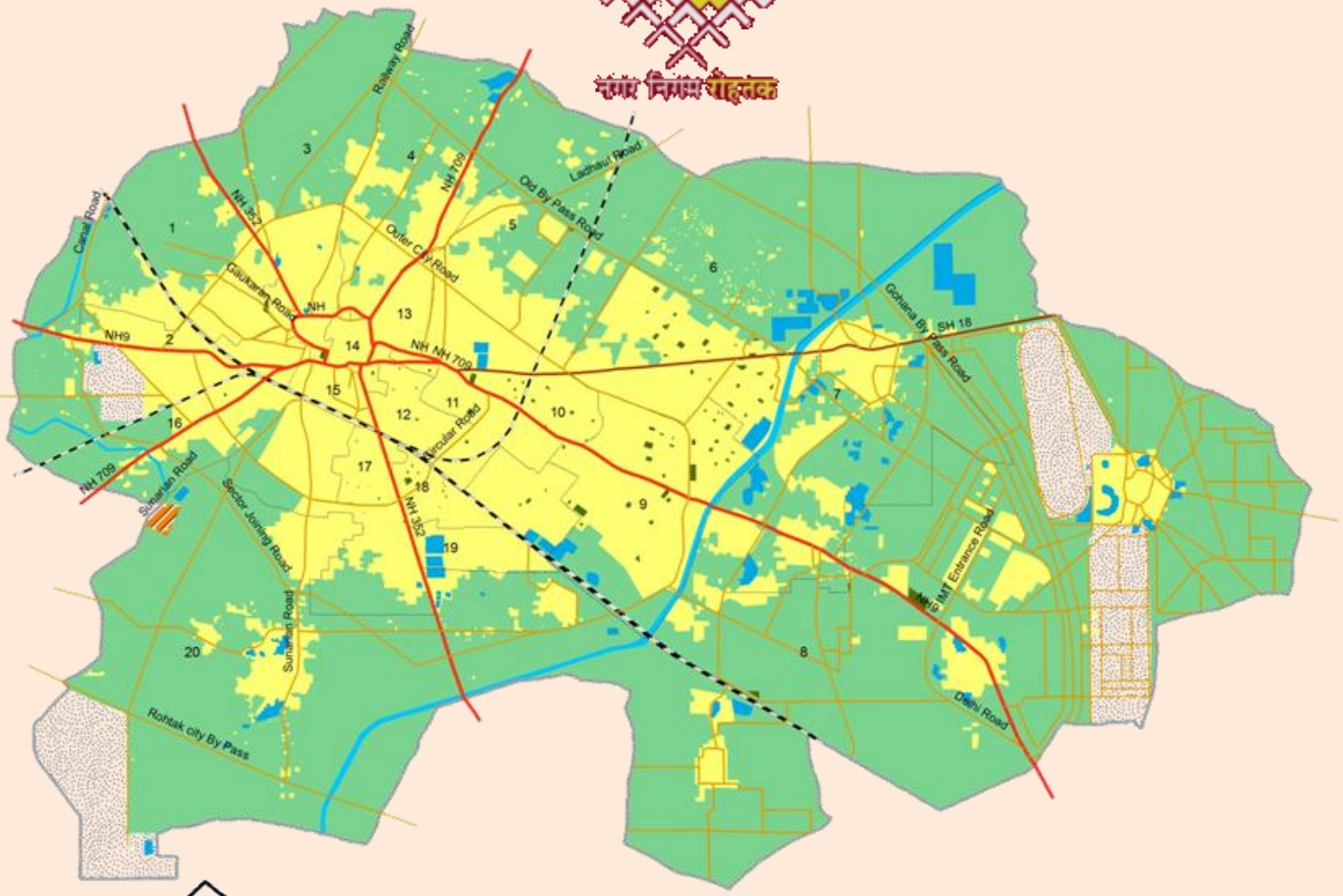
City Sanitation Plan 2019 & 2031

For

Municipal Corporation Rohtak



Submitted By:

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Design Point Consult Pvt. Ltd., Surat, Gujarat

VISION STATEMENT

“To provide infrastructure facilities up to service level benchmark through capacity building & participation of all the stakeholders including citizens with smartness, hence transforming city into wealthier, affordable, livable and clean city."

From Asst. Director's Desk

"Water is Life and Sanitation is Dignity."

The above quote signifies sanitation as essential aspect of a healthy and dignified life.

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

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

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

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Acknowledgment

Thanks can never be expressed in plain words.

