947 | 23,153 | 35,086 | 55,485 | 91,142 | 1,54,381 |
| **25** | 5,985 | 1.93% | 9,880 | 13,812 | 20,054 | 30,389 | 48,058 | 78,941 | 1,33,715 |
| **26** | 7,046 | 2.27% | 11,632 | 16,261 | 23,609 | 35,776 | 56,577 | 92,936 | 1,57,420 |
| **27** | 6,160 | 1.98% | 10,169 | 14,216 | 20,640 | 31,277 | 49,463 | 81,249 | 1,37,625 |
| **28** | 6,248 | 2.01% | 10,314 | 14,419 | 20,935 | 31,724 | 50,169 | 82,410 | 1,39,591 |
| **29** | 7,890 | 2.54% | 13,025 | 18,209 | 26,437 | 40,061 | 63,354 | 1,04,068 | 1,76,276 |
| **30** | 5,900 | 1.90% | 9,740 | 13,616 | 19,769 | 29,957 | 47,375 | 77,820 | 1,31,816 |
| **31** | 6,520 | 2.10% | 10,763 | 15,047 | 21,846 | 33,105 | 52,353 | 85,998 | 1,45,668 |
| **32** | 6,230 | 2.01% | 10,285 | 14,378 | 20,875 | 31,633 | 50,025 | 82,173 | 1,39,189 |
| **33** | 5,865 | 1.89% | 9,682 | 13,535 | 19,652 | 29,780 | 47,094 | 77,358 | 1,31,034 |
| **34** | 7,890 | 2.54% | 13,025 | 18,209 | 26,437 | 40,061 | 63,354 | 1,04,068 | 1,76,276 |
| **35** | 7,925 | 2.55% | 13,083 | 18,290 | 26,554 | 40,239 | 63,635 | 1,04,529 | 1,77,058 |
| **36** | 7,850 | 2.53% | 12,959 | 18,116 | 26,303 | 39,858 | 63,033 | 1,03,540 | 1,75,383 |
| **37** | 7,850 | 2.53% | 12,959 | 18,116 | 26,303 | 39,858 | 63,033 | 1,03,540 | 1,75,383 |
| **38** | 5,870 | 1.89% | 9,690 | 13,547 | 19,668 | 29,805 | 47,134 | 77,424 | 1,31,146 |
| **39** | 5,900 | 1.90% | 9,740 | 13,616 | 19,769 | 29,957 | 47,375 | 77,820 | 1,31,816 |
| **40** | 7,750 | 2.50% | 12,794 | 17,886 | 25,968 | 39,351 | 62,230 | 1,02,221 | 1,73,148 |
| **41** | 6,084 | 1.96% | 10,044 | 14,041 | 20,385 | 30,892 | 48,853 | 80,247 | 1,35,927 |
| **42** | 5,900 | 1.90% | 9,740 | 13,616 | 19,769 | 29,957 | 47,375 | 77,820 | 1,31,816 |
| **43** | 7,926 | 2.55% | 13,084 | 18,292 | 26,557 | 40,244 | 63,643 | 1,04,543 | 1,77,081 |
| **44** | 5,890 | 1.90% | 9,723 | 13,593 | 19,735 | 29,906 | 47,295 | 77,688 | 1,31,593 |
| **45** | 5,875 | 1.89% | 9,699 | 13,559 | 19,685 | 29,830 | 47,174 | 77,490 | 1,31,258 |

## 3.5 POPULATION PROJECTIONS AND SANITATION SERVICES DEMAND

**Table 7: Infrastructure and Population Demand**

| **Infrastructure Demand** | **Population** | | | |
|---|---|---|---|---|
| | 2011 | 2021 | 2031 | 2041 |
| Projected Population | 5,12,296 | 10,39,803 | 24,91,832 | 69,33,267 |
| Gross Water Demand in MLD | 80 | 160 | 386 | 1076 |
| Solid Waste Generation TPD | 158 | 322 | 772 | 2149 |
| Waste Water Generation in MLD | 63.62 | 129 | 309 | 861 |

**Figure 17: Population and Sanitation Projection (1981-2021)**




**Gross Water Supply** demand will be 160 MLD in 2021 and increase to 368 MLD in 2031 and 1076 MLD in 2041. These translate to a **waste water generation** (@ 80% of net water consumed.

**Solid Waste generation** is likely to grow at a faster place due to a combination of population growth and increase in per capita consumption to 322 TPD in 2021, 772 TPD in 2031 and 2149 TPD in 2041.

The demand for **Public Toilet blocks and Community toilet blocks** is expected to increase with increasing public awareness.

# SECTION II PLAN COMPONENTS

# Chapter 4. ACCESS TO TOILETS FACILITIES

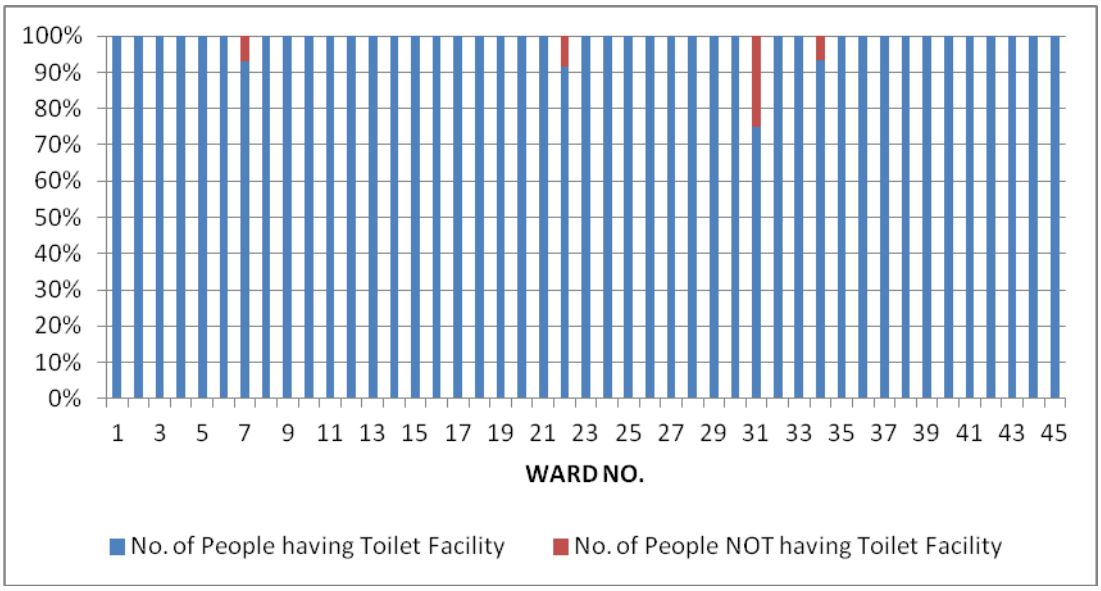
## 4.1 CITY LEVEL STATUS

Our specific observations on baseline status with respect to access to toilets are summarised below:

- **Coverage:**

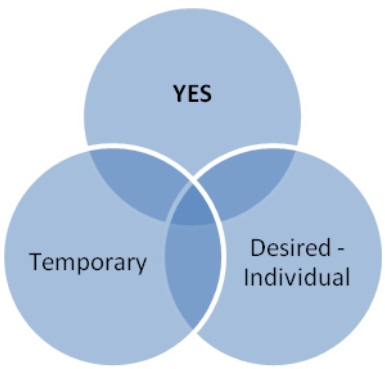
The primary household survey conducted as part of the CSP exercise concerning toilet facilities reveals nearly 96% of respondents having access to toilets which are temporary but they desire individual in-house toilet facilities.

**Figure 18: Access to Toilet, Coverage**



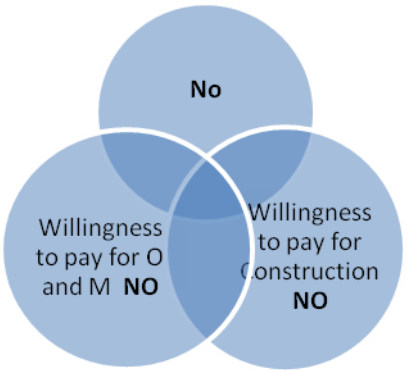

Source: Primary Survey

**Figure 19: Access to Toilet**




Source: Primary Survey

**Figure 20: Access to Community Toilet**




Source: Primary Survey

- **Open defecation**

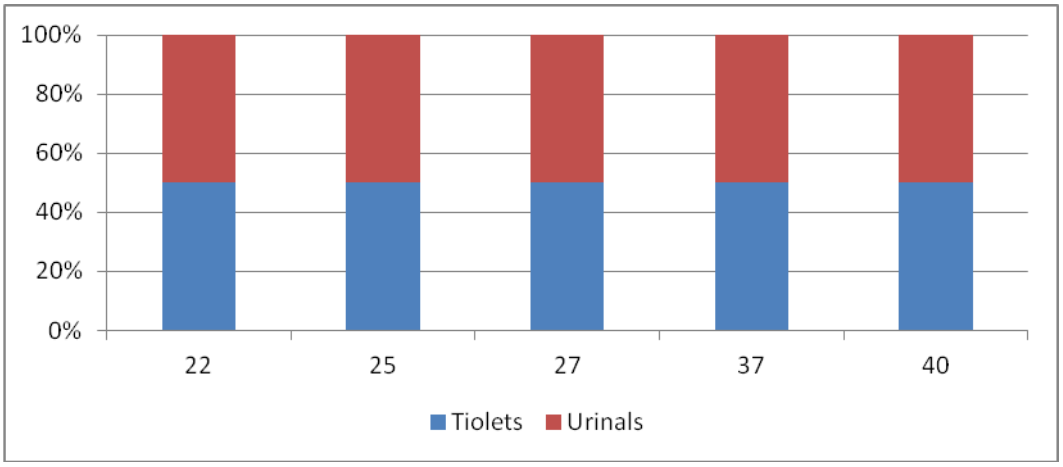
Prevalence of Open Defecation is rare and limited to areas near slum pockets Open urination is rampant in commercial areas particularly in ward 35-36, which suggests the need for greater awareness generation and creation of public toilet facilities in busy commercial areas or unused spots.

**Figure 21: Open Defecation, Ward 35**

Source: Primary Survey

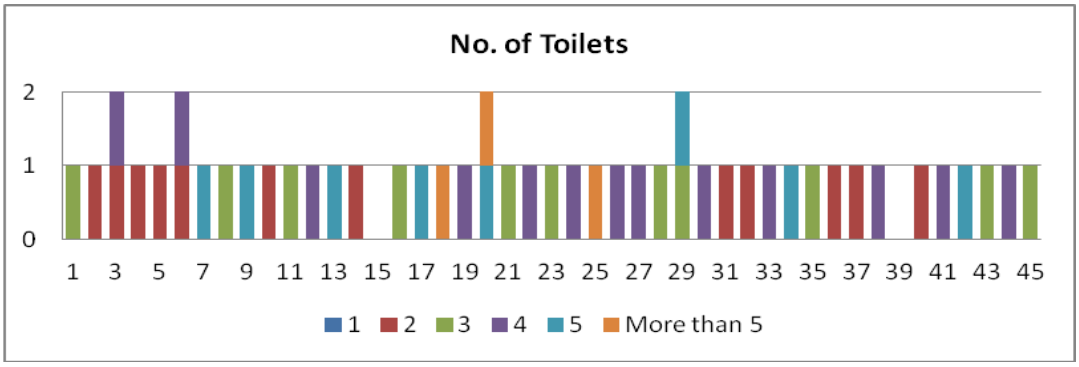
## 4.2 RESULTS OF PRIMARY SURVEYS

**Figure 22: Access to Toilets in Industries**




Source Primary Survey

**Figure 23: Access to Toilets in School**




Source Primary Survey

**Table 8: Access to Toilets in Public Places**

| Ward No. | No. of Public Toilet | Seating Capacity /Urinals |
|---|---|---|
| **5** ( Railway Station, City Hospital) | 2 | 7/7 |
| **33** (Navi Nursing Home) | 1 | 5/5 |
| **36** (Gov. Hospital) | 1 | 6/6 |
| **30** (Bus Stand) | 1 | 5/5 |

Source: Primary Survey

**Table 9: Current Overall Status**

| Ward No. | Ward Area(Hec) | Ward HH | Ward Population | Population Density(PPH) | Slum HH | Slum Population | Land Use |
|---|---|---|---|---|---|---|---|
| Total | 3597.98 | 92,327 | 5,12,296 | Avg. - 351.64 | 22,000 | 10,3900 | |
| 1 | 112.37 | 2695 | 13,041 | 116.05 | 400 | 2000 | Commercial |
| 2 | 77.15 | 2775 | 12,604 | 163.37 | | | |
| 3 | 29.12 | 831 | 13,083 | 449.35 | 850 | 4200 | Commercial |
| 4 | 69.62 | 2043 | 11,407 | 163.84 | 1000 | 4700 | |
| 5 | 65.44 | 2935 | 13,075 | 199.80 | 1500 | 7200 | Public Places |
| 6 | 41.52 | 985 | 10,590 | 255.03 | 1100 | 5150 | |
| 7 | 34.69 | 2233 | 10,194 | 293.86 | 1500 | 7000 | |
| 8 | 26.85 | 1517 | 12,695 | 472.79 | | | Commercial |
| 9 | 25.24 | 1925 | 12,842 | 508.80 | | | Commercial |
| 10 | 90.24 | 2273 | 13,058 | 144.70 | | | Commercial |
| 11 | 132.37 | 1752 | 10,821 | 81.75 | 500 | 1900 | |
| 12 | 261.84 | 5276 | 13,058 | 49.87 | 900 | 4500 | |
| 13 | 25.25 | 1494 | 13,025 | 515.85 | | | Commercial |
| 14 | 19.49 | 1358 | 10,318 | 529.49 | | | Commercial |
| 15 | 30.69 | 2128 | 10,433 | 339.97 | | | |
| 16 | 23.54 | 2112 | 10,070 | 427.73 | 600 | 2750 | Commercial |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 17 | 36.94 | 3678 | 13041 | 352.99 | 1300 | 6200 | |
| 18 | 30.53 | 1736 | 11789 | 386.10 | 600 | 2800 | Commercial |
| 19 | 12.62 | 1094 | 9732 | 771.01 | 300 | 1200 | |
| 20 | 49.13 | 4094 | 13075 | 266.13 | 1900 | 9000 | Commercial |
| 21 | 13.20 | 1145 | 9938 | 752.87 | | | Commercial, Sabzi Mandi |
| 22 | 32.83 | 2395 | 10829 | 329.84 | | | Industrial |
| 23 | 14.87 | 1639 | 10143 | 682.22 | 700 | 3100 | |
| 24 | 26.30 | 2930 | 11407 | 433.66 | 800 | 3700 | |
| 25 | 31.46 | 1781 | 9880 | 314.06 | 1100 | 5200 | Industrial, Commercial |
| 26 | 311.81 | 2219 | 11632 | 37.30 | 500 | 2300 | |
| 27 | 19.61 | 1191 | 10169 | 518.50 | | | Industrial, Commercial |
| 28 | 40.95 | 2092 | 10314 | 251.86 | | | |
| 29 | 128.22 | 2724 | 13025 | 101.59 | | | Commercial |
| 30 | 51.93 | 755 | 9740 | 187.56 | | | Bus Stand, Commercial |
| 31 | 425.01 | 4985 | 10763 | 25.32 | 1200 | 5700 | |
| 32 | 30.36 | 1172 | 10285 | 338.77 | | | |
| 33 | 119.54 | 966 | 9682 | 80.99 | 600 | 2700 | Public Places |
| 34 | 161.33 | 2063 | 13025 | 80.73 | 1000 | 5000 | Commercial |
| 35 | 67.14 | 1574 | 13083 | 194.87 | | | Commercial |
| 36 | 27.23 | 1404 | 12959 | 475.82 | | | Public Places |
| 37 | 26.23 | 1246 | 12959 | 494.04 | | | Industrial |
| 38 | 557.05 | 2100 | 9690 | 17.40 | 450 | 2100 | |
| 39 | 29.41 | 2098 | 9740 | 331.23 | | | |
| 40 | 30.03 | 1879 | 12794 | 426.11 | | | Industrial, Commercial |
| 41 | 5.89 | 1146 | 10,044 | 1706.48 | | | Commercial, Sabzi Mandi |
| 42 | 29.03 | 2079 | 9740 | 335.52 | 900 | 4500 | Commercial |
| 43 | 189.44 | 4082 | 13084 | 69.07 | 2300 | 11000 | Commercial |
| 44 | 14.83 | 881 | 9723 | 655.73 | | | |
| 45 | 19.64 | 847 | 9697 | 493.82 | | | |

Predominant Land Use – Residential (R)

Absence of Slum

In Loni predominant Land use is Residential with some percentage of Commercial (in the wards abutting highway all along the length on both sides), Industrial, Institutional and Public places (Table no.8) as shown in the respective wards. **Population Density, Presence of Slums and Land uses** clearly indicates the

requirement of Public Toilets and Community/Shared Toilets for slums dwellers and general public.

## 4.3 SWOT, ISSUES AND PRIORITIES

The given table captures the SWOT analysis for access to toilets within NPP.

**Table 10: Access to Toilet SWOT**

| STRENGTH | WEAKNESSES |
|---|---|
| • Good Coverage for Toilets Access even if temporary<br>• General awareness on sanitation hygiene is good | • Open Defecation in Slums<br>• Open urination particularly in commercial areas<br>• Limited availability of community toilets in slum pockets and constrained availability of Public Toilets |
| **OPPORTUNITIES** | **THREATS** |
| • Open defecation is limited to selected low-income pockets<br>• People desire individual in house toilets<br>• Limited identifiable areas with no toilet | • No willingness to pay for construction of Community Toilets and its O & M.<br>• Poor Hygiene conditions near open defecation spots and open urination would create health hazards |

**Key issues with respect to Access to Toilets within NPP are summarised below-**

- Open Defecation while rare is still prevalent in selected pockets of the city.
- Open Urination in public places along roadside is rampant in congested commercial areas.
- Priority should be given to the construction of Public toilets with the PHED department in NPP accountable for it.

## 4.4 CONCEPTUAL BASIS AND BEST PRACTICES

While individual household toilets are preferable to communal/public toilets, shared toilet access solutions are still appropriate in specific situations; notably as Community Toilets in slums when a high proportion of tenants are without access to toilets and even Public Toilets in urban pockets such as commercial areas and transit points are loaded. Nonetheless, financing and sustainable management of communal/ public toilets has been challenging, and requires extensive consultation and careful analysis. Our action plans and recommendations for **Shared Toilet Access in Loni** is build on insights from recent studies and research initiatives on this subject.

***Where are public toilets used?***

- The **Sulabh** organisation runs **Pay-per-use toilets** throughout India. Reports suggest that these facilities are profitable in public locations, but tend to be loss-making in residential areas and are often inadequately maintained.

- **Community toilets** are seen in low-income communities of many African and Asian cities. The SPARC model, implemented in Pune and Mumbai are constructed and managed by NGOs under contract from municipality with community involvement. A **moderate per-household** monthly fee is collected.

***Key conclusions***

- Communal or public toilets should only be introduced after exploration of the **social and economic context.**
- People will generally prefer communal toilets closer to home over public toilets located far-off.
- Communal or public toilets are only acceptable if they provide effective service for women and children.
- Communal toilets serving small groups of households and charging a monthly per household fee will be preferred by users, especially women, than pay-per-use public toilets. However, per-capita capital cost tend to be higher.

### 4.4.1 *OPTIONS FOR IMPROVING SERVICE DELIVERY*

Advertising rights potential does make toilet complexes profitable, so that maintenance is commercially viable. The challenge is to develop contracts so that the public service is delivered to an acceptable standard. The following could help:

- **Assess Local Demand before developing New Toilet Blocks**. Where demand is high, toilets can be profitable without advertising revenue. Demand is a prerequisite for contracts based on user charges.
- Revitalize **Monitoring and Strengthen Accountability**. Municipalities need to enforce contract compliance. Media interest, municipal accountability, consumer feedback are possible solutions. Further, service level parameters should be defined and monitored. Punitive measures should be contractually enforced to disincentives in case of poor maintenance.
- Increase **the Lease Period**. Longer lease periods could enable longer term cost recovery plans with proper attention to maintenance when backed by contractually enforcing penalties for poor performance.
- **Bundle Contracts.** Bundling toilets into single contract would simplify administration and reduce monitoring burden.

## 4.5 VISION AND GOALS

4.5.1 *VISION*

**Equitable and Efficient access to Public and Community toilet to "Eliminate Open Defecation" and by making all citizens sanitation-conscious through sustained awareness effort"**

4.5.2 *GOALS*

To meet service delivery targets to achieve the above Vision.

**Table 11: Access to Toilet Supply, SML Term Targets**

| PARAMETER | UNIT | NORM | BASELINE/Ward Number |
|---|---|---|---|
| **Open Defecation** | | | |
| | | | |
| No. of open urination Spots | No. | 0 | **35-36** |
| No. of open defecation spots | No. | 0 | Near Slum Pockets |
| **Toilet Coverage** | | | |
| % households with Toilet access | **%** | 99% | 95% |
| Access to Public Toilets | **F**loating Population/Public | - | 5% |
| Access to Community Toilets | Slum Dwellers/Community | | 0 |

In case like Loni all the **above targets should be met on a short term basis** (3years) as the service delivery rate must be equivalent to rate of growth of city. Medium term (5 years) and Long term (10 years) targets can be proposed in large scale projects.

## 4.6 GAP ANALYSIS

Since most of the wards are low-income high density Shared Toilets in Slums, Public Toilets in busy commercial wards or a combination seems to be an appropriate solution.

For calculating requirement of Public Toilets, we assume **floating population is 5%** of existing population which is 25,614. These toilets will also be accessed by intercity commuters.

**Existing -**

Currently ward number **5** (Railway Station, City Hospital), **33** (Nursing Home), **36** (Gov. Hospital) and **30** (Bus Stand) have 5 Public Toilet with 5-7 seaters as discussed in Table 8.

**Assumption –**

If 30 people use 10 Seater Public Toilet in 1hour, so for 8 hours - 240 people can access 1 Public Toilet.( Each with 10 seated capacity with 50:50 for male and female

usage, suitably located within accessible distance of busy areas like Markets, Sabzi Mandi's, Bus Stands, Railway Stations, etc. )

**Requirement -**

Therefore, **10 – 11 Public Toilets are required in the city**. Now these public toilets will be located in different wards of the city which may or may not have slums but definitely will be a high density ward with busy areas so some Toilets will be commercially viable and some will not be commercially viable.

Apart from this each slum must have at least 1 Shared Toilet facility. Now as per Table 9 the total population of slum is 10, 3900 .Also, minimum slum population is approximately 2000 and maximum is 11000.Using the baseline information and assumption taken above, the table below gives us no. of shared toilets required in each ward with slum.

**Table 12: Ward Wise Toilets Required in Slum (10 Seater)**

| Ward No. | Slum Population | No. of Toilet Required |
|---|---|---|
| 1 | 2000 | 9 |
| 3 | 4200 | 18 |
| 4 | 4700 | 20 |
| 5 | 7200 | 30 |
| 6 | 5150 | 21 |
| 7 | 7000 | 29 |
| 11 | 1900 | 9 |
| 12 | 4500 | 19 |
| 16 | 2750 | 11 |
| 17 | 6200 | 25 |
| 18 | 2800 | 12 |
| 19 | 1200 | 5 |
| 20 | 9000 | 40 |
| 23 | 3100 | 13 |
| 24 | 3700 | 15 |
| 25 | 5200 | 22 |
| 26 | 2300 | 10 |
| 31 | 5700 | 24 |
| 33 | 2700 | 11 |
| 34 | 5000 | 21 |
| 38 | 2100 | 9 |
| 42 | 4500 | 19 |
| 43 | 11000 | 45 |
| Total | 10,3,900 | 437 |

**Gap -**

Firstly up gradation of existing 5 toilets is a priority and then **addition of more 7-8**, 10 seater for Public Toilets is must.

As discussed in Table no.12 437 toilets are required in all slums. Now, cost of one community toilet (10seater), connected to septic tank is Rs. 1000,000

**Total cost for Public and Shared Toilet Facility is (8+437)*1000000 = Rs.44, 70, 00,000 (44 Cr. 70 lac)**

## 4.7 RECOMMENDATIONS

We suggest PPP model for the large number of requirement .There are 2 ways in which the bidding can take place in PPP model. Firstly all the public toilets can be bid for separately and all shared toilets in slums can be bid separately. But the slum is occupied by economically weaker section so for a successful sanitation scheme in these wards it is advisable for grouping of Toilet facility(**group bidding**) to a contractor with few commercially viable and few commercially unviable located toilet sites. This would be a win- win situation where profit from the viable sites can be used to run the toilets in unviable sites.

Also once the private party develops the facility on the land provided by ULB, it can avail 20% subsidy from the ULB for the O and M of the facility every month.

Recommendations are summarised in detail below

**Table 13: Recommendation, Access to Toilets**

| ACTIONS | RECOMMENDED BODY |
|---|---|
| **Prepare and Implement a city wide Public and Community Toilet Development/Rehabilitation Plan** | NPP |
| • Prepare a DPR to identify locations, configuration and sizing of Public and Community Toilets | |
| • Simultaneously replace dilapidated open urinals with enclosed toilets where feasible and required | |
| • Provide Community Toilets, starting with identified locations with high OD prevalence | |
| • Provide Public Toilets starting with identified areas having high floating population | |
| • Progressively increase Public Toilet access to meet a city wide standard (say 1 every 500 m) | |
| **Implement a comprehensive inspection/monitoring** | NPP/UPSIDC |
| • Render existing toilets usable through designated accountability among sanitation officials | |
| • Engage local stakeholders in maintenance, monitoring and oversight of shared toilets | |

| | |
|---|---|
| • Periodic Third Party Audit of facilities and reviews | |
| **Strengthen capacity through formulation of bye-laws and guidelines** | State Gov. |
| • Incorporate Toilet Sizing and specifications as part of Building regulations. | |
| • Incorporate fines for open defecation and urination in Sanitation bye-laws | |
| **Drive behaviour change through awareness campaigns** | NPP/UPSIDC |
| • Initiate a Slum level sanitation campaign to eliminate open defecation | |
| • Initiate a Trader-support campaign in commercial areas to eliminate open urination | |
| • Initiate a school campaign to impart positive behaviours on civic duties, sanitation and toilet use | |
| **Initiate actions to improving financial sustainability** | NPP/UPSIDC |
| • Prepare a Toilet Budget annually | |
| • Explore appropriate outsourcing models for Public Toilets | |
| • Encourage adoption of toilets through Corporate Social Responsibility initiatives | |

Priorities:

a) Create access to Public/Community Toilets to eliminate Open Defecation and Urination

b) Create Awareness on Hygiene and Health Impacts and drive behaviour change

c) Fix accountability, Enforce Standards, and Strengthen Monitoring

d) Assess financing needs and address them innovatively to ensure Sustainable operations.

# Chapter 5. WATER SUPPLY

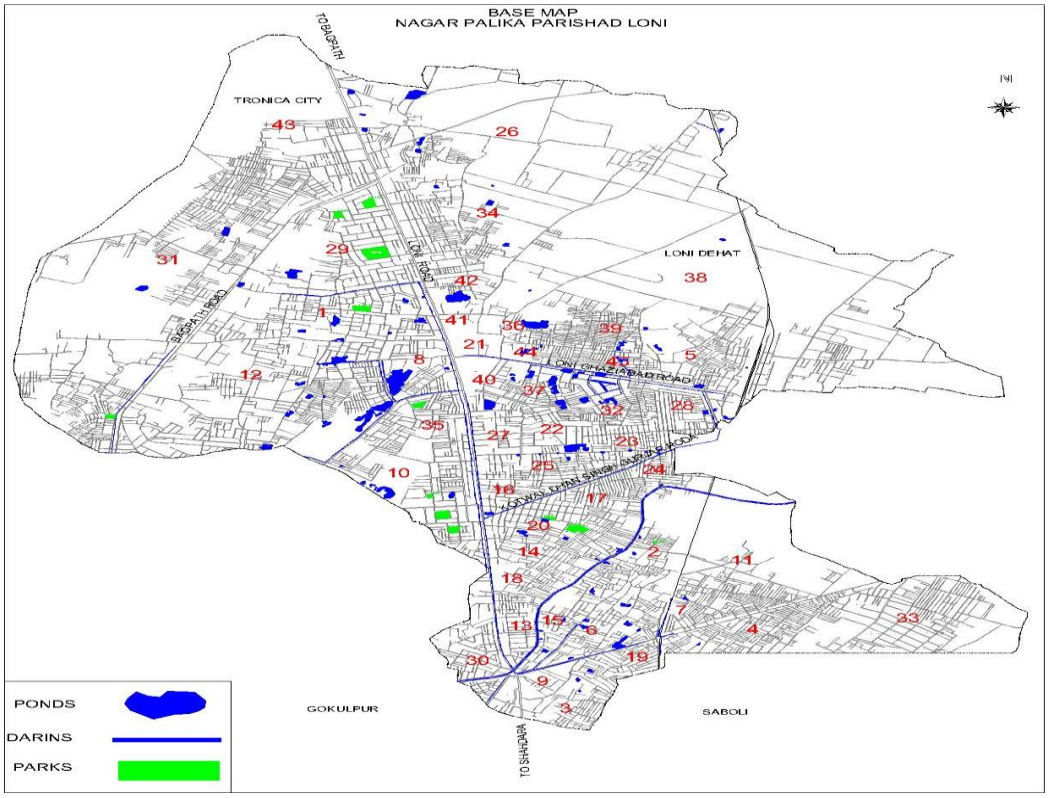
## 5.1 CITY LEVEL STATUS

- **Sources and Availability**

The river Yamuna is flowing at a distance of approximately 5 kms from Loni town. The quality of water of this river is not fit for human consumption and it requires costly head works, complete and comprehensive treatment and lengthy rising main. Moreover, the flow available in this river is not adequate round the year. In comparison, the quality of ground water in and around Loni town is good enough for human consumption and the tube wells are quite successful in the area. Thus, drawing ground water from tube wells is the only alternative as the reliable source of water. The adopted yield for the existing tube wells at the time of commissioning was 2000 to 2500 1pm.

At present, there are 4 no. water supply zones, but the distribution of water in the town is inequitable and proper pressure is not maintained in many areas. Moreover, the existing water supply system is catering to the needs of vary small population and area of the town. Therefore, rezoning of the water supply arrangements has been done on city level.

**Map 5: Water Bodies in Loni**




Source: Nagar Palika Parishad

- **Services in Waters Infrastructure**

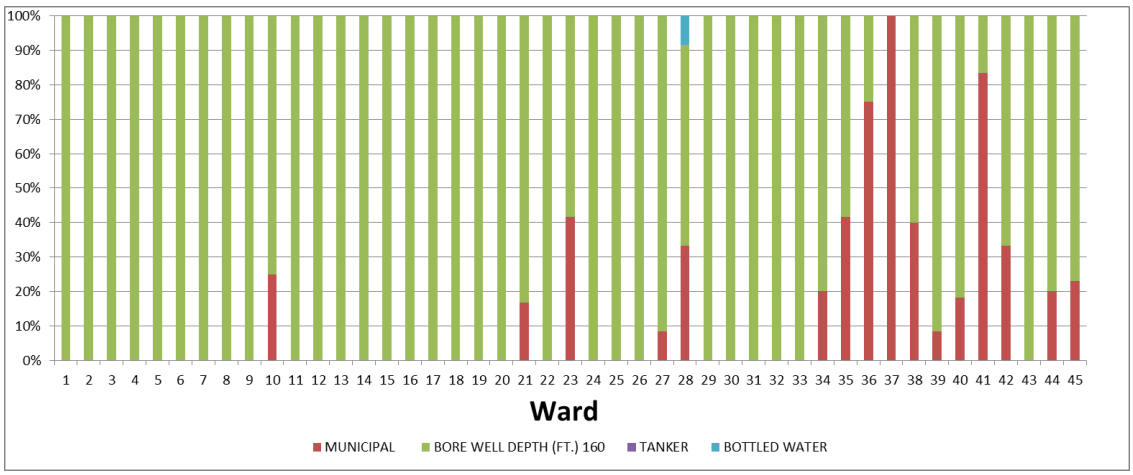
**Table 14: Water Infrastructure**

| | |
|---|---|
| Sources of Water | Ground Water(most reliable) |
| Water Supply Zones | 4 (inequitable distribution with lack in adequate pressure maintenance in many cases) |
| Coverage of Water Supply | 12.16% |
| Per capita supply of Water | 148 lpcd |
| No. of Tube Wells | 37 |
| No. of Over Head Tanks | 11 |
| No. of Hand Pumps | 1508 |
| Water Treatment Plant (WTP)- | NA |
| No. of Drain | 15 |
| Length of Line | 20400metres |

### 5.1.1 *CITY LEVEL STATUS*

To explain the city level status ward wise data from primary surveys was collected and then has been analysed and presented in the form of charts and tables.

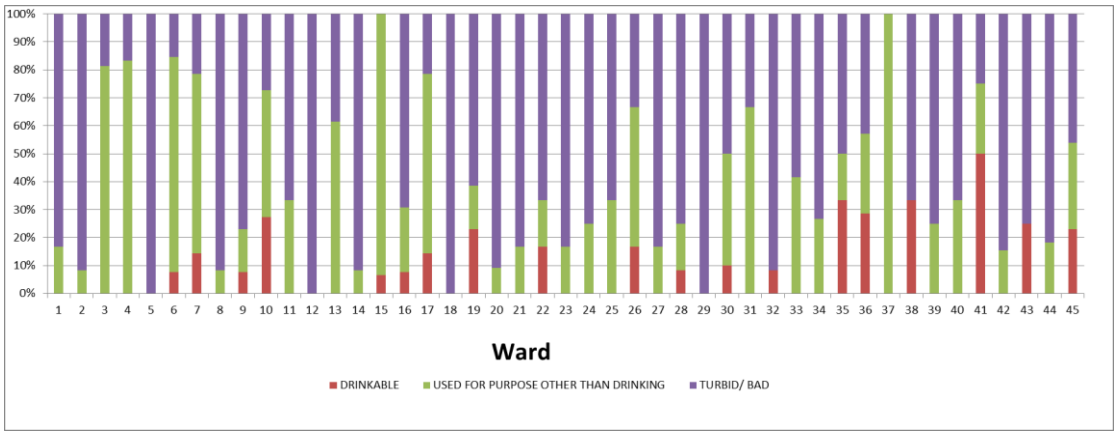
**Figure 24: Sources of Water**




Sources: Primary Survey

As analysed by the feedback of respondents in various wards the dependency of people is on the Ground Water and only 12-20% coverage by Nagar Palika. The use of Ground water resources at rate higher than its recharge rate should be thoughtfully done.

**Figure 25: Quality of Water**




Sources: Primary Survey

As analysed quality of water available is 15% Drinkable,35% used for purposes other than drinking and 50% Turbid in nature.

### 5.1.2 *CURRENT AND PROJECTED WATER DEMAND*

The water demand has been calculated keeping in mind the decadal population projections, rate of water supply which is 135 lpcd (as per CPHEEO manual) and adding the provision of 15% for unaccounted water which makes per capita supply 155.25 lpcd.

For example the projected water demand for year 2021 is
678289 *155.25*$10^{-3}$ Kld

**Table 15: Present & Projected Water Demand**

| Year | Population | Population (in Thousands) | Water Demand (MLD) | Water Supplied (MLD) | Gap in Supply (MLD) |
|---|---|---|---|---|---|
| **1981** | 14,317 | 14 | **2.223** | **75.820** | |
| **1991** | 66,921 | 67 | **10.389** | **75.820** | |
| **2001** | 3,10,328 | 310 | **48.178** | **75.820** | |
| **2011** | 5,12,296 | 512 | **79.534** | **75.820** | **3.714** |
| **2016** | 7,16,185 | 716 | **111.188** | **75.820** | **35.368** |
| **2021** | 10,39,803 | 1,040 | **161.429** | **75.820** | **85.610** |
| **2026** | 15,75,690 | 1,576 | **244.626** | **75.820** | **168.806** |
| **2031** | 24,91,832 | 2,492 | **386.857** | **75.820** | **311.037** |
| **2036** | 40,93,172 | 4,093 | **635.465** | **75.820** | **559.645** |
| **2041** | 69,33,267 | 6,933 | **1,076.390** | **75.820** | **1,000.570** |

**Initiatives for Enhancing Water Supply (Implemented Scheme)**

The Loni water supply Reorganization scheme has been framed as per Manual on Water Supply & Treatment of CPHEEO manual. Design period for scheme has been taken as 25 years under UIDSSMT scheme as per the instruction given in the letter of Chief Engineer, U.P Jal Nigam, Lucknow. Considering 3 years completion period, the base year is taken as 2009, the mid stage year as the year 2024, and the design year as the year 2034. A Detailed Project Report was prepared with all necessary technical information and the proposal has been implemented in last few years.

Since ground water is a reliable source and tube wells are quite successful in this area, deep tube wells were proposed as a source of water for this DPR. The adopted yield for the existing tube wells in the 4 water supply zones at the time of commissioning was 2000lpm -2500lpm.Therefore keeping in mind the longevity of tube well life, design yield of 1800lpm with a draw –down of 4.5 m was proposed as the source.

The projected population for the 3 stages as discussed in the 45 wards was considered and the entire town was proposed to be rezoned into 14 water supply zones with respective sub zones.

Currently the ULB is distributing water in an equitable and efficient manner since its division into 14 water supply zone. But the coverage is 12% due to people's absence in accessing the supply.

**Table 16 : Estimated Cost and Contribution (WS DPR)**

| S .No. | Institution | Share(Rs. Lacs) |
|---|---|---|
| 1 | Gov. of India | 4094.36 |
| 2 | U.P Government | 1149.65 |
| 3 | Urban Local Body | 504.23 |
| | Total | **5748.24** |

**Table 17: Ward Wise Water Demand Projections**

| Total Water Demand (MLD) | 48.178 | 79.534 | 111.188 | 161.429 | 244.626 | 386.857 | 635.465 | 1,076.390 |
|---|---|---|---|---|---|---|---|---|
| **Ward No.** | **2001** | **2011** | **2016** | **2021** | **2026** | **2031** | **2036** | **2041** |
| **1** | 1.226 | 2.025 | 2.830 | 4.109 | 6.227 | 9.848 | 16.177 | 27.402 |
| **2** | 1.185 | 1.957 | 2.736 | 3.972 | 6.019 | 9.518 | 15.634 | 26.482 |
| **3** | 1.230 | 2.031 | 2.839 | 4.123 | 6.247 | 9.879 | 16.228 | 27.488 |
| **4** | 1.073 | 1.771 | 2.476 | 3.595 | 5.447 | 8.614 | 14.150 | 23.968 |
| **5** | 1.230 | 2.030 | 2.838 | 4.120 | 6.243 | 9.873 | 16.218 | 27.471 |
| **6** | 0.996 | 1.644 | 2.298 | 3.337 | 5.057 | 7.997 | 13.136 | 22.251 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **7** | 0.959 | 1.583 | 2.212 | 3.212 | 4.868 | 7.698 | 12.645 | 21.418 |
| **8** | 1.194 | 1.971 | 2.755 | 4.000 | 6.062 | 9.586 | 15.747 | 26.673 |
| **9** | 1.208 | 1.994 | 2.787 | 4.047 | 6.132 | 9.697 | 15.929 | 26.982 |
| **10** | 1.228 | 2.027 | 2.834 | 4.115 | 6.235 | 9.861 | 16.197 | 27.436 |
| **11** | 1.018 | 1.680 | 2.349 | 3.410 | 5.167 | 8.172 | 13.423 | 22.736 |
| **12** | 1.228 | 2.027 | 2.834 | 4.115 | 6.235 | 9.861 | 16.197 | 27.436 |
| **13** | 1.225 | 2.022 | 2.827 | 4.104 | 6.220 | 9.836 | 16.157 | 27.367 |
| **14** | 0.970 | 1.602 | 2.239 | 3.251 | 4.927 | 7.791 | 12.798 | 21.678 |
| **15** | 0.981 | 1.620 | 2.264 | 3.288 | 4.982 | 7.879 | 12.942 | 21.921 |
| **16** | 0.947 | 1.563 | 2.186 | 3.173 | 4.809 | 7.604 | 12.491 | 21.158 |
| **17** | 1.226 | 2.025 | 2.830 | 4.109 | 6.227 | 9.848 | 16.177 | 27.402 |
| **18** | 1.109 | 1.830 | 2.559 | 3.715 | 5.629 | 8.902 | 14.623 | 24.769 |
| **19** | 0.915 | 1.511 | 2.112 | 3.067 | 4.647 | 7.349 | 12.071 | 20.447 |
| **20** | 1.230 | 2.030 | 2.838 | 4.120 | 6.243 | 9.873 | 16.218 | 27.471 |
| **21** | 0.935 | 1.543 | 2.157 | 3.132 | 4.745 | 7.505 | 12.327 | 20.881 |
| **22** | 1.018 | 1.681 | 2.350 | 3.412 | 5.171 | 8.178 | 13.433 | 22.754 |
| **23** | 0.954 | 1.575 | 2.201 | 3.196 | 4.843 | 7.659 | 12.581 | 21.311 |
| **24** | 1.073 | 1.771 | 2.476 | 3.595 | 5.447 | 8.614 | 14.150 | 23.968 |
| **25** | 0.929 | 1.534 | 2.144 | 3.113 | 4.718 | 7.461 | 12.256 | 20.759 |
| **26** | 1.094 | 1.806 | 2.525 | 3.665 | 5.554 | 8.784 | 14.428 | 24.439 |
| **27** | 0.956 | 1.579 | 2.207 | 3.204 | 4.856 | 7.679 | 12.614 | 21.366 |
| **28** | 0.970 | 1.601 | 2.239 | 3.250 | 4.925 | 7.789 | 12.794 | 21.672 |
| **29** | 1.225 | 2.022 | 2.827 | 4.104 | 6.220 | 9.836 | 16.157 | 27.367 |
| **30** | 0.916 | 1.512 | 2.114 | 3.069 | 4.651 | 7.355 | 12.082 | 20.464 |
| **31** | 1.012 | 1.671 | 2.336 | 3.392 | 5.140 | 8.128 | 13.351 | 22.615 |
| **32** | 0.967 | 1.597 | 2.232 | 3.241 | 4.911 | 7.766 | 12.757 | 21.609 |
| **33** | 0.911 | 1.503 | 2.101 | 3.051 | 4.623 | 7.311 | 12.010 | 20.343 |
| **34** | 1.225 | 2.022 | 2.827 | 4.104 | 6.220 | 9.836 | 16.157 | 27.367 |
| **35** | 1.230 | 2.031 | 2.839 | 4.123 | 6.247 | 9.879 | 16.228 | 27.488 |
| **36** | 1.219 | 2.012 | 2.813 | 4.083 | 6.188 | 9.786 | 16.075 | 27.228 |
| **37** | 1.219 | 2.012 | 2.813 | 4.083 | 6.188 | 9.786 | 16.075 | 27.228 |
| **38** | 0.911 | 1.504 | 2.103 | 3.054 | 4.627 | 7.318 | 12.020 | 20.360 |
| **39** | 0.916 | 1.512 | 2.114 | 3.069 | 4.651 | 7.355 | 12.082 | 20.464 |
| **40** | 1.203 | 1.986 | 2.777 | 4.031 | 6.109 | 9.661 | 15.870 | 26.881 |
| **41** | 0.945 | 1.559 | 2.180 | 3.165 | 4.796 | 7.584 | 12.458 | 21.103 |
| **42** | 0.916 | 1.512 | 2.114 | 3.069 | 4.651 | 7.355 | 12.082 | 20.464 |
| **43** | 1.231 | 2.031 | 2.840 | 4.123 | 6.248 | 9.881 | 16.230 | 27.492 |
| **44** | 0.914 | 1.510 | 2.110 | 3.064 | 4.643 | 7.343 | 12.061 | 20.430 |
| **45** | 0.912 | 1.506 | 2.105 | 3.056 | 4.631 | 7.324 | 12.030 | 20.378 |

## 5.2 SWOT, ISSUES AND PRIORITIES

The given table captures the SWOT analysis for access to toilets within NPP.

**Table 18: Water Supply SWOT**

| STRENGTH | WEAKNESSES |
|---|---|
| • Reliable Ground water availability with adopting yield of existing tube wells at 2000-2500 lpm | • Poor coverage of pipe network by Nagar Palika<br>• No previous audit data on loss levels<br>• Likely water shortage in medium term<br>• Groundwater exploitation and pollution are key concerns<br>• No data available to show coverage in slums<br>• Low connections |
| **OPPORTUNITIES** | **THREATS** |
| • Plans to augment supply in Future under UIDSSMT scheme.<br>• Potential to expand access to entire 35sqkm area under Nagar Palika by initiating a water master plan<br>• Potential to address service delivery gaps through a time-bound performance improvement program | • Inadequate coverage indicates least focus on O&M, poor delivery and therefore low cost recovery.<br>• Execution capacity and weak local financials could constrain implementation<br>• Over use of Ground water resource<br>• Mixing of Industrial waste with Ground water is concern. |

**Key issues and priorities with respect to water supply within MCT are summarised below**

- **Service delivery in Water Supply within NPP falls significantly short** of service level norms as it not even close to 90% coverage. There is a need to explore and implement options to bring water to NPP and other extended areas within Nagar Palika.
- **Information discrepancies and inadequacies constrain analysis and decision making .**No information regarding presence of metered connections and need to validate higher dependency on ground water (primary source)when municipal connections can are be made available.
- Absence of Water Treatment plant and water quality monitoring station.
- **Institutional issues included inadequate capacity, multiplicity of agencies and weak monitoring**

  Inadequate enforcement of groundwater conservation is leading to indiscriminate extraction. Further there is need for clarity on processes for dealing with unauthorized water connections and action in case of user charge defaulters.