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Mr. Gulshan Ishpuniani, Sanitation Committee, Chairman and Mr. Rajbir, Vice-Chairman for their whole heartedly support and assistance to us in undertaking action research and developing City Sanitation Plan of Rohtak City.

We express our sincere thanks to all the people who supported us and helped to finish this document with all the specifications.

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ABBREVIATIONS

Abbreviation	Full form
CSP	City Sanitation Plan
GOI	Government of India
GOH	Government of Haryana
MOUD	Minstry of Urban Develeopment
SLB	Service level Benchmark
ULB	Urban Local Body
NUSP	National Urban Sanitation Policy
PPP	Public Private Policy
MCR	Municipal Corporation Rohtak
SWM	Solid Waste Managemnt
MSW	Municipal Solid Waste
NGO	National Government Organization
CPHEEO	Central Public Health And Environmental Engineering Organization
MLD	Million Liters Per Day
LPCD	Liters Per Capita Per Day
STP	Sewerage Treatment Plant

Executive Summary

This document presents City Sanitation Plan (CSP) of Rohtak City Municipal Corporation. Rohtak is one of the 10 cities whose CSPs have been prepared by ISPER and Design Point Consult. in consortium with Government of Haryana and RMC.

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

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

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

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

The report has divided into two major sections which are described below–

Section-1 *The Situation Analysis*

- Introduction
- Approach & Methodology
- City Introduction
- Demography
- Situation Analysis

Section-2 *The Gap Identification and Recommendations*

- City Sanitation Task Force (CSTF)
- 100% Sanitation Campaign
- Institutional Capacity & Municipal Finance
- Proposal

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

The later section there after provides gap identification, strategies and solutions to bridge the identified gaps, mitigate the existing issues, and provide ways and means to aid the sustenance of the existing and proposed strategies and projects. This section is covered from Chapter 6 to Chapter 9.

The Situation Analysis

Chapter -1 gives an introduction to the background study of Sanitation Plan in context with National Urban Sanitation Plan. Here in this chapter we gave the detail description of NSUP with vision of NSUP, Objective of NSUP. Also explain the Objective of the city sanitation plan in Rohtak, Overview of the scope of work with progress updating report. It gives detailed insight into the NUSP 2008 and the sanitation ranking of cities, the MSW 2000 rules, the SBM (Swachh Bharat Mission) ranking which have been taken up for the improvement of access and coverage of sanitary facilities.

Chapter -2 this is followed by the step-by-step methodology of the CSP process, as well as the status of the CSP for the Rohtak city. The process of collection of baseline information – both primary and secondary, has been explained at length. Here we give just review of approach and methodologies which are adopted by us, for preparation of CSP. Also presents a review of the policies & programme that are prevalent and followed in Haryana to improve the sanitation conditions in the urban areas.

Chapter -3 deals with the City Profile where the various aspects of the city are discussed in order to get a fair idea about the city itself. Aspects such as geographical location, connectivity, physical attributes, Climate, demography details, literacy rate, land use distribution and infrastructure services levels, the slum and squatter settlements are discussed in brief.

Chapter -4 this chapter covers the urban demographic profile with growth rate, population projections and trade off between infrastructure adequacy and cost analysis. We also discuss the migration, floating population and ward wise distribution of future population-density. Here summarized the factors that can affect city level population and its spatial distribution, projection of water demand and sewerage generation, with mapping of future trends and directions for 2019 and 2031.Floating population are also describe with the help of basis for assumption. In addition of this chapter we also illustrate the existing slum population survey of Rohtak Municipal Corporation.

Chapter- 5 This Section covers the Service Profile of Rohtak City. The aim of the chapter is to present a clear picture of the existing systems of sanitation in the city. It contains four sectors; Water supply system, Sewerage & Sanitation, Solid Waste Management and, Sanitation Components – Access to Toilet, Storm Water Drainage system of the city. The performance of each of the sectors is evaluated through Service Level Benchmarking (SLB) indicators. In Section discusses Sanitation Situation in Rohtak City based on information collected by primary sample survey. In this chapter situation analysis is done both at the Household and community level.

Chapter –6 summarizes the Institutional Arrangements in Rohtak. Functions and formation of CSTF City Sanitation Task Force of CSP and Parastatal bodies and overlap of institutional responsibly are also briefly discussed. Later part of chapter discusses agenda, roles and responsibilities of CTF, framework for operations, appointment of council officer by MCR. We also discuss the call for meeting, conducting meetings documentation of proceedings with their framework for monitoring and evaluation process.