  Since the UP Jal Nigam is responsible for planning and designing the water supply and sewerage projects of the State However Implementation , operation and Maintenance is done by the Nagar Palika Parishad and there is insufficient involvement of Nagar Palika in planning for water supply during planning and execution as a result of which ownership, capacity and accountability for O&M within Palika is weak. Inadequate exposure to modern water management practices is also a constraint.

**Figure 26: Dumping of Waste in Water Bodies, Ward -16**


## 5.3 CONCEPTUAL BASIS AND BEST PRACTICES

.

Apart from ensuring equitable supply of water, cities should initiate measures to ensure measures to promote **water conservation** and **protection of its water bodies**. Apart from protection of water bodies against dumping of waste rainwater harvesting (RWH) and non revenue water (NRW) reduction/prevention should two critical focus areas as the city embark on improving its water supply systems

**Water conservation: RWH legislation and Performance Contracts for NRW reduction**

**Legislation on Rainwater harvesting**
***Source:*** http://www.rainwaterharvesting.org/policy/legislation.htm

Several states and cities like Andhra Pradesh , Himachal Pradesh Ahmedabad Bangalore Chennai and Kerela have passed legislation for implementing Rainwater harvesting as a water conservation measure.

If there will be huge volumes of water being lost through leaks, which are not being invoiced it will affect the viability of water utilities through lost revenues and increased cost. All this affects capacity of water utilities fund expansion of service, especially for poor. Reducing NRW is not just a technical issue but one that goes to the heart of failings of water utilities which should be taken care of in the very beginning. This is where private sector could be of assistance.

## 5.4 VISION AND GOALS

### 5.4.1 *VISION*

**"Achieve Water Security through provision of equitable and efficient access to continuous water supply in an environmentally sustainable manner"**

### 5.4.2 *GOALS*

The table below translates the above vision into tangible service delivery targets

**Table 19: Goals, SML Term Targets**

| PARAMETER | UNIT | NORM | SLB | Short Term | Medium. T | Long. T |
|---|---|---|---|---|---|---|
| Coverage | % | 100% | 12% | ✓ | | |
| Per Capita Supply | LPCD | 135 | 148 | | ✓ | |
| Non-Revenue Water | % | 20% | - | | ✓ | |
| Metered connections | % | 100% | - | | ✓ | |
| Continuity | Hours | 24.00 | - | | | ✓ |
| Complaints Redress | % | 80% | - | ✓ | | |
| Quality of Supply* | % | 100% | 15 | ✓ | | |
| Cost Recovery | % | 100% | - | | ✓ | |
| Collection Efficiency | % | 90% | - | | ✓ | |

**Table 20: 13th Finance Commission: Declaration of Service Level Benchmarks**

| WATER SUPPLY INDICATORS | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coverage of water Supply Connections | | Per capita supply of water | | Extent of metering of water Connections | | Extent of Non Revenue Water | | Continuity of Water Supply | | Quality of Water Supplied | | Efficiency in redresal of customer complaints | | Cost Recovery in water Supply Service | | Efficiency in collection of water supply related | |
| BENCHMARKS | | | | | | | | | | | | | | | | | |
| 100% | | 135lpcd | | 100% | | 20% | | 24hrs | | 100% | | 80% | | 100% | | 90% | |
| C | T | C | T | C | T | C | T | C | T | C | T | C | T | C | T | C | T |
| 4 | 4 | 148 | 148 | | 0 | 22 | 21 | 5 | 6 | 80 | 84 | 100 | 100 | 23 | 24 | 41 | 43 |

C =Current, T= Target

## 5.5 RECOMMENDATIONS

The DPR proposed and implemented had carefully rezoned water supply zones to develop a comprehensive system of water supply and for distribution of water in the most equitable and efficient manner in Loni.

The various considerations on which zoning was based –

- Optimum utilization of existing works
- No valley line was traverse.
- No Crossing of National Highway and Railway track
- Size of zone considered was neither very large nor very small.
- Well defined zonal boundaries or at least along the main roads or other geographical features as far as possible.

- Zonal water works are preferably proposed in the centre of the zone to economize the distribution system.
- Ward boundaries

Along with this the given table summarizes a set of suggested actions on Water Supply

**Table 21: Recommendation, Water Supply**

| ACTIONS | RECOMMENDED BODY |
|---|---|
| Strengthen **Baseline information** on Water | NPP |
| • Conduct a Household Sanitation Survey to capture baseline information regarding **coverage of municipal supply and number of people unserved.** | |
| • As short term plan, install Bulk Meters at Intake points, Treatment Plants, Storage and Pumping points on priority; | |
| • Shift to consumer level metering in medium to long term. | |
| • Implement a water quality monitoring protocol for piped supply and ground water | |
| Develop and implement an **Investment Program** to achieve SLB norms within 5-10 years | PHED/NPP |
| • Conduct a **Water Loss Audit** within corporation areas and implement actions to reduce losses; Follow up this initiative to prepare and implement a **DPR to achieve SLB norms.** | |
| • Prepare and implement a water supply master plan | |
| Constitute a **Coordination Committee** among PHED and MCT to implement the investment program. | State Gov./NPP |
| Formulate and enforce a) Bye-laws on Ground water conservation/ Rainwater Harvesting, b) Tariff Policy, c) Connection Policy | State Gov./NPP |
| Constitute a **Water and Sanitation Committee** to implement water tariff policy which could be formed from among the CTF members. | State Gov./NPP |
| Initiate measures to increase penetration of piped connections; implement measures to improve and sustain collection efficiency. | NPP |
| Implement differentiated area based tariffs among residential connections; progressively shift to volumetric tariffs for all connections. | NPP |

Priorities:

a) Achieve water security; improve service levels and meet SLB norms
b) Improve information Availability and Reliability
c) Improve capacity and coordination; strengthen monitoring and regulation

# Chapter 6. WASTE WATER MANAGEMENT

## 6.1 CITY LEVEL STATUS

The city does have sewer network with the covering 20kms of area by 30kms long sewer network. Around 1,50,000 population remains unserved. There was lack of willingness by the people to access the facility which was reflected during the site visits. In this situation absence of required Sewage Treatment Plant and storm water drains makes it even worse. Waste water is either treated in septic tank or discharged directly in broken drain or water bodies. The STP proposed is under construction in ward 12.

**Figure 27: Sewage Status, Ward 12**

**Figure 28: Sewage Status, Ward 15**

**Source: Primary Surveys**

- **Sewage Generation**

By 2011 the total estimated wastewater generated by 5,12,296 population is 64 MLD in Loni city. The total water supplied is 80 MLD. As of now there is no waste water treatment facility. Indiscriminate disposal of waste water through storm water drain is detrimental to environment and public health.

***Waste water generation (in MLD)***

The trend of wastewater generation and future projections is calculated based on the sewage return factor taken as 0.8 which indicates that 80% of water supplied returns as sewage.

- **Collection**

Presently, the city has the system of septic tank connections at house hold level and there is no sewage collection network in the city. The waste water overflows from the septic tanks mix into the drain and poses the problem of ground water contamination.

- **Treatment and Disposal**

**Off Site**

The laid sewerage system in not being accessed by people therefore there is **no offsite treatment** of water is happening.

**On Site**

There are many households in Loni which discharge their black water (from toilets) into septic tanks and soak pits. The grey water from kitchens and bathrooms is discharged into open drains without treatment. At present the extent of households relying on the septic tank or coverage of septic tanks in household & slums for wastewater disposal is not known

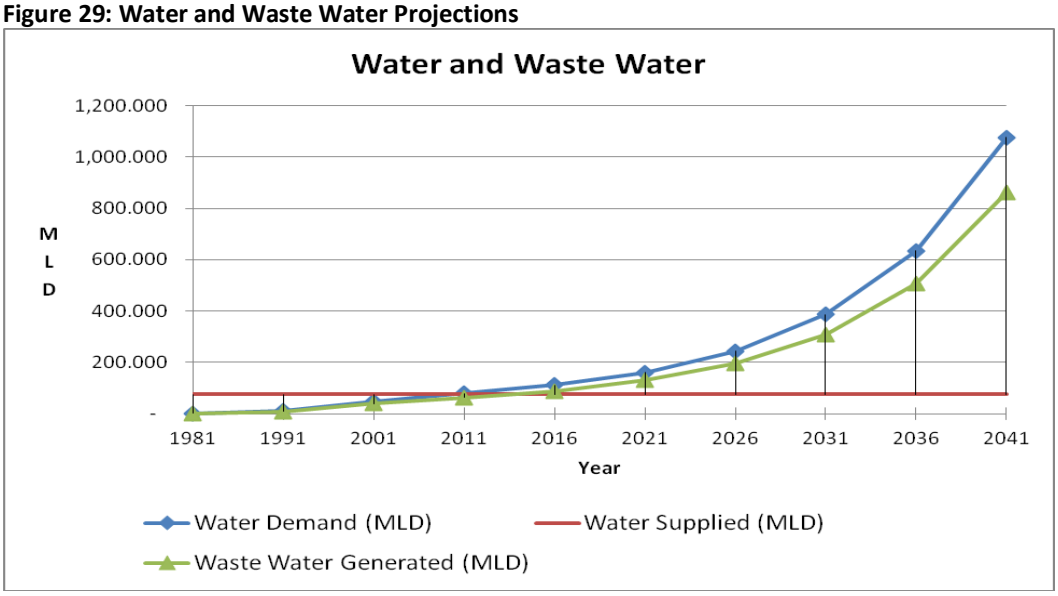
.

**Table 22: Present and Projected Water and Waste Water in MLD**

| Year | Population | Population (in Thousands) | Water Demand (MLD) | Water Supplied (MLD) | Gap in Supply (MLD) | Waste Water Generated (MLD) |
|---|---|---|---|---|---|---|
| **1981** | 14,317 | 14 | 2.223 | 75.820 | | 1.778 |
| **1991** | 66,921 | 67 | 10.389 | 75.820 | | 8.312 |
| **2001** | 3,10,328 | 310 | 48.178 | 75.820 | | 38.543 |
| **2011** | 5,12,296 | 512 | 79.534 | 75.820 | 3.714 | 63.627 |
| **2016** | 7,16,185 | 716 | 111.188 | 75.820 | 35.368 | 88.950 |
| **2021** | 10,39,803 | 1,040 | 161.429 | 75.820 | 85.610 | 129.144 |
| **2026** | 15,75,690 | 1,576 | 244.626 | 75.820 | 168.806 | 195.701 |
| **2031** | 24,91,832 | 2,492 | 386.857 | 75.820 | 311.037 | 309.486 |
| **2036** | 40,93,172 | 4,093 | 635.465 | 75.820 | 559.645 | 508.372 |
| **2041** | 69,33,267 | 6,933 | 1,076.390 | 75.820 | 1,000.570 | 861.112 |

However based on the survey conducted by JT Urja, it is estimated that most of the households are using soak pits or septic tanks .During discussions with the communities, it was observed that most of the houses construct septic tanks based on the available space rather than following the norms of CPHEEO. Surveys in the city indicate that a significant portion of sullage water find their way into drains un checks.

**Figure 29: Water and Waste Water Projections**




**Initiatives for Sewage Disposal in Loni (Implemented Scheme)**

The Loni Sewerage project for was prepared at an **estimated cost of 95.70** crore seeking technical appraisal from CPHEEO for sanctioning under UIDSSMT. The DPR was examined in CPHEEO in consultation with following UP Jal Nigam officials on 31.12.2007,04.01,2008, 08.01.2008,12.02.2008, 13.02.2008 and by now has been implemented.

The scheme was accorded top priority by Government of Uttar Pradesh due to the fact that a PIL No. 914/1996 is under consideration in Hon'bIe Supreme Court for abatement of pollution of river Yamuna. The Govt. of Uttar Pradesh submitted the development made so far in compliance with the directive of Hon'ble Supreme Court of India, wherein, it has been mentioned to stop the flow of waste water from the catchment of Loni to river Yamuna through' Shahadra drain. It has been directed to stop the waste water flowing from loni catchment at U.P border and the same should be disposed to river Yamuna directly after proper treatment without putting into Shahadra drain.

In above respect, the DPR for Loni Sewerage System was earlier also submitted at an estimated cost of Rs. 231-97 crore for entire Loni Municipal area. The scheme was considered in second State Level Sanctioning Committee held in November. 2006, and was deferred due to the fact that there was no existing scheme for providing water supply in the town, so as to ensure that the sewerage system could function efficiently.

Moreover, due to the limited availability of funds under UIDSSMT and to cover other towns also in the state, which are facing acute shortage of water supply, it was found more appropriate to phase out the DPR into two parts. **In the (Part-I)currently implemented under UIDSSMT mainly those areas have been considered which are contributing major portion of waste water, which is flowing through Indrapuri drain and East Yamuna Canal drain and ultimately falls in river Yamuna through Shahadra drain, thus to quickly solve the major portion of the problem.** The remaining areas which relatively less developed may be taken up in second part of the project by State Government from their own funds so as to address the problem of waste water in holistic manner.

The DPR was approved and the proposal was examined under salient features like distance from Delhi, census population, area in sq km etc. Based on the topography of the area and demographic conditions, the entire town has been divided into four zones: The zone 4 is undeveloped. Therefore; sewerage and STP for zone 4 shall be taken up as and when need arises separately by State Government. The proposal implemented had provision for branches, laterals, mains and trunk main ,pumping station, STP for part 1 area of ULB & GDA for zone 1 and 2 for 30MLD and provision for effluent pipes carrying treated waste water of 74MLD from STP to downstream of Wazirabad in river Yamuna.

Also the total O&M cost for sewer line and STP worked out was Rs. 216.20 lacs. Revenue shall be generated from sale of sludge as manure and beneficiaries falling in the sewered area shall be charged with sewer tax @ 500 per annum. Thus, the total revenue from sewerage system worked out to Rs 368.91 lacs. Thus, the scheme is self sustainable since beginning.

The balance cost after the deductions of GDA share for colonies in zone 1 and 2 falling within ULB area was 13516.07.Below is the fund sharing pattern for the balance cost.

| S .No. | Institution | Share(Rs. Lacs) |
|---|---|---|
| 1 | Gov. of India (80%) | 10812.8 |
| 2 | U.P Government (10%) | 1351.60 |
| 3 | Urban Local Body (10%) | 1351.60 |
| | Total | **13516.07** |

6.1.1 *SERVICE LEVEL BENCHMARK FOR SEWERAGE SYSTEM*

| Performance Indicator | Benchmarks | Status |
|---|---|---|
| Coverage of Toilets | 100% | 0% |
| Coverage of Sewerage Network | 100% | 0% |
| Coll. Eff. of Sewerage Network | 100% | 0% |
| Adequacy of Sewage Treatment Capacity | 100% | 0% |
| Quality of Sewage Treatment | 100% | 0% |
| Extent of Reuse and Recycling of Sewage | 20% | 0% |
| Extent of cost recovery | 100% | 0% |
| Eff. in re-dressal of customer complaints | 80% | 0% |
| Eff. In Collection of Sewage Water Charges | 90% | 0% |

6.1.2 *FROM PRIMARY SURVEY*

- **Management of septic tanks:** No information from respondents reported that the septic tank maintenance and cleaning in managed by individuals directly.
- **Cleaning frequency:** No information from respondents about cleaning their septic tanks which seems to suggest that there could be either percolation or leakage into available drains or ground water.

**Table 23: 13th Finance Commission: Declaration of Service Level Benchmarks**

| SEWERAGE MANAGEMENT(Sewerage and Sanitation) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coverage of Toilets | | Coverage of Sewage network system | | Collection efficiency of the sewage network | | Adequacy of the sewage treatment capacity | | Quality of sewage treatment | | Extent of reuse and recycling of treated sewage | | Efficiency in redresal of customer complaints | | Cost Recovery in sewage mgmt. | | Efficiency in collection of sewage charges | |
| BENCHMARKS | | | | | | | | | | | | | | | | | |
| 100% | | 100% | | 100% | | 100% | | 100% | | 20 | | 80% | | 100% | | 90% | |
| C | T | C | T | C | T | C | T | C | T | C | T | C | T | C | T | C | T |
| 95 | 100 | 0 | 61 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |

**Table 24: Ward Wise Projected Waste Generation**

| **Total Waste Water Generated (MLD)** | **38.543** | **63.627** | **88.950** | **129.144** | **195.701** | **309.486** | **508.372** | **861.112** |
|---|---|---|---|---|---|---|---|---|
| **Ward No.** | **2001** | **2011** | **2016** | **2021** | **2026** | **2031** | **2036** | **2041** |
| **1** | 0.981 | 1.620 | 2.264 | 3.288 | 4.982 | 7.879 | 12.942 | 21.921 |
| **2** | 0.948 | 1.565 | 2.188 | 3.177 | 4.815 | 7.614 | 12.507 | 21.186 |
| **3** | 0.984 | 1.625 | 2.272 | 3.298 | 4.998 | 7.903 | 12.983 | 21.991 |
| **4** | 0.858 | 1.417 | 1.981 | 2.876 | 4.358 | 6.891 | 11.320 | 19.174 |
| **5** | 0.984 | 1.624 | 2.270 | 3.296 | 4.995 | 7.899 | 12.974 | 21.977 |
| **6** | 0.797 | 1.315 | 1.839 | 2.670 | 4.045 | 6.398 | 10.509 | 17.801 |
| **7** | 0.767 | 1.266 | 1.770 | 2.570 | 3.894 | 6.158 | 10.116 | 17.135 |
| **8** | 0.955 | 1.577 | 2.204 | 3.200 | 4.850 | 7.669 | 12.598 | 21.339 |
| **9** | 0.966 | 1.595 | 2.230 | 3.237 | 4.906 | 7.758 | 12.743 | 21.586 |
| **10** | 0.982 | 1.622 | 2.267 | 3.292 | 4.988 | 7.889 | 12.958 | 21.949 |
| **11** | 0.814 | 1.344 | 1.879 | 2.728 | 4.134 | 6.537 | 10.738 | 18.189 |
| **12** | 0.982 | 1.622 | 2.267 | 3.292 | 4.988 | 7.889 | 12.958 | 21.949 |
| **13** | 0.980 | 1.618 | 2.262 | 3.283 | 4.976 | 7.869 | 12.925 | 21.894 |
| **14** | 0.776 | 1.281 | 1.791 | 2.601 | 3.941 | 6.233 | 10.239 | 17.343 |
| **15** | 0.785 | 1.296 | 1.812 | 2.630 | 3.986 | 6.303 | 10.353 | 17.537 |
| **16** | 0.758 | 1.251 | 1.748 | 2.539 | 3.847 | 6.083 | 9.993 | 16.927 |
| **17** | 0.981 | 1.620 | 2.264 | 3.288 | 4.982 | 7.879 | 12.942 | 21.921 |
| **18** | 0.887 | 1.464 | 2.047 | 2.972 | 4.503 | 7.122 | 11.698 | 19.815 |
| **19** | 0.732 | 1.209 | 1.690 | 2.453 | 3.718 | 5.879 | 9.657 | 16.358 |
| **20** | 0.984 | 1.624 | 2.270 | 3.296 | 4.995 | 7.899 | 12.974 | 21.977 |
| **21** | 0.748 | 1.234 | 1.726 | 2.505 | 3.796 | 6.004 | 9.862 | 16.705 |
| **22** | 0.815 | 1.345 | 1.880 | 2.730 | 4.137 | 6.542 | 10.746 | 18.203 |
| **23** | 0.763 | 1.260 | 1.761 | 2.557 | 3.875 | 6.127 | 10.065 | 17.049 |
| **24** | 0.858 | 1.417 | 1.981 | 2.876 | 4.358 | 6.891 | 11.320 | 19.174 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **25** | 0.743 | 1.227 | 1.715 | 2.491 | 3.774 | 5.969 | 9.804 | 16.607 |
| **26** | 0.875 | 1.445 | 2.020 | 2.932 | 4.443 | 7.027 | 11.543 | 19.552 |
| **27** | 0.765 | 1.263 | 1.766 | 2.563 | 3.885 | 6.143 | 10.091 | 17.093 |
| **28** | 0.776 | 1.281 | 1.791 | 2.600 | 3.940 | 6.231 | 10.235 | 17.337 |
| **29** | 0.980 | 1.618 | 2.262 | 3.283 | 4.976 | 7.869 | 12.925 | 21.894 |
| **30** | 0.733 | 1.210 | 1.691 | 2.455 | 3.721 | 5.884 | 9.665 | 16.372 |
| **31** | 0.810 | 1.337 | 1.869 | 2.713 | 4.112 | 6.502 | 10.681 | 18.092 |
| **32** | 0.774 | 1.277 | 1.786 | 2.593 | 3.929 | 6.213 | 10.206 | 17.287 |
| **33** | 0.728 | 1.203 | 1.681 | 2.441 | 3.699 | 5.849 | 9.608 | 16.274 |
| **34** | 0.980 | 1.618 | 2.262 | 3.283 | 4.976 | 7.869 | 12.925 | 21.894 |
| **35** | 0.984 | 1.625 | 2.272 | 3.298 | 4.998 | 7.903 | 12.983 | 21.991 |
| **36** | 0.975 | 1.610 | 2.250 | 3.267 | 4.950 | 7.829 | 12.860 | 21.783 |
| **37** | 0.975 | 1.610 | 2.250 | 3.267 | 4.950 | 7.829 | 12.860 | 21.783 |
| **38** | 0.729 | 1.204 | 1.683 | 2.443 | 3.702 | 5.854 | 9.616 | 16.288 |
| **39** | 0.733 | 1.210 | 1.691 | 2.455 | 3.721 | 5.884 | 9.665 | 16.372 |
| **40** | 0.963 | 1.589 | 2.221 | 3.225 | 4.887 | 7.729 | 12.696 | 21.505 |
| **41** | 0.756 | 1.247 | 1.744 | 2.532 | 3.837 | 6.067 | 9.967 | 16.882 |
| **42** | 0.733 | 1.210 | 1.691 | 2.455 | 3.721 | 5.884 | 9.665 | 16.372 |
| **43** | 0.984 | 1.625 | 2.272 | 3.298 | 4.998 | 7.904 | 12.984 | 21.993 |
| **44** | 0.732 | 1.208 | 1.688 | 2.451 | 3.714 | 5.874 | 9.649 | 16.344 |
| **45** | 0.730 | 1.205 | 1.684 | 2.445 | 3.705 | 5.859 | 9.624 | 16.302 |

## 6.2 SWOT ISSUES AND PRIORITIES

**Table 25: Waste Water Management SWOT**

| **STRENGTH** | **WEAKNESSES** |
|---|---|
| • Prevalent use of septic tanks | • In spite of coverage people not accessing sewer connections<br>• Absence of Sewage Treatment Plant<br>• Mixing of storm water and sewage<br>• No clear accountability / regulation for monitoring septic tanks (On site sanitation)<br>• Unorganised sludge removal; Weak guidelines / safety practices<br>• Dumping of sludge in nearby areas; no safe disposal |
| **OPPORTUNITIES** | **THREATS** |
| • Presence of septic tanks in high percentage of household reflects some concern for hygiene.<br>• By some initiatives, campaign and awareness program Nagar Palika can gain confidence of people and convince them to access laid network.<br>• There is Potential to improve connections / cost recovery in offsite sanitation.<br>• Potential for introducing bye-laws and regulation for onsite sanitation and septage management.(frequency of de sludging) for onsite sanitation | • Major threat is pollution of water bodies which can be a major source of water supply<br>• Potential Ground Water contamination which is currently the most reliable source in the absence of standards and regulations<br>• Mixing of storm water and sewage prevents from the opportunity of ground water recharge and increase in water levels of the existing water bodies.<br>• In future capacity and O and M of the STP in absence of people support.<br>• Absence of Treatment Quality Monitoring in case of people resisting connections. |

**The key issues and priorities with respect to waste-water management within NPP are summarised below**

- Limitations of existing sewerage system due to lack of access by people.
- Flows of grey water and in some cases black water into water bodies going unchecked.

## 6.3 CONCEPTUAL BASIS AND BEST PRACTICES

### A. Options for waste-water management

**Fully on-site sanitation:** Fully on-site sanitation arrangements will involve on-plot treatment and disposal of all waste water and involves septic tank and soak pits - to receive and treat waste water. Septage (sludge from septic tanks) is transferred to another location for treatment. Onsite sanitation typically covers:

- **Improvements in existing household disposal facilities:** Existing household sanitation arrangements, which do not have proper disposal, can be improved by

  a) Construction of soak pits for existing toilets having only septic tanks, and
  b) Providing a septic tank / soak pits.

- **Public toilets:** Community/public toilets could also be provided with a septic tank based on-site system with a soak pit or soakage trenches (for effluent disposal).

- **Septage management:** An efficient septage collection system, operated by the ULB or private agencies is required along with regulation and monitoring of septic tanks and septage disposal.

#### Small-bore sewerage

- Septic tank is connected to small-bore sewerage network: all domestic waste water is partially treated in septic tank and the effluent is disposed into small-bore sewerage network. Septage is periodically cleared.

- Twin pit latrine waste water is disposed into soak pits. Small diameter sewer pipe (< 200 mm) is laid at a flatter gradient to carry the effluent from septic tanks.

#### Centralized or decentralized sewerage system

This alternative includes the regular sewerage network to collect the waste water from the households. The network is normally laid through most of the town. A detailed

topographical and land availability survey will be necessary to determine the feasibility and required number of decentralized waste water treatment plants.
In the area covered with a sewerage network, efforts should be made to connect all households to the sewerage network. Even in this alternative, there is a possibility that a few households will still be served by on-site sanitation systems – mainly pit latrines. And Public sanitary conveniences will be directly connected to the nearest sewer line of the network.

### Combined system

Following arrangements are envisaged for household/public sanitation and waste water treatment and disposal arrangements.

**Household sanitation:**

a) Septic tank with soak pits receives the entire household waste water. Septage is periodically cleared and taken away to a common treatment facility.

b) Sewerage network receives all the household waste water and conveys it to the centralized or decentralized treatment plant(s).

### Public conveniences:

Waste water discharge is disposed into the sewerage network for further treatment and final disposal, in areas where some sewer network is provided and in other areas, waste water is discharged into a septic tank with soak pits.

**Disposal of septage:** For households served by on-site sanitation systems, an efficient septage collection system, operated by the ULB or private agencies is required along with regulation / monitoring of septage disposal.

**Waste water conveyance and treatment:** Domestic waste water, disposed into the sewerage network, is transported to the waste water treatment site(s) for treatment and final disposal. Treatment will meet the disposal standards

**B. Challenges and practices in regulating onsite sanitation**

ULBs and Governments have realised the importance of onsite systems as long-term solutions to domestic wastewater treatment and disposal. The NUSP makes specific reference to on-site sanitation systems. However, institutional structure, organizational resources and personnel dedicated to the task of septage management is largely not yet in place.

Municipal laws typically contain provisions for punitive actions against properties causing nuisance, including letting out untreated human excreta into drains and open areas; but enforcement is patchy. Most references to on-site sanitation regulation exist

within building regulations/building bye-laws or the development control rules (DCRs) usually developed for large cities.

Typically, the problems associated with on-site sanitation facilities can be grouped into four primary areas:

- Insufficient knowledge/capacity/awareness and public involvement
- Inappropriate system design and selection processes
- Poor O&M:
- Poor Monitoring

## 6.4 VISION AND GOAL

6.4.1 *VISION*

Collection and Treatment of all waste water to prescribed standards and incorporate recycling and re-use to conserve fresh water resources.

6.4.2 *GOAL*

Table below indicates targets in short, medium and long-term.

**Table 26: Waste Water Management, SML Term Targets**

| PARAMETER | UNIT | NORM | SLB | Short .T | Medium. T | Long.T |
|---|---|---|---|---|---|---|
| *% of area with sewerage network* | % | 100% | - | ✓ | | |
| *% of households with sewerage connections* | % | 100% | 0% | ✓ | | |
| WW Collection Efficiency | % | 100% | - | | ✓ | |
| WW Treatment Adequacy | % | 100% | - | | ✓ | |
| Quality of WW Treatment | % | 100% | - | | | ✓ |
| Reuse and Recycling | % | 20% | - | ✓ | | |
| Cost Recovery | % | 100% | - | ✓ | | |
| Complaints Redress | % | 80% | - | | ✓ | |
| Collection Efficiency | % | 100% | - | | ✓ | |

## 6.5 RECOMMENDATIONS

The Sewer network in the city is laid but is not operational. There is a need to generate awareness among the people regarding the importance of efficient discharge of sewage from the city.

**Table 27: Recommendations, Waste Water Management**

| ACTIONS | RECOMMENDED BODY |
|---|---|
| Identification of Sewered area in Loni, no. of wards covered and uncovered for efficient use of existing facility. | NPP |

| | |
|---|---|
| Awareness generation about the necessity of using existing sewered area for Public. | |
| Initiate a **drive** to increase penetration of sewerage connections covering **black and grey water** flows; | |
| Regulate and monitor de-sludging by keeping a check on available equipment, trained staff & their frequency of activity as per as per standards | NPP/PHED |
| Waste-water recycling should be priority therefore further opportunities should be explored to meet SLB norms in the medium to long term. | NPP/PHED |
| As a medium term initiative action plan for using treated sewage for horticulture, irrigation, industrial & other non potable us to conserve fresh water should be aimed for. | |
| Formulation of **bye-laws / guidelines** on septage management and **on-site sanitation** | |
| Efforts to involve PPP in O & M and STP's & other components | NPP/State Gov. |
| Establish a **waste-water quality monitoring protocol** in coordination with CPCB | NPP |

Priorities:

a) Need to improve service levels and bring sewerage system operational.
b) Clarify accountability; articulate/ enforce monitoring processes and regulation.

# Chapter 7. STORM WATER MANAGEMENT

## 7.1 CITY LEVEL STATUS

There is no provision for storm water drainage system in the city. Storm water drains are severely abused with grey water flows and solid waste dumping. Around 2,00,000 population remains unserved by these drains. The total length of pukka drains is 20km and kutcha drains is 55.6km.

**Table 28: Storm Water Management, SWOT**

| STRENGTH | WEAKNESSES |
|---|---|
| ✓ Topography of old town allows several parts to be drained off, other parts, of the town have quite flat. | ✓ Grey and in some cases black water let out into drains<br>✓ Solid Waste being dumped into drains<br>✓ Poorly maintained drains |
| **OPPORTUNITIES** | **THREATS** |
| • Plans under UIDSSMT scheme. | • Health hazards due to poor maintenance and waste clogging |

### 7.1.1 *ISSUES AND PRIORITIES*

Priorities:

a) Very Low or rather no coverage in the city.

## 7.2 VISION AND GOALS

### 7.2.1 *VISION*

**100 % coverage in the city and prevention of discharge of black and grey water into storm water drains.**

### 7.2.2 *GOAL*

**Table 29: Storm Water Management, SML Term Targets**

| NORM | | | | Short .T | Medium. T | Long. T |
|---|---|---|---|---|---|---|
| Coverage (Drain length / Road length) | | Incidence of water logging/flooding | | | | |
| 100% | | 0% | | ✓ | | |
| C | T | C | T | ✓ | | |
| 8 | 8 | 8 | 8 | ✓ | | |

## 7.3 RECOMMENDATIONS

- Under the UDISSMT scheme storm waters should be constructed
- Strictly prevent waste dumping into natural drains followed by O&M of storm water drains along the major roads, streets and natural drains.

# Chapter 8. SOLID WASTE MANAGEMENT

## 8.1 CITY LEVEL STATUS

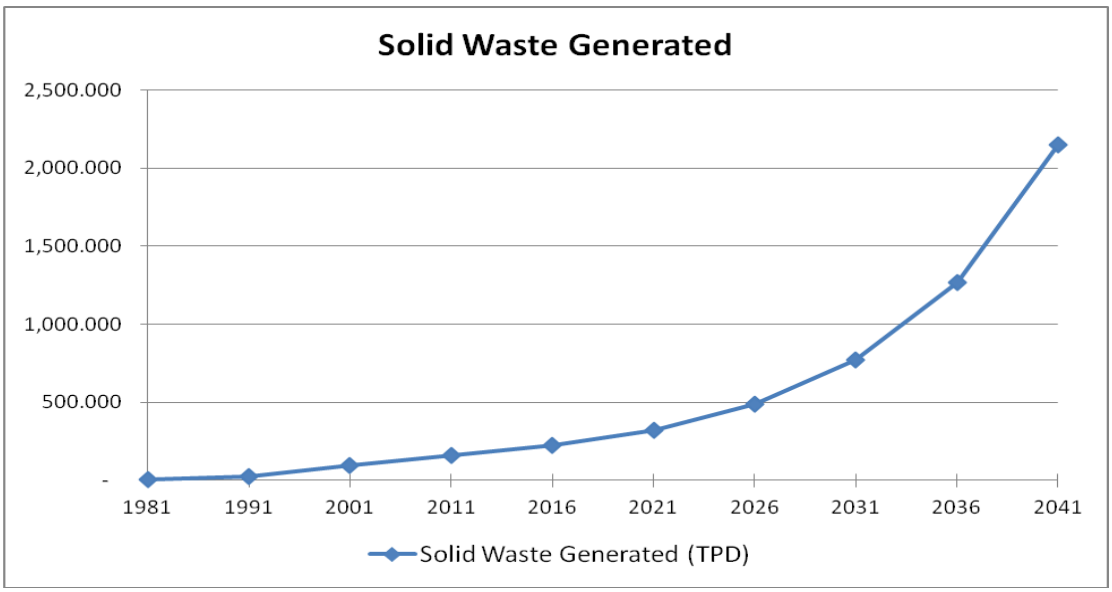
### 8.1.1 *WASTE GENERATION*

Solid Waste Management is a critical issue in LNP due to spread of area under its jurisdiction. Based on the population of the city, it is estimated that the City generates approximately 256 TPD of solid waste per day and waste generated per day is .31kg/capita/day. Nagar Palika is capable to clears only 6 MT of the waste through vehicles available with Nagar Palika and staff engaged for the purpose.

**Table 30: Present Waste Generation and Projections**

| Year | Population | Population (in Thousands) | Solid Waste Generated (TPD) |
|---|---|---|---|
| **1981** | 14,317 | 14 | **4.438** |
| **1991** | 66,921 | 67 | **20.746** |
| **2001** | 3,10,328 | 310 | **96.202** |
| **2011** | 5,12,296 | 512 | **158.812** |
| **2016** | 7,16,185 | 716 | **222.017** |
| **2021** | 10,39,803 | 1,040 | **322.339** |
| **2026** | 15,75,690 | 1,576 | **488.464** |
| **2031** | 24,91,832 | 2,492 | **772.468** |
| **2036** | 40,93,172 | 4,093 | **1,268.883** |
| **2041** | 69,33,267 | 6,933 | **2,149.313** |

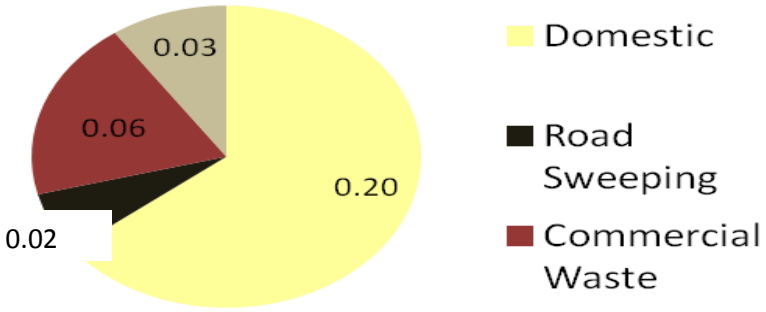
**Figure 30: Solid Waste Generation Projections**



The waste generated from the city includes household waste, commercial waste, bio-medical waste and industrial waste. The major **sources of generation** of waste at city level are Residential establishments, commercial establishments, Bazaar and vegetable markets, Industrial establishments, Hospitals and dispensaries, Slaughter houses, Street sweeping, Construction debris.

### 8.1.2 *TYPES OF WASTE*

**Figure 31: Types of Waste Generation in Kg per capita per day**




**TOTAL = 0.31KG/C/DAY**

As of now there is no system of ***bio-medical waste*** management in Loni. The waste generated from the Hospitals, Nursing homes, and Pathologies, is being collected and disposed of, by dumping along with solid waste.

There is ***no slaughterhouse*** in Loni city. Slaughtering is being done in open places waste produced from slaughter house is dumped in the private land. There are approximately 50 meat shops and about 400 Kg of waste from these shops is being generated. Part of the meat shop waste is consumed by dogs & the rest is disposed off along with Municipal Solid Waste.

Municipal council maintains 50 km bituminous road out of 650 km total road length including brick and Kutcha road. Road sweepings in 3 km length of bituminous road in the city areas was recorded during survey and investigation carried out during DPR 2006-2007 preparation -

Day one - 70.50 kg
Day two - 110.70 kg
Day three- 98.00 kg

Total 279.20kg = 31.02 kg /km/ day (average)

***Total road sweeping*** = 31.02 x 50 = 1551 kg/day from bituminous road only. There are only 19 sweepers deployed in sweeping. Each sweeper is capable to clean

approximately 0.50 km only. Roads are not clean on daily basis due to lack of staff, therefore road sweeping is a major problem.

Study on waste generation from bituminous road was conducted and it is found that waste produced by road sweeping is approximately 31 kg/km/day for bituminous road. It is very difficult to quantify daily sweepings. Municipal officials have informed that approximately 7000kg waste would be produced, had there been sweeping on daily basis.

Assuming 7000kg per day, average per capita works out to 7000/356877 = 0.0196
Say = 0.02 kg/capita/day

In city, ***vegetable market*** is located in Lai Bagh Loni. During 2006-07 surveys it was gathered that 21-22 tractor trolley load of waste from vegetable market, shops, fruit market etc. is being collected daily.
Capacity of each trolley = 1.00 Mt
Therefore total waste generation = 21.50 x 1.00 = 21.50 tons
Waste generation per capita = 21.5 x 1000/ 356877 = 0.060 kg/capita/day

With coming up of new buildings and renovation of some houses, shops etc. dismantled materials in shape of ***debris*** is being produced daily in the tune of 9 to 11 tons per day as informed by Nagar Palika Officials, which amounts to approximately 0.03 kg per capita per day.

As per the information given by Nagar Palika Parishad, there is one Govt. Hospital having 100 beds and 41 nursing homes having capacity of 80 beds, and around 22 pathology centers. Thus, total capacity of towns is 160 beds. The ***bio - waste*** from the hospital and nursing home is approximately **350 kg / day** and is being disposed of along with Municipal Solid Waste without any prevention and care. It is also to mention here that in Loni there is no centralized incinerator provided by the Government or by any agency.

### 8.1.3 *COLLECTION & TRANSPORTATION*

**Primary Collection System -** Door to door collection service does not exist in the city.

Machinery and equipment available with the Nagar Palika are not capable to lift and clear total daily waste generated. The residents throw their waste outside their houses which is manually collected by wheel carts and transported to exiting temporary collection centres.

**Primary Storage -** In Loni there are 10 masonry type temporary collection centers. The wastes from these centers are transported to low-lying area for dumping without any cover and treatment. The present system is absolutely against the norms of proper

Solid Waste Management system as per MSW rule 2000.The Nagar Palika Parishad does not have sufficient staff and proper infrastructure for solid waste management.

**Man Power deployed on SWM**

Sanitary Inspector -1
Sub-ordinate staff including sweeper -19

**Table 31: List of existing Primary Collection Centre**

| Sl.No. | Places |
|---|---|
| 1. | Mohalla Jatav |
| 2. | Mohammad Gauri patti |
| 3. | MainTiraha Loni |
| 4. | Ghaziabad road near, Nikai Karya |
| 5. | Mohalla Musffabad |
| 6. | Prem Nagar |
| 7. | Indrapuri Colony |
| 8. | Nai Pura |
| 9. | Lal baag sabzi Mandi |
| 10 | Balram Nagar |

**Figure 32, Ward 25: Arbitrary Waste Dumping**

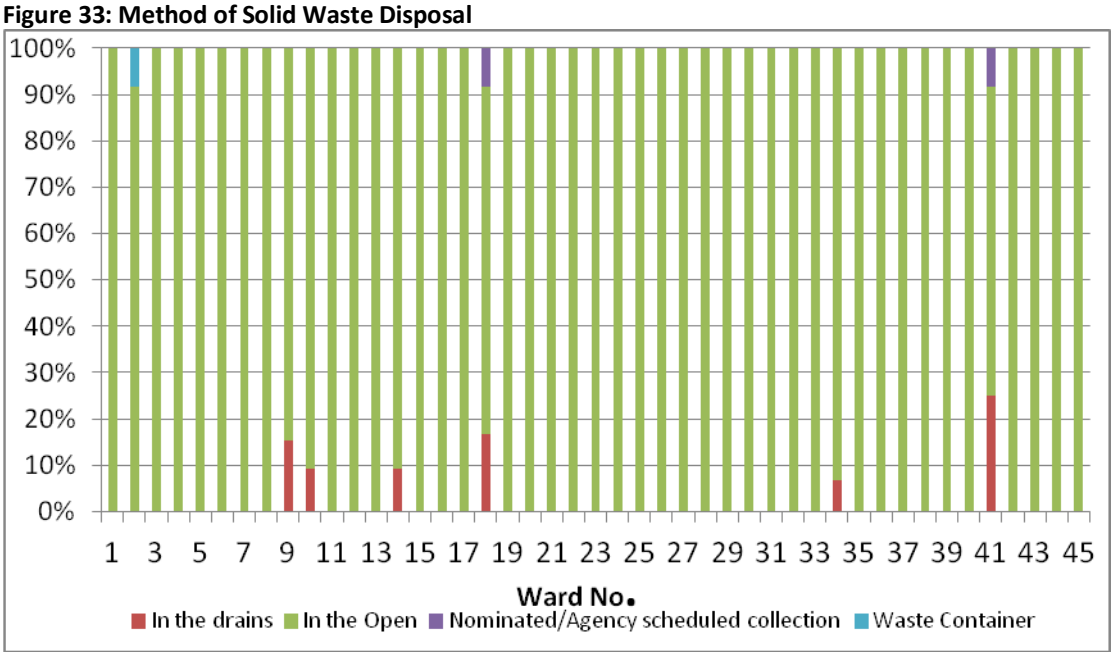
**Table 32: Lit of existing vehicles & equipments with Nagar Palika**

| S.No. | Description | Number available | Functional |
|---|---|---|---|
| 1 | JCB for loading purpose | 4 | 3 |
| 2 | Tractor | 10 | 10 |
| 3 | Trolly 3Cum capacity | 10 | 8 |
| 4 | Dumper | 5 | 5 |
| 5 | Sewerjet | 1 | 1 |
| 6 | Three wheeler 1 Cum capacity | 1 | 1 |
| 7 | Hand cart | 200 | 200 |
| 8 | Metalicbin | 100 | 100 |
| 9 | Rickshaw trolly | | |

As per the surveys conducted by team of JT Urja company, the method of Solid waste disposal is open in 90% of the wards .The frequency of waste collection is once in two days in 70% of the wards followed by 20% twice a day in all the wards .The charts

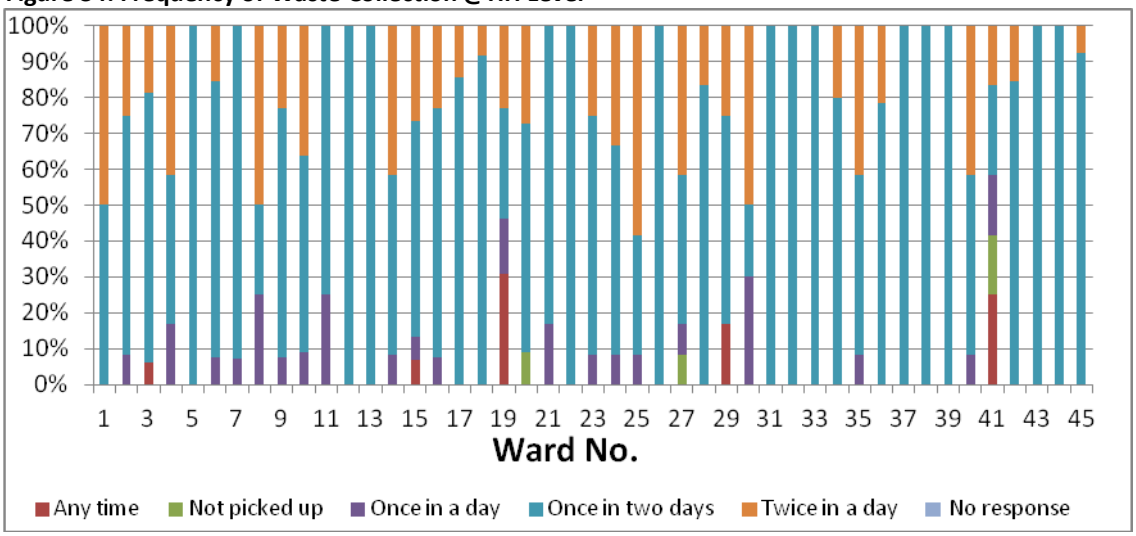
given below explains the current status of collection frequency in all the wards, in the absence of door to door service willingness of people to pay for the service and more.