Chapter – 7 This chapter discusses sanitation issues and target groups and awareness needs for Rohtak city.

Chapter – 8 this chapter summarizes the existing Institutional Arrangements in Rohtak planning area with public sector and other than government agencies. The description of specific sectors are shows the role, responsibility and how they helpful in the preparation and implementation of City Sanitation Plan.

Chapter -9 Firstly we discuss the How CSP will help to improve the ranking? The City Wide Sanitation Strategies and design premises are presented. It provides the vision for the CSP and its goals for 2019 (Short term period), 2031 (Long term period). Thereafter, recommendations of most appropriate options and basic guiding strategies for Water Supply, Solid Waste Management, Sewerage and Drainage are suggested. Strategies have been provided to improve coverage and access to sanitation facilities in phased manner. Concluding the report budget plan to implement effectively the short term proposal and, overall plan for long term is also proposed.

Chapter 1
Introduction

1.1 Background; Sanitation Plan

The word "sanitation" entered into the English language in the nineteenth century, and the term is linked with integrated water and sewer system. Sanitation is a basic, as well as a long-standing, public health issue. Sanitation is the hygienic means of promoting health through prevention of human contact with the hazards of wastes. Hazards can be physical, microbiological, biological or chemical agents of disease. Wastes that can cause health problems are human and animal feces, solid wastes, domestic wastewater (sewage, sullage and grey water), industrial wastes, and agricultural wastes. Hygienic means of prevention can be by using engineering solutions. When early people settled in communities and started to cultivate crops and raise animals, sanitation became a primary concern for society. Today, as urban areas grow; more pressure has been put on local water supplies, for the quality of the water that is available to a community greatly affects all aspects of health. Worldwide, 40 percent of the population does not have ready access to clean, safe drinking water, and approximately, 60 percent does not have satisfactory facilities for the safe disposal of human waste.

The World Health Organization (WHO) states that sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faces. Inadequate sanitation is a major cause of disease worldwide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal. Sanitation is directly related to water quality and water pollution. Water quality usually describes the level of certain compounds that could present a health risk. The quality of water is usually defined by guideline values of what is suitable for human consumption and for all usual domestic purposes, including personal hygiene.

In relating sanitation to water pollution, one must examine both point and nonpoint source pollution, as these are the two routes of entry of pollution into the water supply. Point-source pollutants enter the waterways at well-defined locations, such as a pipe

or a sewer outflow. The discharges are usually even and continuous. Industrial factories, sewage treatment plants, and storm sewer outflows are common point sources of pollution. Nonpoint sources enter the water system from broad areas of land. It is estimated that 98 percent of the bacterial contamination and 73 percent of biological oxygen demand are due to nonpoint sources.

1.2 National Urban Sanitation Policy

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. Ministry of Urban Development also introduced Swachh Bharat Mission to clean cities. The award (Nirmal Shahar Purskara) is based on the premise that improved public health and environment standards are two key outcomes that cities must seek to ensure for their citizens. In doing so, Government in States and urban areas will need to plan and implement holistic city wide sanitation plans, thereby putting in place processes that help

Table No. 1.1 Rank of cities on Sanitation Policy

RANK OF CITIES ON SANITATION 2009-2010:
NATIONAL URBAN SANITATION POLICY

Serial No	City	State	TOTAL	OUTPUT	PROCESS	OUTCOME
1	Chandigarh	CHANDIGARH	73.48	36.250	21.080	16.150
2	Mysore	KARNATAKA	70.65	33.080	25.070	12.500
3	Surat	GUJARAT	69.08	29.750	23.833	15.496
4	N.D.M.C.	DELHI	68.265	36.000	19.715	12.550
5	Delhi Cantt.	DELHI	61.367	30.750	19.417	11.200
6	Tiruchirapalli	TAMIL NADU	59.02	21.160	27.010	10.850
7	Jamshedpur	JHARKHAND	57.96	31.720	17.000	9.240
8	Mangalore	KARNATAKA	57.34	20.840	22.500	14.000
9	Rajkot	GUJARAT	56.118	21.833	21.525	12.760
10	Kanpur	UTTAR PRADESH	55.34	23.545	21.475	10.320
111	Aizawl	MIZORAM	39.53	19.080	12.400	8.050
112	Serilingampally	ANDHRA PRADESH	39.52	14.000	20.272	5.250
113	Agra	UTTAR PRADESH	39.51	20.305	12.765	6.440
114	Thrissur	KERALA	39.49	14.740	16.000	8.750
115	Kumbakonam	TAMIL NADU	39.44	12.440	20.000	7.000
116	Rajpur Sonarpur	WEST BENGAL	39.433	14.333	19.500	5.600
117	Tirupati	ANDHRA PRADESH	39.363	17.613	12.500	9.250
118	Ranchi	JHARKHAND	39.25	14.000	19.300	5.950
119	Raigarh	CHATTISGARH	39.129	16.479	17.900	4.750
120	Pudukottai	TAMIL NADU	39.12	12.920	20.600	5.600
121	Unnao	UTTAR PRADESH	39.106	13.306	18.800	7.000
122	Salem	TAMIL NADU	39.02	15.670	19.850	3.500
123	Rohtak	HARYANA	39	18.250	7.100	13.650
124	Panipat*	HARYANA	39	18.500	10.350	10.150