**Figure 33: Method of Solid Waste Disposal**




Source: Primary Survey

**Figure 34: Frequency of Waste Collection @HH Level**



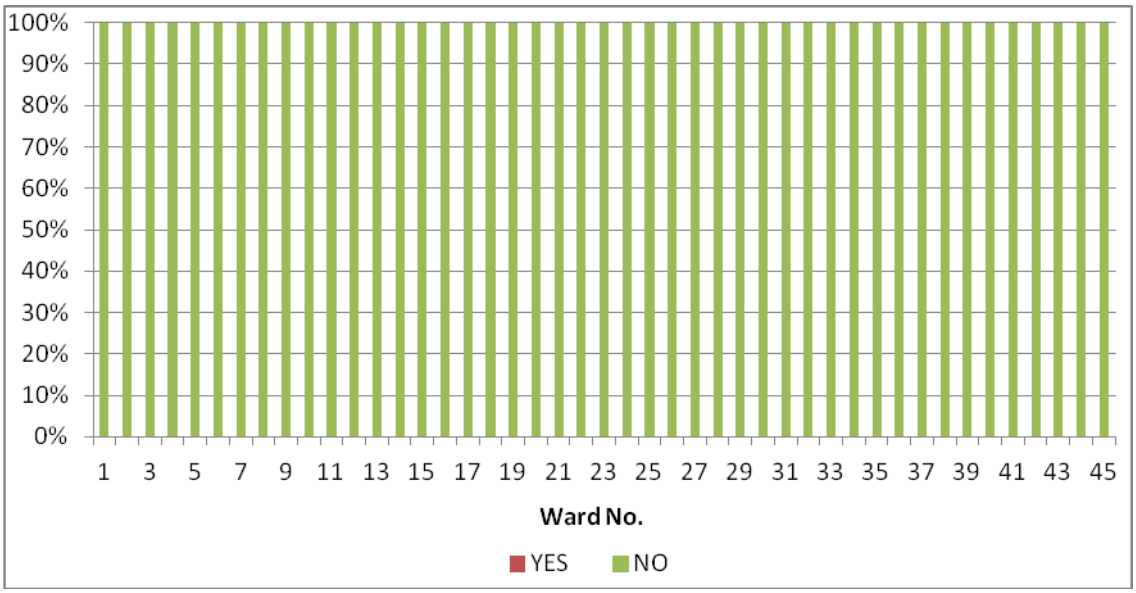

Source: Primary Survey

**Figure 35: Dumping Wastes in Water Bodies**

Ward -16

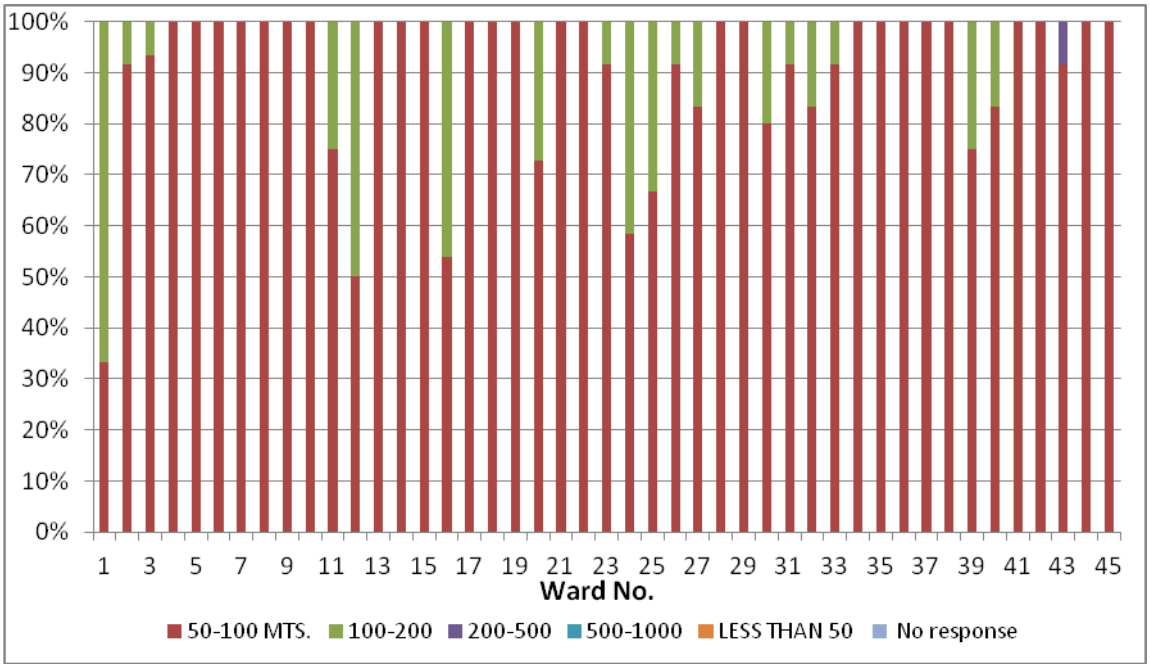
Ward -12

**Figure 36: Willingness to pay for Door to Door Service @HH Level**




Source: Primary Survey

**Figure 37: Distance of Waste Disposal Sites**



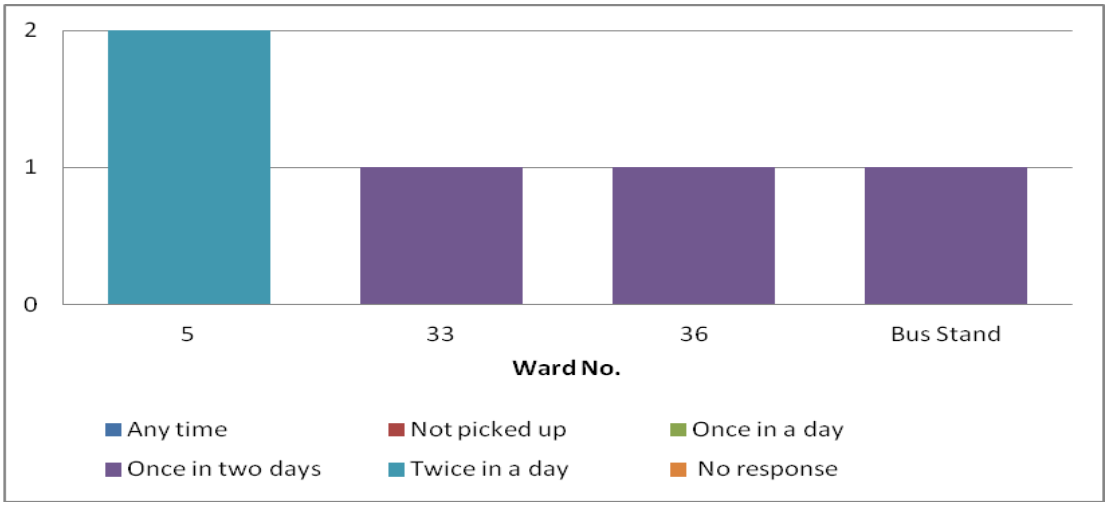

Source: Primary Survey

85% of the wards are throwing the wastes in open, within a range of 50-100mts from the houses which can also be in an existing water body in the absence of any designated disposal sites. This clearly indicates the hygiene condition, status of surrounding environment and lack of awareness among the people of Loni. The presence of Domestic Animal wastes is found maximum in ward 40 followed by ward

12 and 25. 7-10% of wards show presence of animal waste which is dumped in open only.

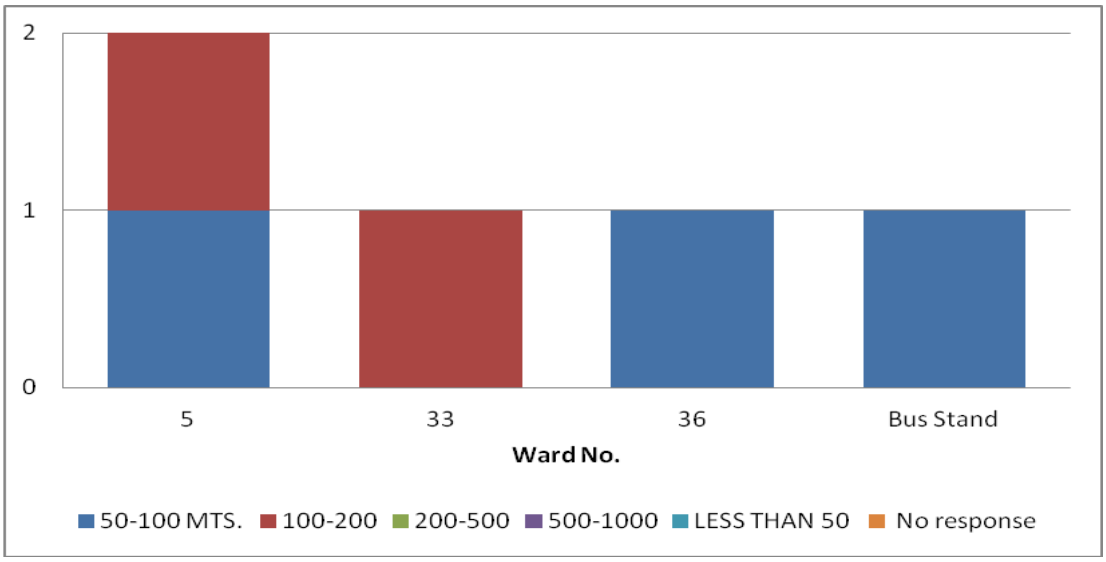
Similar is the situation for Public Places like bus stands and Hospitals where the wastes are collected and disposed along the municipal waste. Below, the charts highlights only those wards which have public places where x axis is ward numbers and y axis is the no. of public places in the respective ward .The frequency of collections once in two days within the range of 50-100kms.

**Figure 38: Frequency of Waste Collection in Public Places**




Source: Primary Survey

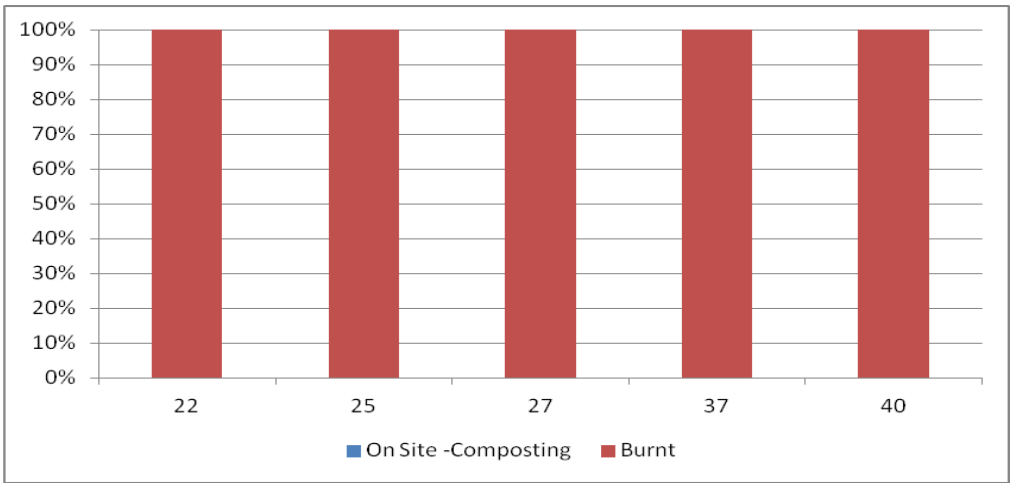
**Figure 39: Distance of Waste Disposal from Public Places**




Source: Primary Survey

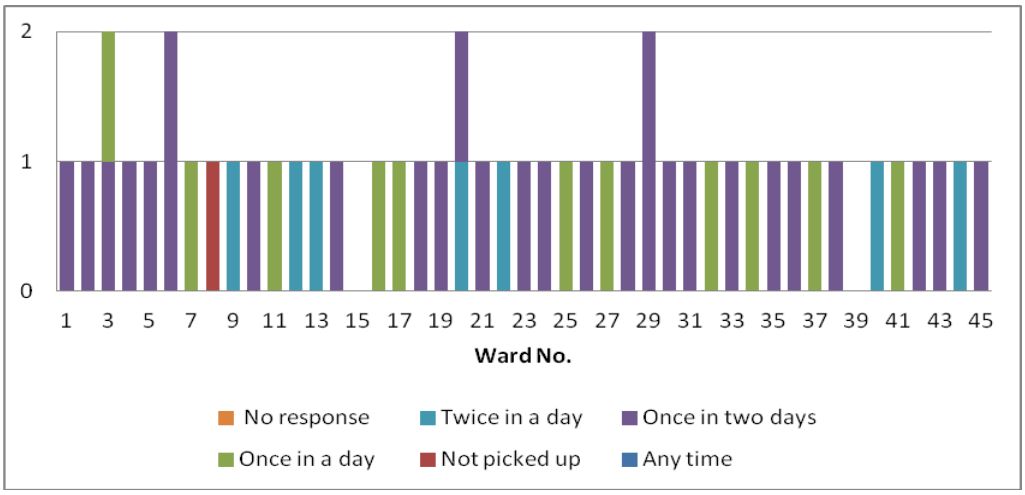
The charts below shows the wards with industries and schools in them are highlighting the disposal of industrial waste and frequency of waste collection from schools indicative of immediate surrounding environment status in these wards.

**Figure 40: Disposal of Industrial Waste**




Source: Primary Survey

**Figure 41: Frequency of Waste Collection from School**




Source: Primary Survey

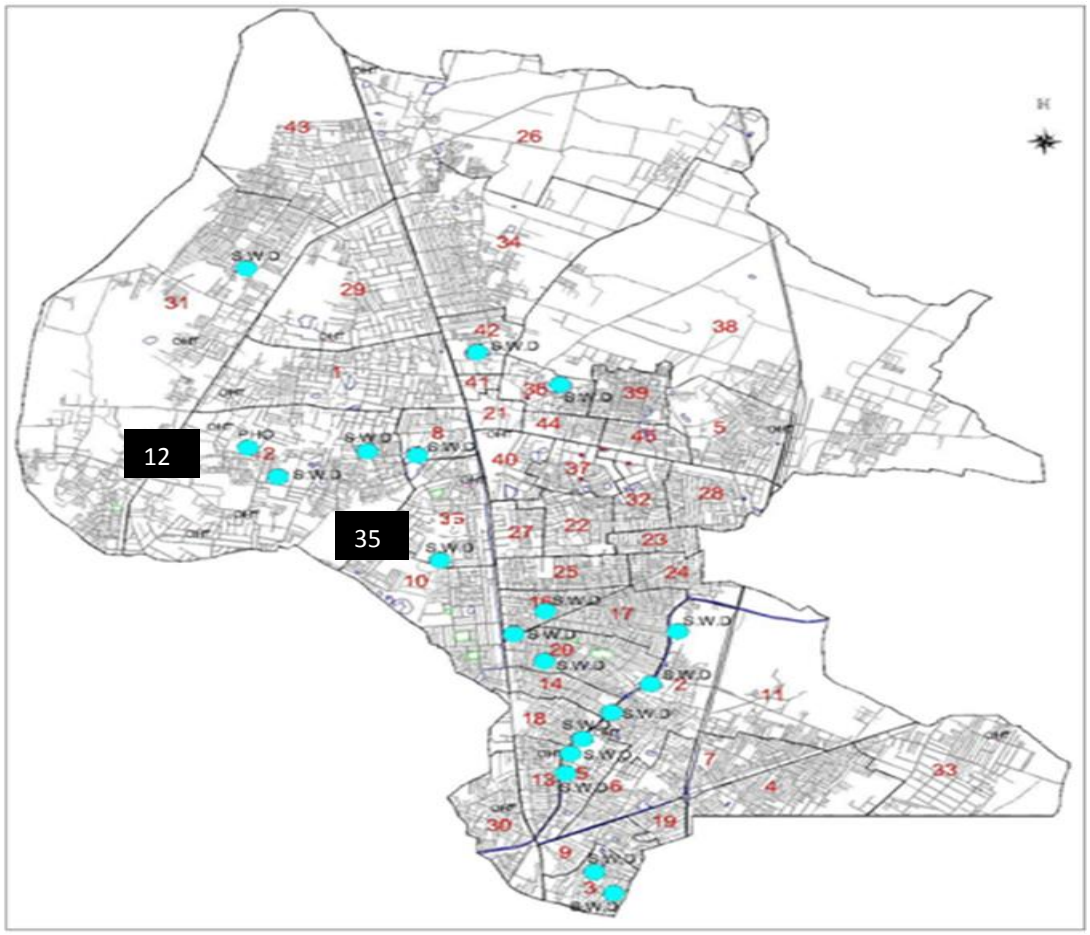
Here x axis is indicative of ward numbers and y axis, is the number of schools in shown wards.

### 8.1.4 *TREATMENT AND DISPOSAL*

Loni town does not have any recognized system of Solid waste disposal due to lack of proper and sufficient number of equipments and lack of Public Awareness.Currently there is no waste treatment facility in the city and the waste is disposed randomly in low lying areas or local pond areas.Only 30% of waste is being cleared & transported to dumping sites without treatment along with municipal waste.

There is Solid Waste Treatment Plant (proposed at Mirpur Village) which is under Construction. Also there is a Sanitary Landfill proposed on a 16 acre land in outskirt of city, village Saidullahbad for period of 5 Years.

**Map 6: Location of Existing Arbitrary Dumping Sites**




**Source: DPR MSWM, Loni 2006-07**

8.1.5 *Service Level Benchmarks*

**Table 33: Service Benchmark for Solid Waste Management**

| Performance Indicator | Benchmark | Status |
|---|---|---|
| Household Level Coverage | 100% | 0% |
| Eff. in Collection of Solid Waste | 100% | 30 % |
| Extent of Segregation of MSW | 100% | 0% |
| Extent of MSW Recovered | 80% | 0% |
| Extent of Scientific Disposal of MSW | 100% | 0% |
| Extent of Cost Recovery | 100% | 0% |
| Eff. in Re-dressal of Customer Complaints | 80% | 0% |
| Eff. In Collection of SWM Charges | 90% | 0% |

**Table 34: Ward Wise Projected Solid Waste Generation**

| Solid Waste Generated (MTPD) | 96.202 | 158.812 | 222.017 | 322.339 | 488.464 | 772.468 | 1,268.883 | 2,149.313 |
|---|---|---|---|---|---|---|---|---|
| **Ward No.** | **2001** | **2011** | **2016** | **2021** | **2026** | **2031** | **2036** | **2041** |
| **1** | 2.449 | 4.043 | 5.652 | 8.206 | 12.435 | 19.665 | 32.302 | 54.715 |
| **2** | 2.367 | 3.907 | 5.462 | 7.931 | 12.018 | 19.005 | 31.218 | 52.880 |
| **3** | 2.457 | 4.056 | 5.670 | 8.232 | 12.474 | 19.727 | 32.404 | 54.888 |
| **4** | 2.142 | 3.536 | 4.944 | 7.177 | 10.877 | 17.200 | 28.254 | 47.858 |
| **5** | 2.455 | 4.053 | 5.666 | 8.227 | 12.466 | 19.714 | 32.384 | 54.853 |
| **6** | 1.989 | 3.283 | 4.589 | 6.663 | 10.097 | 15.968 | 26.230 | 44.430 |
| **7** | 1.914 | 3.160 | 4.418 | 6.414 | 9.720 | 15.371 | 25.249 | 42.768 |
| **8** | 2.384 | 3.935 | 5.502 | 7.988 | 12.104 | 19.142 | 31.443 | 53.260 |
| **9** | 2.411 | 3.981 | 5.565 | 8.080 | 12.244 | 19.363 | 31.807 | 53.877 |
| **10** | 2.452 | 4.048 | 5.659 | 8.216 | 12.451 | 19.690 | 32.343 | 54.784 |
| **11** | 2.032 | 3.355 | 4.690 | 6.809 | 10.318 | 16.317 | 26.802 | 45.400 |
| **12** | 2.452 | 4.048 | 5.659 | 8.216 | 12.451 | 19.690 | 32.343 | 54.784 |
| **13** | 2.446 | 4.038 | 5.645 | 8.195 | 12.419 | 19.640 | 32.261 | 54.646 |
| **14** | 1.938 | 3.198 | 4.471 | 6.492 | 9.838 | 15.557 | 25.555 | 43.287 |
| **15** | 1.959 | 3.234 | 4.522 | 6.565 | 9.948 | 15.732 | 25.842 | 43.772 |
| **16** | 1.891 | 3.122 | 4.364 | 6.336 | 9.602 | 15.184 | 24.942 | 42.248 |
| **17** | 2.449 | 4.043 | 5.652 | 8.206 | 12.435 | 19.665 | 32.302 | 54.715 |
| **18** | 2.214 | 3.654 | 5.109 | 7.417 | 11.240 | 17.775 | 29.198 | 49.458 |
| **19** | 1.827 | 3.017 | 4.217 | 6.123 | 9.279 | 14.674 | 24.104 | 40.828 |
| **20** | 2.455 | 4.053 | 5.666 | 8.227 | 12.466 | 19.714 | 32.384 | 54.853 |
| **21** | 1.866 | 3.081 | 4.307 | 6.253 | 9.476 | 14.985 | 24.615 | 41.694 |
| **22** | 2.034 | 3.357 | 4.693 | 6.814 | 10.326 | 16.329 | 26.823 | 45.434 |
| **23** | 1.905 | 3.144 | 4.396 | 6.382 | 9.671 | 15.294 | 25.122 | 42.553 |
| **24** | 2.142 | 3.536 | 4.944 | 7.177 | 10.877 | 17.200 | 28.254 | 47.858 |
| **25** | 1.855 | 3.063 | 4.282 | 6.217 | 9.421 | 14.898 | 24.472 | 41.452 |
| **26** | 2.184 | 3.606 | 5.041 | 7.319 | 11.091 | 17.539 | 28.810 | 48.800 |
| **27** | 1.910 | 3.152 | 4.407 | 6.398 | 9.696 | 15.333 | 25.187 | 42.664 |
| **28** | 1.937 | 3.197 | 4.470 | 6.490 | 9.835 | 15.553 | 25.547 | 43.273 |
| **29** | 2.446 | 4.038 | 5.645 | 8.195 | 12.419 | 19.640 | 32.261 | 54.646 |
| **30** | 1.829 | 3.019 | 4.221 | 6.128 | 9.287 | 14.686 | 24.124 | 40.863 |
| **31** | 2.021 | 3.337 | 4.665 | 6.772 | 10.263 | 16.230 | 26.659 | 45.157 |
| **32** | 1.931 | 3.188 | 4.457 | 6.471 | 9.806 | 15.508 | 25.474 | 43.149 |
| **33** | 1.818 | 3.001 | 4.196 | 6.092 | 9.232 | 14.599 | 23.981 | 40.621 |
| **34** | 2.446 | 4.038 | 5.645 | 8.195 | 12.419 | 19.640 | 32.261 | 54.646 |
| **35** | 2.457 | 4.056 | 5.670 | 8.232 | 12.474 | 19.727 | 32.404 | 54.888 |
| **36** | 2.434 | 4.017 | 5.616 | 8.154 | 12.356 | 19.540 | 32.097 | 54.369 |
| **37** | 2.434 | 4.017 | 5.616 | 8.154 | 12.356 | 19.540 | 32.097 | 54.369 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **38** | 1.820 | 3.004 | 4.200 | 6.097 | 9.240 | 14.612 | 24.002 | 40.655 |
| **39** | 1.829 | 3.019 | 4.221 | 6.128 | 9.287 | 14.686 | 24.124 | 40.863 |
| **40** | 2.403 | 3.966 | 5.545 | 8.050 | 12.199 | 19.291 | 31.689 | 53.676 |
| **41** | 1.886 | 3.114 | 4.353 | 6.319 | 9.576 | 15.144 | 24.877 | 42.137 |
| **42** | 1.829 | 3.019 | 4.221 | 6.128 | 9.287 | 14.686 | 24.124 | 40.863 |
| **43** | 2.457 | 4.056 | 5.670 | 8.233 | 12.476 | 19.729 | 32.408 | 54.895 |
| **44** | 1.826 | 3.014 | 4.214 | 6.118 | 9.271 | 14.661 | 24.083 | 40.794 |
| **45** | 1.821 | 3.007 | 4.203 | 6.102 | 9.247 | 14.624 | 24.022 | 40.690 |

## 8.2 SWOT ISSUES AND PRIORITIES

**Table 35: Solid Waste Management SWOT**

| **STRENGTH** | **WEAKNESSES** |
|---|---|
| • Compact city; amenable to city wide PPP initiatives | • 0 % coverage ,Negligible levels of Door-to-door collection<br>• Dumping of wastes in water bodies and neighbourhoods<br>• Low frequency of collection<br>• Inadequate Machinery and Staff leading to weak accountability.<br>• No processing and landfill facilities |
| **OPPORTUNITIES** | **THREATS** |
| • Exposure to modern waste management practices.<br>• Proposed landfill site<br>• Scope for generating revenue from processing<br>• Scope for PPP interventions in secondary transfer and processing | • Health hazards<br>• Filling of water bodies by wastes<br>• Mixing of solid waste with waste water leading to choking of existing line network. |

**The key issues and priorities with respect to solid waste management within NPP are summarised below.**

- Service levels in SWM within NPP is below as per SLB norms
- The DPR prepared in 2006-2007 under UIDSSMT scheme should be given priority as it has all the necessary details with respect to baseline demand, demand projections, sizing of equipment, location of storage points, staffing requirement, institutional framework, basis for investment and O&M cost estimates, possible scope and structuring of PPP is also recommended.
- Open dumping and ignorance by people reflects lack of awareness on their responsibilities towards SWM.
- Accountability for SWM is diffused which overlaps between health and engineering departments.

## 8.3 CONCEPTUAL BASIS AND BEST PRACTICES

Municipal solid waste management activities are inter-related, and there are several technical options for every activity in the chain.

### Segregation

Source segregation is a requirement as per MSWM Rules 2000. However, when source level sorting is not developed, then sorting at the community level/ storage / processing facility may be considered till a house level sorting is established. Pre-sorting at processing facilities is desirable to ensure that output (such as compost) meets regulatory standards.

### Sorting

**Manual sorting** comprises activities like unloading of waste collected, manually spreading the waste, handpicking visually identifiable waste for reuse, and collecting the remaining waste.

**Semi-mechanized sorting** comprises mechanized unloading, mechanized loading on conveyor belts, handpicking reusable waste, and mechanized collection, stocking and reloading of remaining waste; and

**Fully-mechanized sorting** comprises mechanized unloading, size reduction through shredders, size separation/ screening, density and magnetic separation and compaction

### Storage, Collection and Transportation

Doorstep collection of waste through containerized ***handcarts/tricycles*** or ***motorized vehicles*** having non-conventional/ sounding horns deployed for doorstep waste collection with active community participation.

Bin-free collection systems are becoming popular. The commonly used waste storage include (i) metal containers/dumpers and (ii) plastic bins:

- A maximum loaded weight of around 30 kg if the collection is manual
- Devices that facilitate its movement between its place in the building and the place of collection
- Closable in order to avoid waste spillage or exposure
- Economical and affordable for the general public
- Not producing excessive noise while handling
- Easy to empty without leaving waste at the bottom

**Transfer Stations:** Transfer stations are considered when the distance between the location of large-scale collection activities and the landfill is greater than 20 km.

**Treatment: Biological processes** include; (i) aerobic stabilization and composting processes that principally generate water, carbon dioxide and heat; and (ii) anaerobic important for the production of methane. ULB should look at alternate uses for dry/non-degradable waste like RDF, utilisation of inerts. Other options including thermal processes like incineration.

**Sanitary Landfill:** Sanitary landfill uses engineering principles to confine the waste to as small areas as possible, covering it daily with layers of earth and compacting to reduce its volume.

## 8.4 VISION AND GOALS

8.4.1 *VISION*

**Litter- free through implementation of sustainable waste management practices.**

8.4.2 *GOALS*

**Table 36: Solid Waste Management, SML Term Targets**

| PARAMETER | UNIT | NORM | Status | Short .T | Medium. T | Long. T |
|---|---|---|---|---|---|---|
| HH coverage | % | 100% | 0% | ✓ | | |
| Waste Collection Efficiency | % | 100% | 20% | ✓ | | |
| Source Segregation | % | 100% | 0% | ✓ | | |
| MSW recovery | % | 80% | 0% | | ✓ | |
| Scientific disposal | % | 100% | 0% | ✓ | | |
| Cost recovery | % | 100% | 0% | | ✓ | |
| Cost Collection efficiency | % | 100% | 0% | | ✓ | |
| Complaints Redress | % | 100% | 0% | | ✓ | |

**Ongoing Initiatives –**

Municipal Solid Waste Management Scheme (DPR) for Loni (U.P) under UIDSSMT Programme was prepared in 2006-07 proposing investment of 1275.78 lacs. The objective was to provide an efficient Municipal Solid waste Management system in Loni in compliance with MSW Rules 2000 and contains all the technical information required.

- It proposes provision for door to door collection of segregated waste by providing tricycle with six bins each bins of 50lts capacity.
- 16 Acres landfill site is proposed for dumping and installation of compost plant for 5 years.

**Table 37 : Estimated Cost and Contribution (SWM DPR)**

| S. No. | Institution | Share(Lacs) |
|---|---|---|
| 1 | Gov. of India | 1020.624 |
| 2 | U.P Government | 127.578 |
| 3 | Urban Local Body | 127.578 |
| | **Total** | **1275.78** |

The scheme is not completely executed yet and is under progress.

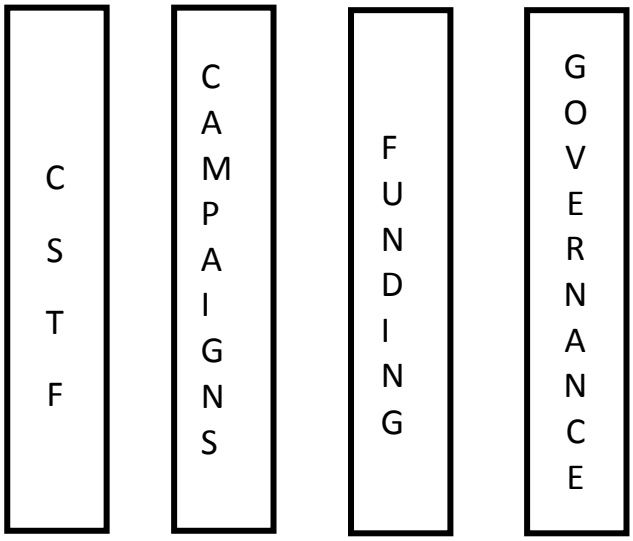
## 8.5 RECCOMENDATIONS

| ACTIONS | RECOMMENDED BODY |
|---|---|
| Give priority to any Initiatives in the form of DPR's made. | NPP |
| Initiate actions such as auditing, inviting suggestions from stakeholders to improve accountability, oversight and public participation. | NPP |
| • Improve coordination among health and engineering departments and create a separate SWM department to facilitate better accountability in the medium term<br>• To avoid overlapping powers, duties and responsibilities of each department should be clearly defined.<br>• Engage local stakeholders in monitoring and oversight of SWM activities | |
| Capacity building in terms of availability of required number of equipments and trained staff for management of facility in a particular area of the city. | NPP |
| Simultaneously formulate and enforce bye-laws and guidelines to articulate citizen duties and obligations prohibit littering, ban on use of plastic below 40 microns and levy of fines for littering. | NPP |
| Implement user charges for SWM towards achieving O&M cost recovery in long term | NPP |
| Avail JNNURM and other state level grants available to implement an integrated PPP. | NPP |

Priorities:

a) With help of prepared DPR, focus on implementation and achieving SLB norms.
b) Clarify accountability and mobilize people support.

# SECTION III CSP SUPPORT PILLARS



# Chapter 9. CITY SANITATION TASK FORCE

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. Hence, it is one of the main recommendations and pre-requisites for the preparation of the city sanitation plan, under the National and state policy framework that a city sanitation task force (CTF) is formulated at city level. The CTF is involved in the preparation and execution of the sanitation plan from the very initial stage of the planning and conceptualisation.

## 9.1 CITY SANITATION TASK FORCE MEMBERS

The City sanitation task force (CTF) should comprise of representative from diversified sectors of the society:

**Figure 42: CTF Representatives**


***CSTF would be responsible for the CSP and appoint one of the govt. agencies a City Sanitation Implementation Agency***

- Agencies directly responsible for sanitation including on- site sanitation, sewerage, water supply, solid waste, drainage, etc. including the different divisions and departments of the ULB, PHED, etc.;

- Agencies indirectly involved in or impacted by sanitation conditions including representatives from the civil society, colonies, floating population slum areas, apartment buildings, etc.,

- Eminent persons and practitioners in civic affairs, health, urban poverty,

- Representatives from shops, industries and establishments,

- Representatives of other large institutions in the city (e.g. Cantonment Boards, Govt. of India or State Govt. Enterprise campuses, etc.).

- NGOs working on water and sanitation, urban development and slums, health and environment,

- Representatives of unions of safai karamcharies, sewerage sanitary, recycling agents/ kabaries etc.

- Representatives from private firms/ contractors formally or informally working in the sanitation sector (e.g. garbage collectors, septic tank de-sludging firms etc.)

- Representatives from educational and cultural institutions

- any other significant or interested stakeholders

Some of the elected Members of the ULB must be members of the Task Force. The Task Force should be headed by the Mayor / Chairman with the executive head (e.g. Municipal commissioner / Executive Officer) as the Convener. Cities can also choose to appoint, as a part of the Task force, City Sanitation Ambassadors chosen from Draft City Sanitation Plan for Loni 2014 eminent people who enjoy outstanding credibility and influence amongst the city's leadership and population.

Political leadership must be involved from all political parties and persuasions so that the sanitation campaign has the full support of all stakeholders and no opposition from any group. One of the things to be considered by the Task Force is to organize a multi stakeholder, multi- party meeting in the preparatory stage, and take a formal resolution to make the city 100% Sanitized, and publicize the same, with all signatories.

## 9.2 RESPONSIBILITIES OF CSTF

- Launching the City 100% Sanitation Campaign
- Generating awareness amongst the city's citizens and stakeholders

- Approving materials and progress reports provided by the implementing agency, other public agencies as well as NGOs and private parties contracted by the implementing Agency, for different aspects of implementation

- Approving the City Sanitation Plan for the city prepared by the Sanitation Implementation Agency after consultations with citizens

- Implementation of Information System Improvement Plan (ISIP)

- Undertaking field visits from time to time to supervise progress

- Issue briefings to the press/ media and state government about progress

- Providing overall guidance to the Implementation- Agency

- Implementation of Performance Improvement Plan (PIP)

- Recommend to the ULB fixing of responsibilities for city- wide sanitation on a permanent basis

The Task Force should meet formally frequently (at least once in two months) in the initial stages to monitor and guide the process of planning and implementation. At a later stage, meetings and field visits can be on an as- needed basis. In some cities, the City Sanitation Task Force may divide up roles and responsibilities amongst smaller sub- committees to focus on different aspects closely while keeping the overall character of the Task Force intact.

(a) The Task Force should appoint one of the key agencies, preferably the ULBs, to become the City Sanitation Implementing Agency for the CSP for the city. This agency will be responsible for day to day coordination, management and implementation of the sanitation programmes on a city- wide basis. The agency will coordinate with and agree on joint actions with other public agencies, and contract in and supervise the services of NGOs (through Memorandum of Understanding) and private parties (through contracts) for preparing and disseminating materials for IEC, conducting baseline surveys and stakeholder consultations, maintaining a comprehensive GIS- based database of better reliability, implementing the Performance Improvement Plan (PIP) and physical works, letting out and supervising O&M management contracts, etc. The Loni Nagar Palika formally appointed City Sanitation Task Force and intimated to the Implementing Agency.

(b) Assign Institutional Responsibilities:

One of the key gaps in urban sanitation is lack of clear and complementary institutional responsibilities. This comprises two aspects: a) roles and responsibilities

institutionalized on a permanent basis; and b) roles and responsibilities for the immediate campaign, planning and implementation of the City's Sanitation Plan based on which the former can be outlined experimented with, and finally institutionalized.

The Sanitation Task Force will recommend the assigning of permanent responsibilities for city- wide sanitation to the ULB including the following aspects:

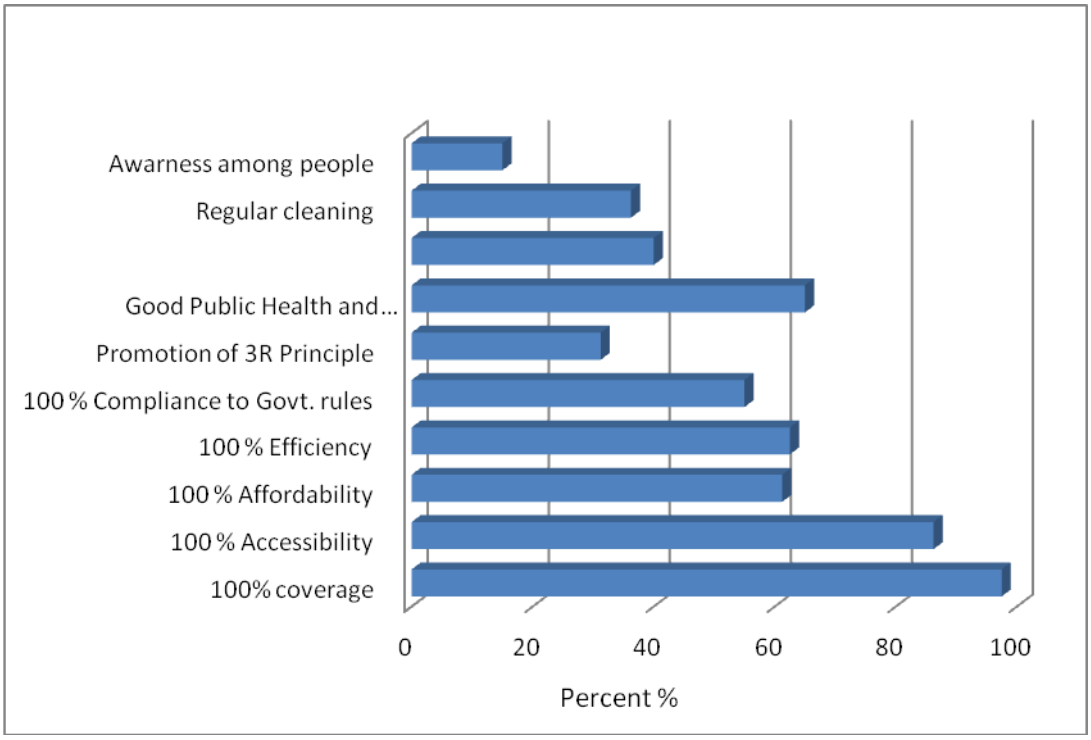
- The ULB to have final overall responsibility for city- wide sanitation, including devolving power, functions functionaries and funds to them
- Planning and Financing including State Government and Govt. of India schemes
- Asset creation including improvement, augmentation
- Operations and Management(O&M) Arrangements for all network, on -site, individual, community and public sanitation facilities and systems(including transportation up to final treatment and disposal of wastes)
- Fixing tariffs and revenue collections in order to make O&M sustainable
- Improving access and instituting special O&M arrangements for the urban poor and un served populations in slum areas and in mixed areas
- Adopting standards- for
  - ✓ Environment Outcomes (e.g. State pollution Control Board standards on effluent parameters).
  - ✓ Public- Health Outcomes(e.g. State Health Departments),
  - ✓ Processes(e.g. safe disposal of on- site septage)
  - ✓ Infrastructure( e.g. design standards and criteria) (PHEDs/ Para statals)
- Service Delivery standards( e.g. by Urban Development departments)
  - ✓ Adoption of Regulatory roles including environmental standards (e.g. State pollution Control Boards), Health outcomes (e.g. Health Departments).
  - ✓ Measures in case specific stakeholders do not discharge their responsibilities properly
  - ✓ Training and Capacity Building of implementing agency and related personnel - Redressal of public complaints regarding sanitation, water supply and solid waste management.

- ✓ Monitoring of 100% Sanitation involving multiple stakeholders. The roles and responsibilities for the Sanitation Plan implementation will also be the task of the City Sanitation Task Force.

## 9.3 Stakeholders Workshop Feedback

Before finalizing the CSP of Loni it is critical for the stakeholders to agree on the key goals of the CSP of the CSP. The results of discussions are presented below:

**Figure 43: Goals of City Sanitation**

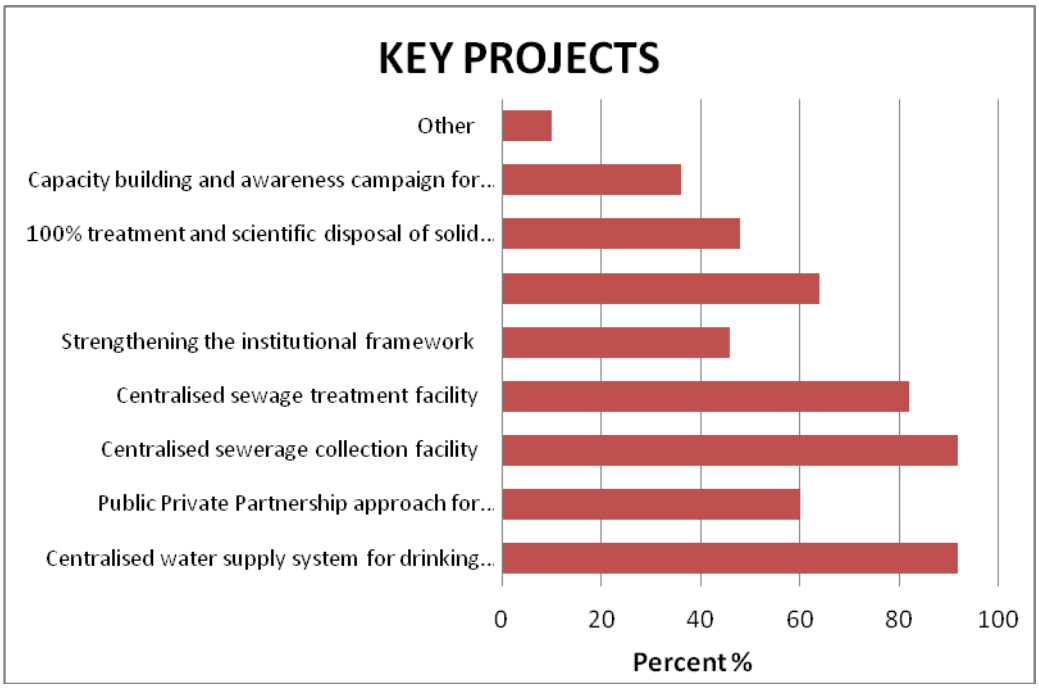



As evidenced from the figure above, 100% coverage and accessibility of sanitation services was given top most priority followed by affordability good public health and 100% efficiency.

Goals like 3R principal, Compliance with government rules were not given too much of priority. Surprisingly, awareness among people of Loni which is an equally important issue was not recommended by stakeholders. In light of above situation it is pertinent that immediate steps are taken to increase coverage and accessibility of sanitation facility along with quarterly campaigning to sensitise public on sanitation issues affecting their health's.

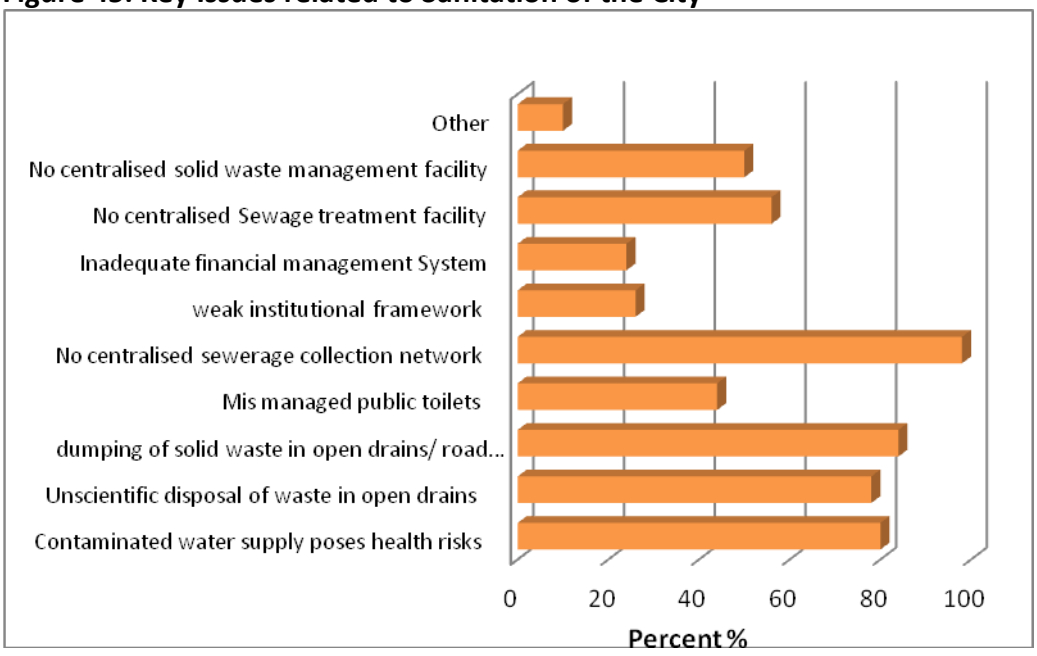
Below are the results of deliberation by CTFM and stakeholders on the key issues related to sanitation of the city.

**Figure 44: Key Projects linked to Sanitation of City**




As evident from figure above absence of centralized sewage collection network and indiscriminate dumping of solid waste in drains and water body were identified as key issue. Both results in contamination of ground water which is the only source of water supply in the city. Hence the stakeholders felt that these practices which leads to contamination of water supply and pose health risk should be addressed immediately. At the conclusion the stakeholders deliberated on the key projects that should be implemented in the city. Understanding that limited funds may be available for implementation of sanitation projects this exercise aimed at deciding on short term, medium term and long term project. The result of their deliberation is presented below:

**Figure 45: Key Issues related to Sanitation of the City**



The major concern comes to be the absence of centralised sewerage collection network and dumping of wastes in water bodies and open drains.

Loni already has some infrastructure like, sewer network in the city (needs to be accessed by people), and 12% water supply. Also the DPR for water supply and SWM has been prepared and are under execution. Absence of STP, Storm water drains and public toilets is definitely the key issue highlighted.