Sources: (NUSP) National Urban Sanitation Policy, 2009-10

achieve outputs pertaining to safe collection, confinement and disposal (including conveyance, treatment, and/ or reuse without advance impacts on the environment in and around the cities). The first rating of cities with regards to their performance in sanitation improvement based on a set of objective indicators of outputs, processes

and out comes, was carried out in 2010 to set the baseline ranking. Ranking is carrying out every year under Swachh Bharat Mission and Rohtak city got 295th position in 2017. Cities are expected to undertake an objective self assessment from time to time.

Image No. 1.1 Swachh Bharat Campaigning in Rohtak MC

Swachh Bharat Mission Ranking 2017

Table No. 1.2 Ranking of Rohtak city according to SBM

Rank	City	State
291	Hisar	Haryana
292	Jhunjhunu	Rajasthan
293	Bodh Gaya	Bihar
294	Kalaburagi (Gulbarga)	Karnataka
295	Rohtak	Haryana
296	Akola	Maharashtra
297	Dibrugarh	Assam
298	Bareilly	Uttar Pradesh
299	Aurangabad	Maharashtra

Source: Ministry of Urban Development

1.2.1 Vision of NSUP

The NSUP National Sanitation Urban Policy 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."

1.2.2Objective of NUSP

The overall goal of this policy is to transform Urban India into community driven, totally sanitized, healthy and livable cities and towns. The objectives are:

- Awareness generation and behavior change
- Open defecation free cities
- Integrated city-wide sanitation
- Proper Operation & Maintenances (O&M) of all sanitary installations

1.3Objective of the City Sanitation Plan Rohtak

The main objective of the City Sanitation Plan is to keep the city clean, hygienic and suitable to make it livable for all, by focusing on;

i. Spread awareness about the benefits of clean surrounding by which there will be no health problems arises in future and citizens will live healthy and hygienic life.
ii. Give safety and hygienic facilities like public toilets to eradicate the practice of open defecation.
iii. Give facilities of safe drinking water, underground drainage system, reuse of wastewater, regular city cleaning, disposal of waste with scientific ways etc.
iv. The implementation of policy guidelines of Government of India on management of Municipal Solid Waste and management of biomedical waste as per MSW (2000) Act.
v. Engage civil societies, communities (women in particular, NGOs and CBOs of the locality) in awareness generation, hygiene education, creation of sanitation infrastructure and its maintenance.
vi. Ensure inter-departmental coordination and integration of various relevant projects, schemes, programmes for their optimum use and outcome.

1.4Overview of the Scope of Work

The following are the broad tasks included in the scope of work; the current status is also mentioned:

1.4.1 Task 1 – Formation of City-level Implementation task force

A City-level committee consisting of government and private sectors stakeholders has been formed for the purpose of overseeing preparation and implementation of the City Sanitation Plan.

1.4.2 Task 2 – Conduct 1st Consultation

A first consultation has been conducted to orient the city stakeholders on the objectives of the NUSP and SBM, and on the process and methodology of preparing the City Sanitation Plan.

1.4.3 Task 3 – Reconnaissance Survey & Focused Group Discussion

A reconnaissance survey has been conducted to authenticate the secondary data. This survey includes information on the following, which has been reviewed and used as part of the situation analysis

- Field Survey of Surface Drains
- Field Survey of Solid Waste Arrangement
- Testing of Quality of Water and Waste Water
- Sample survey of slum and non slum households
- Focused group discussion with elected representative and officials

1.4.4 Task 4 – Preparation of Situation Analysis

The situation analysis report has been prepared which details out existing household sanitation arrangement, public sanitary conveniences, waste water disposal, solid waste management and water supply. It highlights the deficiencies in sanitation facilities. The analysis also provides the strategy to address the deficiencies.

1.4.5 Task 5 – Conduct 2nd Consultation

A second consultation workshop was held with the city implementation task force to present the findings of the situation analysis for feedback and suggestions

1.4.6 Task 6 – Preparation of Draft City Sanitation Plan

A draft city sanitation plan is presented incorporating assessment of strategies and technology options for safe collection, transportation, treatment and disposal of both solid and liquid waste in the city.

1.4.7 Task 7 – Conduct 3rd Consultation

The draft City Sanitation Plan and implementation plan will be presented to the city-level implementation task force. The recommendations of the committee and other stakeholders will be documented for their incorporation into the final version of the City Sanitation Plan.

1.4.8 Task 8 – Final City Sanitation Plan

The final version of the City Sanitation Plan will be prepared after appropriately addressing all comments and suggestions of the 3rd meeting with CSTF members.

1.4.9 Sanitation Components

The CSP needs to include a comprehensive plan for the following:

i. Safe disposal of human excreta and liquid waste at household level.
ii. Safe disposal of Human excreta and liquid waste at public sanitary conveniences.
iii. Safe collection, conveyance, treatment and disposal of liquid waste from individual communities (like wards and slums) and the city.
iv. Safe disposal of storm water drainage from communities and city.
v. Safe collection, transport, treatment and disposal of solid waste.
vi. Safe collection, treatment and disposal of hazardous wastes.

1.5 Progress Update

The activities carried out as part of CSP preparation and overall progress is mentioned as below Table No. 1.3:

Table No.: 1.3 Task Progress for CSP

Sr.No.	Task	Date	Remarks
1	Formation of City-level Implementation task force	2015	Constitution of City Sanitation Task Force (Sub-Committee) by MC Rohtak
2	Conduct 1st Consultation	2015	Meeting Conduced with MC Staff and Ward Members.
3	Reconnaissance Survey & Focused Group Discussion	Jan, 2016	Ward level ground truthing in each ward at HHs level according to sample survey size (residential and commercial level)
4	Preparation of Situation Analysis	March, 2017	Data collection from PHED, Education Department, and sample collection from site survey of Hospitals
5	Conduct 2nd Consultation	22.11.2017	Meeting with DTP, MC Rohtak for necessary changes in submitted reoport
6	Preparation of Draft City Sanitation Plan	11.12.2017	Discussion with Mr. Vipin Narwal on left over data of MC, Rohtak and site visits
7	Conduct 3rd Consultation	23.12.2017	Site survey, mapping of STPs and Solid Waste dumping site visits with Sanitary inspector of MCR
8	Final City Sanitation Plan	8.01.2018	Final report submission of City Sanitation Plan at MC Rohtak