Understanding that first a detailed project report needs to be prepared and necessary funds needs to be sanctioned for implementation of this large scale Draft City Sanitation initiative the stakeholders rest of the facilities as a medium term goal.

Under long term goal the stakeholders agreed to keep initiatives like capacity building, sustainability, institutional strengthening and solid waste treatment facilities. They argued that since the city lakes basic infrastructure there is no logic in conducting awareness campaigns, capacity buildings etc until the basic infrastructure is in place.

# Chapter 10. GOVERNANCE AND INSTITUTIONAL FRAMEWORK

## 10.1 CITY LEVEL STATUS

NPP, as in the case of other ULBs in Uttar Pradesh, is responsible for providing basic infrastructure services and other civic services within its jurisdiction. Apart from NPP, a number of state level agencies are involved in planning and providing urban services within city.

**Table 38 : Existing Organizational Chart**

| S. No. | Designation | NO. |
|---|---|---|
| 1 | Adhishasi Adhikari, Grade II (EO | 1 |
| 2 | Junior Engineer (Civil) | 1 |
| 3 | Supervisor | 1 |
| 4 | Pump operating staff ( Water) | 11 |
| 6 | Centralised Employees(Total approved / existing) | 11 |
| 7 | Total Sanitation Sweepers | 464 |
| 8 | Daily wagers | 3 |
| 9 | Total office staff( permanent) | 11 |
| 10 | Total Water Work staff( permanent) | 11 |
| 11 | Sanitation staff (permanent) | 18 |

Loni is constantly plagued by the issues of irregular absenteeism, sub-standard work practices, non-compliance with occupation health and safety rules, non-cooperation with communities and several disciplinary issues. It also lacks the training programs to orient the workers towards best management practices, service delivery methods, and general code of conduct.

Loni sewerage service management is further affected adversely owing to the vacancies in its department with respect to key positions. Large absenteeism, disciplinary issues, non -compliance to best management practices, occupational health and safety rules, lack of training, regular vacancies in Loni department are evidently the major issues.

**RECOMMENDED STRUCTURE**

According to the Model Municipal Law (MML) the municipal bodies should be responsible for basic facilities for the city including:

1. Water supply;
2. Drainage, waste management (sewerage & solid waste);
3. Economic and social development plans;
4. Transportation systems;
5. Community health and protection of environment;
6. Construction and maintenance of slaughterhouses.

Accordingly, the entire range of sanitation functions in any city should be vested in a single (well structured, capacitated, and (financially) resourced) institution. Hence, for the effective implementation of the city sanitation plan, it is very important to upgrade the existing institutional strength of the Nagar Palika of Loni. Hence, restructuring of the current set up is proposed, with an officer from UP state services of the equivalent rank of the Superintendent Engineer, as Chief Executive of the organisation. Details of the proposed administrative set up are presented below:

**Proposed Organization Structure**

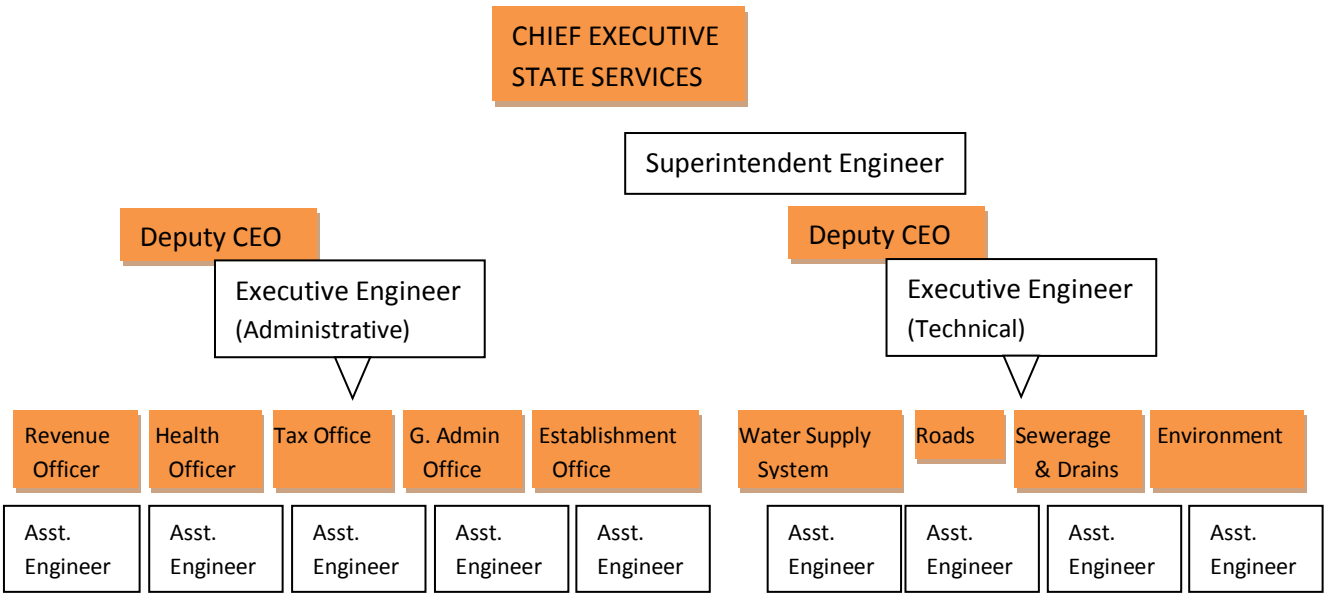



**Table 39: Revised Institutional Responsibilities for Basic Services**

| Urban Services | Planning | Execution | O & M | Tarrif fixing & collection |
|---|---|---|---|---|
| **Water Supply** | PHED | PHED | NPP | NPP |
| **Sewerage** | PHED | PHED | NPP | NPP |
| **Public & Community Toilets** | Multiple Agencies | NPP/PPP | NPP/PPP | NPP/PPP |
| **SWM** | NPP | NPP/PPP | NPP/PPP | - |
| **Storm Water Drainage** | PHED | PHED | NPP | NPP |

## 10.2 CAPACITY BUILDING

### 10.2.1 *TRAINING*

A Detailed Training Needs Assessment is required to ascertain and validate the training requirements.NPP should set aside a Training Budget annually as part of its

budgetary exercise, based on the Training Needs identified .It should implement a phased time-bound program to impart training as per the areas and level of instruction required in collaboration with GOUP.

The Training needs assessment should cover all classes of employees with the recognition that the nature and type of training requirements could be very different.

The table below provides an illustrative set of training needs across select sanitation components –

**Training needs across Sanitation plan Components**

| Sanitation Component | Senior Officials | Technicians / Operating Staff / Workers |
|---|---|---|
| **All Departments** | • Powers and Duties<br>• Citizen Charter and commitments<br>• Urban Reforms and JNNURM<br>• Service Level Benchmarking<br>• Procurement and PPPs<br>• Use of Computers for Information system Improvement | • Rights and Responsibilities<br>• Health and Safety<br>• Citizen Charter and commitments |
| **Water Supply** | • CPHEEO Manual and norms<br>• Developing a Water Supply DPR<br>• Conducting a Water Loss Audit<br>• Metered Supply<br>• SLB Reporting | • Water Quality Testing methods<br>• Installation of Meters/Reading<br>• Repairing water leakages<br>• Handling pipe breaks<br>• Field Inspections and reporting<br>• Use of equipment and safe work practices |
| **Sewerage** | • CPHEEO Manual and norms<br>• Developing a Sewerage DPR<br>• Treatment systems including decentralised /centralized options<br>• Reuse of grey water after primary treatment and Methane Generation<br>• Monitoring Onsite Sewage Treatment<br>• SLB Reporting | • Waste Water Quality Testing<br>• Guidelines for providing connections<br>• Repairing pipe breaks and choking<br>• Field inspections and reporting<br>• Use of equipment and safe work practices |
| **Solid Waste Management** | • Implementing Door-to-Door collection and source segregation<br>• Waste collection routing<br>• Awareness generation and Community mobilisation<br>• PPPs and Contracting<br>• Waste recovery and Landfill technologies | • Collection efficiency<br>• Segregation techniques<br>• Complaints Redresses<br>• Cost Recovery<br>• Safe work practices |
| **Finance and Accounts** | • Budget preparation and Reporting<br>• Financial Management<br>• MIS and Information Management<br>• Auditing and follow up | • National Municipal Accounting Manual and local accounting rules<br>• Accrual Accounting<br>• Accounting software |

### 10.2.2 *PERSONNEL MANAGEMENT AND OCCUPATIONAL HEALTH*

Sanitation operations especially waste management essentially involve significant role of manpower especially sanitation workers and safai karamcharis with most of them working on contract (temporary basis). Majority of these workers are unskilled and poorly educated. Further, the problems of low level of awareness, poor commitment, and discipline; resource diversion; absenteeism; alcoholism; drug addiction; etc. have also been commonly observed among these workers.

Further, due to the very nature of their occupation, the sanitation workers are exposed to a plethora of disease vectors at various stages of handling waste. As a result of this high exposure, typically, morbidity rate is found to be high among them, resulting in poor productivity as well as in generally high mortality.

In order to address these issues, it is recommended that NPP, Loni allocate adequate resources to ensure appropriate interventions for management of personnel and their health and safety. These interventions will comprise of a range of short-term training courses round the year on a regular basis for all grades of sanitation workers on the significance and importance of their work to the city to enhance self-esteem, on handling the issues of alcoholism and drug addiction and occupational health and safety aspects, personal health protection, etc.

NPP should arrange to conduct regular medical check-up of all MSW/sanitation workers with the provision of appropriate and commensurate support for curative treatment for those found to have chronic ailments.

Arrangement to provide uniforms, caps with NPP, Loni logos, and personal protective equipment on a regular basis to impart a sense of identity.

Further the institutional set up and capacity for effective sanitation can be enhanced by NPP, Loni by participatory approach:

- Engaging a group of NGOs and social workers with good communication skills to commence a sustainable campaign on effective sanitation practices all across the city;

- Involving civil society/ community-based organizations such as resident welfare associations, mohalla committees, market/traders associations, women's groups, and rag-pickers' groups in various municipal services & evolving a participatory monitoring system for sanitation services.

- Adopt a system of organizing regular consultations with stakeholders on the issues of, environmental sanitation, MSW management, public health and hygiene, quality of life and urban governance/development in general.

### 10.2.3 *INFORMATION MANAGEMENT*

**House Level Baseline Sanitation Information**

Updation of baseline information on sanitation indicators at a household level is critical for NPP planning, analysis and decision making with respect to sanitation services. A possible periodic approach is suggested below –

- Information when compiled should be recorded in the property tax database.
- Updation through a self-declaration while residents pay their property taxes
- Ensuring Accuracy through sample Inspection of say 1-2% households and fines on false information will ensure information validity.

**Table 40: List of Information from HH Survey**

| **Property Tax Identification Code** | |
|---|---|
| Toilet Access | Yes/No |
| Type | Toilet within Property / Shared facility |
| No. of people using the Toilet | |
| Primary Water Source | |
| Other Water Sources | |
| Toilet connected to | SepticTank/Sewer/local treatment system/open drain/others |
| If Septic Tank, last cleaned on | Date |
| If Sewered, is grey water outlets also connected | Yes / No |
| | |
| Covered under SWM Door-to-door collection | Yes/No |
| Practising source segregation | Yes/No |

Whenever there will be increase in sanitation facilities coverage NPP should install **bulk meters** at intake and discharge points in water supply and sewerage system. This will help in overcoming any future constraints in non-availability of information on water flows.

The Information Systems Improvement Plan (ISIP) prepared following the Service Level Benchmarking exercise should be implemented on priority.

Also NPP should track and report progress with respect to cost recovery and collection efficiency targets on a quarterly basis. (recording financial performance)

### 10.2.4 *IMPLEMENTATION STRATEGY*

- For the capacity building and increase of awareness levels in the public, it is recommended that a third party is hired by NPP, Loni which is competent enough to prepare a detailed IEC plan & implement it in a phased manner.

- Citizen participation and involvement is crucial to achieving service delivery goals in sanitation. There are two levels at which communication and citizen engagement in the context of sanitation is challenging:

    - **To engage and mobilise their support for the transformation**
    - **At the level of individual sanitation components, behaviour needs change**

  Open defecation and open urination which is rampant in parts of the city should be prohibited. Therefore at the level of an individual sanitation

component, there are a number of behavioural aspects that need to be focused on through awareness generation and communication campaigns to effect positive behaviours need to achieve specific sanitation outcomes.

**Table 41: Approach to Address Awareness Generation**


## 10.3 RECOMMENDATIONS

**Table below provides an overall Accountability**

| ROLES | PUBLIC/COMMUNITY TOILETS | SWM | ON Site Sanitation | Sewerage | Water Supply |
|---|---|---|---|---|---|
| Guidance | MOUD AND CPHEEO | | | | |
| Planning | NPP, W &S Department | | | PHED + NPP & W & S Dept. | |
| Asset Creation/Capital Investment | NPP, W &S Department | | HH | PHED + NPP & W & S Dept. | |
| O and M | NPP, W &S Department | | HH | NPP, W &S Department | |
| Monitoring | NPP, Ward Committees(if exists),Independent (third party) | | | | |
| Regulation & Tariff Setting | Elected Body | | | | |
| Clarity on Land Titles | NPP and Revenue Department, GOAP | | | | |

The above framework attempts to fix accountability for various components of Sanitation with respect to various roles namely, Guidance, Planning, Asset creation, O&M, Monitoring and Regulation/Tariff Setting. The framework recognises that

- NPP clearly has single point accountability for Shared Toilet Access, Solid Waste Management and planning and monitoring of Onsite sanitation
- A three tier monitoring approach is recommended for oversight of delivery of water and sanitation services.
- There will continue to be overlaps between PHED in sewerage and water supply, particularly in planning and asset creation, with O&M being the responsibility of NPP.

# REFERENCES


- National Urban Sanitation Policy
- Uttar Pradesh State Sanitation Policy
- Urban Infrastructure Development Small and Medium Towns
- Municipal Solid Waste Management Scheme for Loni (U.P) under UIDSSMT Programme Year 2006-2007
- Loni Water Supply Re-organisation Scheme (UNDER UIDSSMT)
- Loni Sewerage Scheme under UIDSSMT – District Ghaziabad
- Nagar Palika Parishad, Loni–Statistical Summary Report
- Service Level Benchmarking –General Information of City

# ANNEXURES

**ANNEXURE-1**: LIST OF CSTF MEMEBERS

## सिटी सेनिटेशन प्लान तैयार किये जाने हेतु टास्क फोर्स समिति

| क0 | नाम | पद | मौबाइल नम्बर |
|---|---|---|---|
| 1 | श्री मनोज कुमार धामा, न0पा0प0 | अध्यक्ष | 9717956104, 9312569100 |
| 2 | श्री धीरेन्द्र कुमार राय अधिशासी अधिकारी न0पा0प0 | सचिव | 9958970821 |
| 3 | श्री ब्रहम सिंह लेखाकार न0पा0प0 | सदस्य | 9412350851 |
| 4 | श्री सुरेन्द्र नाथ सिह अवर अभियंता न0पा0प0 | सदस्य | 9654048570 |
| 5 | श्री जय प्रकाश सफाई निरीक्षक न0पा0प0 | सदस्य | 9310797414 |
| 6 | श्री तपसि न0पा0प0 | सदस्य | 9540123428 |
| 7 | श्री सुभाश चन्द्र,लोनी इसटेट एसोसिएशन | सदस्य | 9871805043 |
| 8 | श्री पहल सिंह, प्रबंधक अमर जयोति पबलिक स्कूल | सदस्य | 9312472569 |
| 9 | श्री संजीव कुमार, सी.ए. | सदस्य | 9319072856 |
| 10 | श्री के. के. अतरी , अध्यक्ष र. डबलू. ए. इन्द्रापूरी | सदस्य | 9457101283 |
| 11 | श्री राबत , र. डबलू. ए. खन्ना नगर | सदस्य | 9654820423 |
| 12 | श्री सचिव कृषि मण्डी | सदस्य | |
| 13 | श्री डाक्टर सि एच सि | सदस्य | 0120.3126232, 9350538741 |
| 14 | श्री अकरम , ब्यूरोचीफ दैनिक हिन्दी हिन्दुस्तान | सदस्य | 987337492 |
| 15 | श्री रविंद्र ,ब्यूरोचीफ दैनिक सहारा हिन्दी | सदस्य | 856847107 |
| 16 | श्री सुबोध गुपता, ब्यूरोचीफ दैनिक हिन्दी अमर उजाला | सदस्य | 9810283957 |
| 17 | श्री विनोद मावी, ब्यूरोचीफ दैनिक जागरण | सदस्य | 9311329090 |
| 18 | श्री सुभाश चन्द्र, यंग रूरल एसोसिएशन | सदस्य | 9871805043 |
| 19 | श्रीमति सुनीता देवी | सदस्य | 9871553628 |
| 20 | श्रीमति नीरज धामा | सदस्य | 9312356931 |
| 21 | श्रीमति कुसुम लता | सदस्य | 9560229038 |
| 22 | श्री बेगराज मावी | सदस्य | 9818003228 |
| 23 | श्री आदेश कश्यप | सदस्य | 9015346630 |
| 24 | श्री अमित सैनी | सदस्य | 9540800407 |
| 25 | श्रीमति शीतला देवी | सदस्य | 9718181561 |

| | | | |
|---|---|---|---|
| 26 | श्रीमति पुष्पा देवी | सदस्य | 9312472769 |
| 27 | श्री अनिल पुत्र श्री तेजपाल | सदस्य | 9718953243 |
| 28 | श्री दीपक | सदस्य | 9971974791 |
| 29 | श्रीमति मुनेश | सदस्य | 9717227124 |
| 30 | श्री सुभाष | सदस्य | 9311793831 |
| 31 | श्री सतीश जैन | सदस्य | 9999484950 |
| 32 | श्री प्रमोद कुमार उर्फ बबलू शर्मा | सदस्य | 9871410216 |
| 33 | श्री सतपाल शर्मा | सदस्य | 8802434094 |
| 34 | श्री नितिन शर्मा | सदस्य | 9990562011 |
| 35 | श्रीमति लक्ष्मी देवी | सदस्य | 9911848541 |
| 36 | श्री सुनोल | सदस्य | 9312307624 |
| 37 | श्री उदयपाल सिंह | सदस्य | 9718655680 |
| 38 | श्री मुकेश | सदस्य | 9899722075 |
| 39 | श्री सत्यवीर सिंह | सदस्य | 9350170031 |
| 40 | श्री राम कुमार | सदस्य | 9810090121 |
| 41 | श्री विनोद | सदस्य | 9311809352 |
| 42 | श्री पप्पू | सदस्य | 9312940170 |
| 43 | श्री इस्लामूद्दीन | सदस्य | 9990824630 |
| 44 | श्रीमति विभा देवी | सदस्य | 9818889779 |
| 45 | श्री सुधीर कुमार | सदस्य | 9990750087 |
| 46 | श्रीमति लोकेश पत्नी श्री जगत सिंह | सदस्य | 9350222816 |
| 47 | श्रीमति फैमिदा पत्नी श्री अली हसन | सदस्य | 9313399997 |
| 48 | श्री विरेन्द्र कुमार शर्मा | सदस्य | 9717350309 |
| 49 | श्री जितेन्द्र कुमार | सदस्य | 9711977491 |
| 50 | श्रीमति लता चौधरी | सदस्य | 9818391626 |
| 51 | श्री मनबीर गुर्जर | सदस्य | 9711111149 |
| 52 | श्री योगेश कुमार | सदस्य | 9313776122 |
| 53 | श्रीमति रेखा रानी | सदस्य | 9313370170 |
| 54 | श्रीमति वहीदा बेगम | सदस्य | 9313094148 |
| 55 | श्रीमति मिथलेश | सदस्य | 9971934684 |

| | | | |
|---|---|---|---|
| 56 | श्री अजीत सिंह | सदस्य | 9810601339 |
| 57 | श्री माहम्मद यामीन | सदस्य | 9312735088 |
| 58 | श्रीमति साहिदा | सदस्य | 9312463149 |
| 59 | मौ0 अकील | सदस्य | 9312353953 |
| 60 | श्री शौकीन मलिक | सदस्य | 9899773052 |
| 61 | श्रीमति माया देवी | सदस्य | 9871171697 |
| 62 | श्री खुशनूद | सदस्य | 9313607714 |
| 63 | श्री जमील अहमद | सदस्य | 9350082007 |

**ANNEXURE-2**: MINUTES OF MEETING OF CITY SANITATION TASK FORCE

## MINUTES OF MEETING OF STAKEHOLDERS CONSULTATION

**Date** : 27th January 2014

**Time** : 13:30 p.m. – 3:30 p.m.

**Venue** : Nagar Palika Conference Hall, Loni

The Chairman welcomed all the CSTF members and introduced the consultants and briefly explained the process of City Sanitation Plan and asked Mr. Jawed to give the presentation on situation analysis based on the survey results and analysis, conducted by the survey team and explained the prioritization setting exercise as proposed to be carried out at the conclusion of the meeting. The points discussed are as follows:

I. Participants highlighted the problems faced by them in their respective wards. Mostly, it was related to Collection, Disposal & Proper Management of **Solid Waste**. They also suggested that water supply & quality of water should be given top priority.

II. One of the participant highlighted that there should be an individual centre in every ward to look after sanitation problems.

III. There should be a multipurpose community centre in each ward with having facilities like dispensary and community toilets.

IV. Chairman assured that they will organize a meeting with all the representatives of nursing homes and hospitals to understand the issue in detail and propose an appropriate solution. He also mentioned that the GIS based satellite mapping and e-governance initiative has been carried out and GIS map was being shown to all participants.

V. NGO and RWA should be used for awareness generation in the people, particularly for improved sanitation.

VI. One of the participants highlighted Talab ka Saundarikaran aur Viriksha ropan activity should be done near every water body exists in Nagar Palika area.

VII. One of the CSTF member highlighted problems of road and slum and laid more emphasis on sanitation and also expressed their feeling on quality of water supplied, water related health problems and told that quality of ground water is not too good for drinking purposes in Loni.

VIII. One of the CSTF member expressed his views on operation and maintenance that how to make city clean. Installation of a centralized sewerage system and provision of clean drinking water forms the need of the hour. He mentioned that the process should not stop at planning stage but implementation should also be given importance.

IX. Unsystematic disposal of solid waste and waste water from industries in low lying areas will lead to contamination of ground water and the same should be checked immediately.

X. EO assured that the problems of city will be resolved as soon as possible specially for improved sanitation and water supply systems in the city with the positive cooperation from public.

XI. The chairman thanked to all stakeholders for their participation and assured that problems raised by participants will be resolved. In addition chairman needs public cooperation to increase the awareness in the public regarding sanitation.

**ANNEXURE-3**: SURVEY QUETIONNAIRE

## Questionnaire for Household Survey

### Personal information

Name: _____ H. No.:_____

No. of members in the household: ____ Ward No.:_____

Employment Type: _____ Zone: _____

Income Category: _____

| Q. No. | Questions | Responses | Count |
|---|---|---|---|
| **I.** | **Sanitation System** | | |
| 1. | Is there toilet facility available in house? | Yes | |
| | | No | |
| | | Total | |
| 2 | Type of Toilet (Wet-Flush/dry- soak pit | | |
| 3 | If yes.<br>a. How many members of household use it?<br>b. Is the toilet shared by houses OR Individuals? | | |
| 4. | If No, do you use a public/community toilet OR defecate openly? | | |
| 5 | Are there community toilets/ Urinals in your locality? | Yes | |
| | | No | |
| | | Total | |
| | **If Yes:** | | |
| 6 | What is the condition of the public toilet? | | |
| 7 | Who is responsible for maintenance of the public toilet? | | |
| 8 | Is there any user fee/charges for the usage of public toilet? | | |
| 9 | If yes, what are the charges? | | |
| 10 | How many people use the public toilet (average daily number of visitors) | | |
| 11. | Any toilet for physically disabled persons in your community | | |
| | | | |

| | | | |
|---|---|---|---|
| 12 | **If Not**, are you willing to contribute to such facilities? | Yes | |
| | | No | |
| | | Total | |
| 13 | Will you also contribute to O&M of such facilities? | Yes | |
| | | No | |
| | | Total | |
| 14 | What type of toilet do you use and where the waste is disposed? | Open drains | |
| | | Manual Scavenging | |
| | | Septic Tank (if yes, go to section …) | |
| | | Connected to sewerage system (if yes, go to section II) | |
| **II.** | **Sewerage System** | | |
| 1. | Do you have sewer connection? | Yes | |
| | | No | |
| 2. | If yes, what is the cost of the connection you paid? | | |
| | Any monthly fee? | | |
| 3. | If no, are you willing to pay for sewerage connection and how much? | Yes | |
| | | No | |
| 4. | Do you face any problem with your sewer connection? | Chocking | |
| | | Frequent leakage/rupture | |
| | | Foul smell | |
| | | Overflowing in rainy season | |
| 5. | Who is responsible for cleaning the sewerage system of your locality? | Pvt./ Municipality/any other agency | |
| 6. | How often the corporation people visit you for health/sewerage purpose | Quarterly | |
| | | Half yearly | |
| | | Annually | |
| | | Need base | |
| | | When complaint is made | |
| 7 | Where does the sewage go from your place | STP/open drains/storm drain/river/any other | |

| | | | |
|---|---|---|---|
| **III.** | **Septic Tanks** | | |
| 1. | Are you connected to individual septic tank or community septic tank? | | |
| 2. | Who manages the septic tanks? | Municipal corporations | |
| | | Community initiatives | |
| | | Individuals | |
| | | No One | |
| 3. | How often do you get the septic tank cleaned? | Once in a year | |
| | | Once in two years | |
| | | Once in three years | |
| | | Not yet done | |
| 4. | How much do you pay for septic tank cleaning to MC or community initiatives? | | |
| 5. | Where is septic tank waste disposed off? | STP | |
| | | Open drain/ open space | |
| | | Don't know | |
| IV. | Water Supply | | |
| 1. | What is the source of water supply? | Municipal corporation | |
| | | Bore –well | |
| | | Private tankers | |
| | | others | |
| 2. | What is the frequency of water supply? | < 2 hours | |
| | | 2-4 hours | |
| | | 4-8 hours | |
| | | >8 hours | |
| 3. | What is the quality of water supplied? | Always poor | |
| | | Occasionally poor | |
| | | Good | |
| 4. | Do you have your own house water | Yes | |

| | | | |
|---|---|---|---|
| | connection? | No | |
| 5. | What is the adequacy of water supply? | Sufficient | |
| | | Not sufficient | |
| V. Solid Waste Management | | | |
| 1. | Where do you dispose your household solid waste? | In drain | |
| | | In open | |
| | | To nominated agency/ scheduled collection | |
| | | Waste containers/ community bins | |
| 2. | How far is the place, where Solid waste is dumped? | < 100 mts | |
| | | 100-200 mts | |
| | | 200-500 mts | |
| | | >500 mts | |
| 3. | How often the garbage is collected by ULBs? | Once in a day | |
| | | Once in two days | |
| | | Once in three days | |
| | | Never picked up | |
| 4. | Do you have domestic animals? | Yes | |
| | | No | |
| 5. | Where do you dispose the animal waste? | In open | |
| | | Use at home | |
| | | Dispose with other waste | |
| | | Outside the city | |

Similar questionnaires were prepared for conducting surveys in commercial, industrial, Institutional areas and public places to process baseline information and critically analyse the existing situation from public point of view.

## **ANNEXURE- 4**: WASTE WATER MANAGEMENT SYSTEMS

**A typical wastewater management system comprises of three main components:**

(i) **Wastewater collection system**, which could be based on any of the following systems:

- Micro scale conventional centralized system,
- settled sewage system,
- Small bore sewer system,
- Shallow sewer system,
- Twin drain system and
- Incremental sewerage system

**(ii) Treatment system having following components:**

a. Primary treatment system consists of screens, grit chambers and primary sedimentation tank;

b. Secondary treatment system mainly consists of biological treatment systems.

c. Tertiary treatment is given to polish the treated wastewater coming out of secondary treatment unit to meet the reuse / recycle requirement. A tertiary treatment process normally consists **of coagulation, solid/liquid separation and disinfection** units for the removal of residual suspended solids (SS), colour, organic matter, offensive odour and microorganisms. Solid/liquid separation is normally achieved by filtration, floatation and adsorption. Disinfection of the pathogenic organisms is achieved by chlorination or Ozonation or UV disinfection or combination thereof.

**(iii) Reuse / disposal systems could be**

**Septic tank:** A septic tank is a wet technology. It is a watertight tank that collects wastewater from household utilities via a pipe. The wastewater flows through the tank and the solids will settle to the bottom of the tank. It functions as a storage tank for settled solids and floating materials with storage time of usually 2 to 4 days. About 50% removal of BOD and Suspended Solids is usually achieved in a properly operated septic tank. The clarified effluent flows out of the tank into a drainage field or a drainage system. The solids that accumulate must be removed periodically, as in the case of pit latrine (UNEP/GPA, 2000; UNEP, undated).

- These are relatively low-tech, low-cost technologies which allow construction and operation by the local community, and they can reduce public health problems related to wastewater (UNEP/GPA, 2000). However, they provide only partial treatment and do not meet strict environmental standards, and very often are associated with environmental pollution (Wilderer and Schreff, 2000; Bakir, 2001).

Nevertheless, recently, improved technologies are being developed to provide better solutions for decentralized treatment. Combining septic tanks with sand filters can upgrade septic tank's effluent to advanced secondary and even tertiary levels (Verhuizen, 1997) and various

processes for on-site aerobic treatment systems have been developed and are available commercially (Bakir, 2001.) Further developments include combination of hi-tech components such Membrane Bioreactor (MBR) with the aerobic systems. The advanced aerobic systems, however, require power for aeration and possibly pumping. These improved technologies can meet high environmental standards and can indeed be considered as viable alternatives for wastewater treatment. In this case smaller flows of wastewater will be collected and treated in several small treatment facilities in the community (Bakir, 2001).

- Constructed wetland,
- Anaerobic baffled reactor,
- Green toilets with separation of urine and faeces.

## ANNEXURE-5: DETAILS OF VARIOUS SCHEMES FOR IMPLEMENTATION OF CITY SANITATION PROJECTS

### Valmiki Ambedkar Awas Yojana's component - Nirmal Bharat Abhiyan

Though the National Slum Policy was never finalized, yet on 15 August 2001 the Prime Minister of India announced a new Centrally Sponsored Scheme called the Valmiki Ambedkar Awas Yojana (VAMBAY), to ameliorate the conditions of the urban slum dwellers living below the poverty line. The main objective being to provide shelter or upgrade the existing shelter for people living below the poverty line in urban slums in a march towards the goal of slum less cities with a healthy and enabling urban environment. The guidelines of the scheme say: "Another very important basic amenity for slum dwellers especially in congested metropolitan cities is the lack of rudimentary toilet facilities. A new National City Sanitation Project under the title of 'Nirmal Bharat Abhiyan' is an integral sub component of VAMBAY. 20% of the total allocation under VAMBAY will be used for the same. The State Governments/ Local Bodies will be free to supplement the Government of India subsidy with their own grant.

### Integrated Low Cost Sanitation (ILCS) Scheme, 2008

The Centrally Sponsored Scheme of Low Cost Sanitation for Liberation of Scavengers started from 1980-81 initially through the Ministry of Home Affairs and later on through the Ministry of Welfare. From 1989-90, it was operated through the Ministry of Urban Development and later on through Ministry of Urban Employment and Poverty Alleviation now titled Ministry of Housing & Urban Poverty Alleviation. A revised set of guidelines were released in January 2008. (The scheme is now called the "Integrated Low Cost Sanitation" Scheme)

*The main objectives of the Scheme is to convert the existing dry latrines into low cost pour flush latrines and to construct new ones where EWS (Economically Weaker Section) households have no latrines and follow open defecation practices.*

The scheme is on an 'All Town' coverage basis. The proposal can be submitted by the urban local body duly authorized by the State Government to the State Urban Development Authority for undertaking the programme. The concerned urban local body/ organisation has to give an undertaking prohibiting dry latrines in the towns thereafter.

The programme can be implemented by any state selected local NGO having adequate experience in this field , with the maximum funding of 15% over and above the total project cost to be borne by the Centre and States based on the ratio of 5:1 at different stages of implementation.

Further, the NGO shall be given the responsibility to look after operation and maintenance of the converted units, and organise training/ seminars for preparation of project reports and estimates by the ULBs/Development Authorities (DAs) after ensuring willingness of identified beneficiaries.

| S. No | Projects Proposed | Schemes/Plans | Funding Agency |
|---|---|---|---|
| 1 | Waste water management system (laying of sewers and development of STP). | Water for Asian Cities programme, 2006 of UN-HABITAT: Water and Sanitation trust Fund<br>Department for International Development (DFID), UK | Asian Development Bank (ADB) |
| | | Small scale finance for water and sanitation (WATSEN) scheme. | Department for International Development (DFID), UK |
| | | Sewerage PPPs: PPPs on urban infrastructure under AusAID-WB partnership project scheme for South Asia | AusAID –World Bank |
| | | Integrated Low Cost Sanitation (ILCS) Scheme, 2008, under NUSP | Ministry of Housing & Urban Poverty Alleviation (HUPA), Govt. of India |
| | | UIDSSMT started in 2005-6, under JNNURM of MOUD | Ministry of Urban development, Govt. of India |
| | | UP Urban Sanitation policy, | State Govt. U.P. |
| | | Total sanitation Campaign (TSC) Budget | U.P. state Govt. funds |
| | | PPP initiatives scheme | Central/ State govt. of India |
| 2 | Solid waste management system including collection, transportation, treatment (composting plant) and disposal system. | UIDSSMT started in 2005-6, under JNNURM of MoUD | Ministry of Urban Development(MoUD) , Govt. of India |
| | | Under MSW (management and handling) rules, 2000 | CPCB, MOEF, Govt. of India |
| | | PPP initiatives scheme/support to NGO | Ministry of Finance, Govt. of India |
| | | Under District/city planning scheme, 2008 | Planning Commission, Govt. of India |
| | | Federal Grant schemes for SWM | EPA'S Indian Health Service, U.S. Department of Interior Bureau of Indian Affairs (BIA) |
| 3 | Water supply system for the city including development of source i.e basic treatment of groundwater, reservoirs, pump houses and laying of supply pipelines, household connections . | Revised National Water Policy, 2002 | |

| | | | |
|---|---|---|---|
| | | Urban Water Supply Programme (AUWSP), 1994, currently merged under UIDSSMT of JNNURM | |
| | | Water for Asian Cities programme, 2006 of UN-HABITAT: Water and Sanitation Trust Fund | |

# **ANNEXURE-6**: MUNICIPAL SOLID WASTE PROCESSING TECHNOLOGIES

## THERMAL PROCESSING TECHNOLOGIES

Thermal processing technologies are mainly adopted to treat the hazardous waste with high calorific values. Thermal technologies are those technologies that operate at temperatures greater than 200°C and have higher reaction rates. They typically operate in a temperature range of 375°C to 5,500°C. Thermal technologies include advanced thermal recycling (a state-of-the-art form of waste to-energy facilities) and thermal conversion (a process that converts the organic carbon based portion of the MSW waste stream into a synthetic gas which is subsequently used to produce products such as electricity, chemicals, or green fuels). These technologies are briefly described below.

## INCINERATION

Mass-burn systems are the predominant form of the MSW incineration. Mass-burn systems generally consist of either two or three incineration units ranging in capacity from 50 to 1,000 tons per day; thus, facility capacity ranges from about 100 to 3,000 tons per day. It involves combustion of unprocessed or minimally processed refuse. The major components of a mass burn facility include: (1) Refuse receiving, handling, and storage systems; (2) Combustion and steam generation system (a boiler); (3) Flue gas cleaning system; (4) Power generation equipment (steam turbine and generator); (5) Condenser cooling water system; and (6) Residue hauling and storage system. This technology is predominantly applicable for hazardous waste.

## PYROLYSIS

In Pyrolysis**,** at high temperatures of 700°C to 1200 °C, thermal degradation of organic carbon-based materials is achieved through the use of an indirect, external source of heat, in the absence or almost complete absence of free oxygen. This thermally decomposes and drives off the volatile portions of the organic materials, resulting in a syngas composed primarily of hydrogen (H2), carbon monoxide (CO), carbon dioxide (CO2), and methane (CH4). Some of the volatile components form tar and oil, which can be removed and reused as a fuel. Most Pyrolysis systems are closed systems and there are no waste gases or air emission sources (if the syngas is combusted to produce electricity, the power system will have air emissions through a stack and air emission control system). After cooling and cleaning in emission control systems, the syngas can be utilized in boilers, gas turbines, or internal combustion engines to generate electricity or used as raw stock in chemical industries. The balance of the organic materials that are not volatile or liquid that is left as a char material, can be further processed or used for its adsorption properties (activated carbon). Inorganic materials form a bottom ash that requires disposal, although some pyrolysis ash can be used for manufacturing brick materials. Similar to incineration, Pyrolysis is also applicable for hazardous waste treatment.

## GASIFICATION

In the Gasification process, thermal conversion of organic carbon based materials is achieved in the presence of internally produced heat, typically at temperatures of 660°C to 1800°C, and in a limited supply of air/oxygen (less than stoichiometric, or less than is needed for complete combustion) to produce a syngas composed primarily of H2 and CO. Inorganic

materials are converted either to bottom ash (low-temperature gasification) or to a solid, vitreous slag (high temperature gasification that operates above the melting temperature of inorganic components). Some of the oxygen injected into the system is used in reactions that produce heat, so that Pyrolysis (endothermic) gasification reactions can initiate; after which, the exothermic reactions control and cause the gasification process to be self-sustaining. Most gasification systems, like Pyrolysis, are closed systems and do not generate waste gases or air emission sources during the gasification phase. After cooling and cleaning in emission control systems, the syngas can be utilized in boilers, gas turbines, or internal combustion engines to generate electricity, or to make chemicals.

## PLASMA ARC GASIFICATION

In Plasma Arc Gasification process, alternating current (AC) and/or direct current (DC) electricity is passed through graphite or carbon electrodes, with steam and/or oxygen/air injection (less than stoichiometric), to produce an electrically conducting gas (a plasma) typically at temperatures greater than 2,200°C. This system converts organic carbon-based materials, including tar, oil, and char, to syngas composed primarily of H2 and CO and inorganic materials to solid, vitreous slag. Like Pyrolysis and conventional Gasification, Plasma Arc Gasification is a closed system; therefore there are no waste gases and no emission sources in the Plasma Arc Gasification process. After cooling and cleaning in emission control systems, the syngas produced by plasma arc gasification can be utilized in boilers, gas turbines, or internal combustion engines to generate electricity or to make chemicals. The final emission products are CO2 and water. The furans and dioxins in the emissions are extremely low and lower than the recommended USEPA or EU emission norms.

## BIOLOGICAL PROCESSING TECHNOLOGIES

Biological technologies are widely used to treat Municipal Solid Wastes (MSW) and are operated at lower temperatures with lower reaction rates. Biological processing technologies are essentially focused on the conversion of organics in the MSW consisting of dry matter and moisture. The dry matter further consists of organics (i.e., whose molecules are carbon-based), and minerals, also referred to as the ash fraction. The organics can be further subdivided into biodegradables or refractory organics, such as food waste, and non-biodegradables, such as plastic. Biological technologies can only convert biodegradables component of the MSW. Byproducts can vary, which include: electricity, compost and chemicals. Various biological processing technologies are briefly described below.

## COMPOSTING

Composting is a natural micro-biological process where bacteria break down the organic fractions of the MSW stream under controlled conditions to produce a pathogen-free material called “Compost” that can be used for potting soil, soil amendments (for example, to lighten and improve the soil structure of clay soils), and mulch. The microbes, fungi, and macro-organisms that contribute to this biological decomposition are generally aerobic. A mixture of organic materials is placed into one or more piles (windrows), and the natural microbial action will cause the pile to heat up to 65-80°C, killing most pathogens and weed seeds. A properly designed compost heap will reach 70°C within 6 to10 days, and slowly cool off back

to ambient temperatures as the biological decomposition is completed. Systematic turning of the material, which mixes the different components and aerates the mixture, generally accelerates the process of breaking down the organic fraction, and a proper carbon/nitrogen balance (carbon to nitrogen or C/N ratio of 20:1) in the feedstock insures complete and rapid composting. The composting process takes from 17 to 180 days. For composting process, the moisture content of the MSW should be ideally > 45%. There are two fundamental types of composting techniques: open or windrow composting, which is done out of doors with simple equipment and is a slower process, and enclosed system composting, where the composting is performed in some enclosure (e.g., a tank, a box, a container or a vessel).

**ANAEROBIC DIGESTION**

In anaerobic digestion (AD), biodegradable material is converted by a series of bacteria groups into methane and CO2. A first group breaks down large organic molecules into small units like sugar. This step is referred to as hydrolysis. Another group of bacteria converts the resulting smaller molecules into volatile fatty acids, mainly acetate, but also hydrogen (H2) and CO2. This process is called acidification. The last group of bacteria, the methane producers or methanogens, produce biogas (methane and CO2) from the acetate and hydrogen and CO2. This biogas can be used to fuel boilers or reciprocating engines with minimal pre treatment. In addition to biogas, anaerobic bioconversion generates a residue consisting of in organics, non-degradable organics, non degraded biodegradables, and bacterial biomass. If the feedstock entering the process is sufficiently free of objectionable materials like colorful plastic, this residue can have market value as compost. AD process is also referred to as Bio methanation process.

**BIOREACTOR LANDFILL**

A bioreactor landfill is a wet landfill designed and operated with the objective of converting and stabilizing biodegradable organic components of the waste within a reasonable time frame by enhancing the microbiological decomposition processes. The technology significantly increases the extent of waste decomposition, conversion rates and process effectiveness over what would otherwise occur in a conventional wet landfill. Stabilization in this context means that landfill gas and leachate emissions are managed within one generation (twenty to thirty years) and that any failure of the containment system after this time would not result in environmental pollution. There is better energy recovery including increased total gas available for energy use and increased greenhouse reduction from reduced emissions and increase in fossil fuel offsets. These factors lead to increased community acceptance of this waste technology. Management of a bioreactor landfill requires a different operating protocol to conventional landfills. Liquid addition and recirculation is the single most important operational variable to enhance the microbiological decomposition processes. Other strategies can also be used to optimize the stabilization process, including waste shredding, pH adjustment, nutrient addition and temperature management.

## PHYSICAL PROCESSING TECHNOLOGIES

Physical technologies involve altering the physical characteristics of the MSW feedstock. The MSW is subjected to various physical processes that reduce the quantity of total feedstock, increase its heating value, and provide a feedstock. It may be densified or palletized into homogeneous fuel pellets and transported and combusted as a supplementary fuel in utility boilers. These technologies are briefly described below.

## REFUSED DERIVED FUEL OR RDF

The RDF process typically includes thorough pre-separation of recyclables, shredding, drying, and densification to make a product that is easily handled. Glass and plastics are removed through manual picking and by commercially available separation devices. This is followed by shredding to reduce the size of the remaining feedstock to about eight inches or less, for further processing and handling. Magnetic separators are used to remove ferrous metals. Eddy-current separators are used for aluminum and other non-ferrous metals. The resulting material contains mostly food wastes, non-separated paper, some plastics (recyclable and non-recyclable), green wastes, wood, and other materials. Drying to less than 12% moisture is typically accomplished through the use of forced-draft air. Additional sieving and classification equipment may be utilized to increase the removal of contaminants. After drying, the material often undergoes densification processing such as pelletizing to produce a pellet that can be handled with typical conveying equipment and fed through bunkers and feeders. The RDF can be immediately combusted on-site or transported to another facility for burning alone, or with other fuels. The densification is even more important when RDF is transported off-site to another facility, in order to reduce volumes being transported. RDF is often used in waste to energy plants as the primary or supplemental feedstock, or co-fired with coal or other fuels in power plants, in kilns of cement plants, and with other fuels for industrial steam production.

## MECHANICAL SEPARATION

Mechanical separation is utilized for removing specific materials or contaminants from the inlet MSW stream as a part of the pre-treatment process. Contaminants may include construction and demolition (C&D) debris, tires, dirt, wet paper, coarse materials, and fine materials. Generally, MSW reaching the dumping sites is unsegregated and mixed containing C&D debris and other contaminants. Therefore, it is essential to remove these contaminants from the incoming MSW by mechanical separation before processing the waste further by either biological, physical and thermal technologies (except Plasma Arc Technology).
However, in MBIR project source segregation will be adopted and the C&D debris (if generated) is expected to be reused for daily cover of the landfill. Therefore, the MSW reaching the dumping grounds may not require the elaborate mechanical separation process. This MSW has high organic content, fit to be directly used for various technologies after manual sorting only.

Size reduction is often required to allow for more efficient and easier handling of materials, particularly when the feed stream is to be used in follow-on processes. Sizing processes include passive, moving, and vibrating screens and trommels. In order to reduce the size of the entire stream, or portions of it, mechanical equipment, such as shredders, is utilized. This allows for other physical processes, such as dryers, magnetic and eddy current separators, and densification equipment to work more efficiently. Magnetic and eddy current separators may be installed both up- and down-stream of shredders to increase the recovery of metals.

**LANDFILLING**

Land filling means disposal of residual solid wastes on land in a facility designed with protective measures against pollution of ground water, surface water and air fugitive dust, wind-blown litter, bad odour, fire hazard, bird menace, pests or rodents, greenhouse gas emission, slope instability and erosion. Both for MSW and industrial hazardous waste land filling is an essential component of solid waste management plan to accommodate the residue of treatment and the inert coming from the waste streams.

The technical requirement and design criteria for disposal of MSW and hazardous waste are different and is depends upon the quantity and characteristics of the waste. Therefore, in the solid waste management plan for MBIR two separate disposal strategy will be adopted for MSW and hazardous waste.