Chapter 2
Approach & Methodology

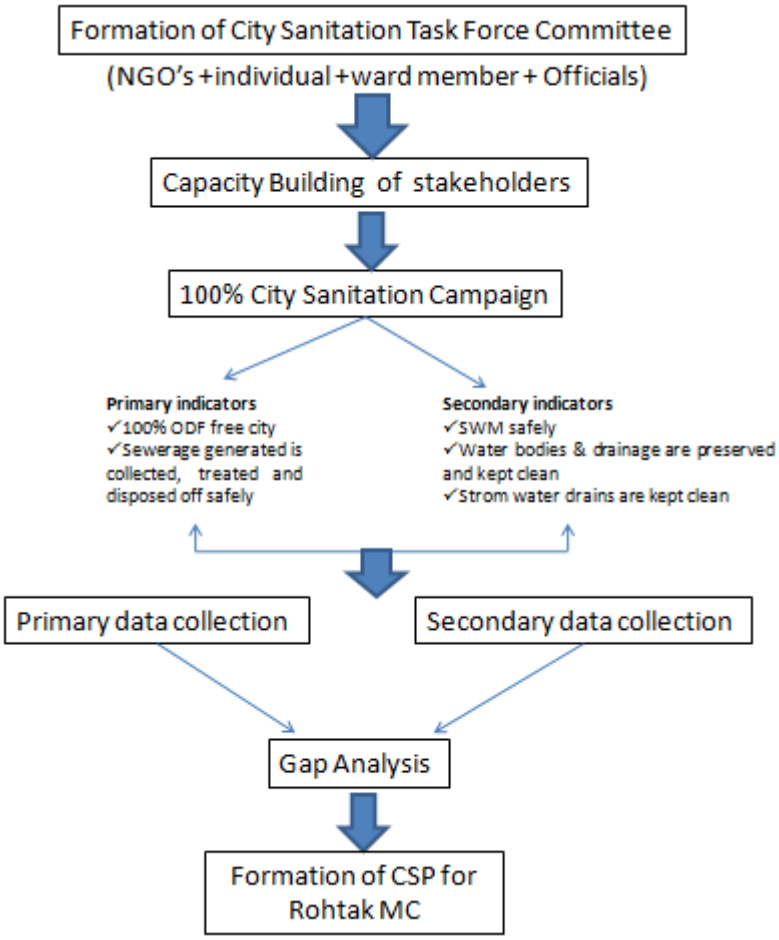
2.1 Key Aspects of the Approach

Under the guidelines of NUSP and with the directives of Central Govt. and State Govt, the process of preparation of city sanitation plan was initiated. As per the process, a “City Sanitation Task Force Committee (CSTFC) ” under the Chairmanship of Honorable Mayor of Rohtak City will be constituted. Various stakeholders such as NGO’s, Individuals, Ward Members and Officials will be the part of CSTFC. Capacity building of various stakeholders and officers will be carried out by arranging meetings and discussions time to time at Municipal Corporation Rohtak. Launching of 100% “City Sanitation Campaign” is the main challenge for the Task Force.

CSTFC will facilitate the meetings and discussions at City level for initiating the process of CSP and colleting the data from all wards. The questionnaire will be forward to the Ward Members and officers for assessment of Availability of Toilets and Deficiency therein, Solid Waste Management, Sewerage, Storm Water Drains, Water Supply and Environment. The main objective of collecting data is to achieve 100% open defecation free city.

Authentic data will be collected from grass root level i.e. ward wise, slum area wise. The data will be compiled and be analyzed thoroughly. The analysis will be helpful for depicting the gaps in the infrastructure and working out the estimates. City sanitation plan is thus formulated with involvement of all Sanitary Inspectors, Assistant Commissioners, Technical Staff and Officers from various departments of Rohtak Municipal Corporation.

Methodology



2.2 Public Awareness of CSP:

For making citizens of Rohtak awared about a city sanitation plan the following activities will be undertaken:

a) Publicity about City Sanitation Plan and its Campaign in Local, Regional and State level newspapers.

b) Through the digital media a message of proper garbage disposal, personal hygiene, noise pollution, open defecation issues will take to public for their involvement in CSP.

c) Proposals from NGOs and citizens invited towards launching a 100% sanitation campaign for preparing Banners, Pamphlets, Slogans and Street Plays.

d) Task Force & Implementing Agency Constitute under the Chairmanship of chairmen.

e) Suggestions received from professionals, NGOs, Citizens through e-communications and through letters.

f) NGOs, other institutions, resident welfare association, industries and offies, school teachers, students help will be taken in future for school sanitation, environmental awareness and behavioral change. These will be helpful towards launching a 100% sanitation campaign in the city.

g) Social networking is also the major part of the Public Awareness Campaigning.

2.3 Inclusive Approach:

2.3.1 Social Mapping in Urban Poor Settlements:

With an aim to include the grass roots and assess their requirements towards improved sanitation, social mapping will be undertaken in all slums of Rohtak.

Participatory tools such as focused group discussions, sanitation mappings, available water and its quality, other infrastructural facilities i.e. Temple, school, Play Ground etc. its trend analysis will be applied in different sets in different slums as per requirements. The slums for intervention for social mapping will be chosen based on the situational analysis but need-based. Direct interaction with the urban poor is the main aim of this process. In way of discussion and meetings facilitated through innovative participatory tools, actual situation would be analyzed and map on paper.

2.3.2 Social mapping

2.3.3 Objectives:

The Main objective is to define the sanitation problems and the community expectations to solve their problems using their own ability in a rapid and systematic way.

1. To identify community problems and needs or the community plan to solve their sanitation problems.
2. To identify the community ability to provide contribution for sanitation improvement.
3. To understand demographic profile of the community.
4. To assess socio-economic status of the community and to develop better understanding about sanitation needs, demands and challenges of community sanitation planning.

2.3.4 The Process of Social Mapping:

Sanitation Mapping: Used as a first tool to draw same pictures of the site/village/hamlet and surrounding based on participants perspectives. The sanitation mapping shows : main street, water taps, wells, and water tankers related to water services, rivers, open drains, places of open defecation, grounds, houses and important places etc.

2.3.5 Time line:

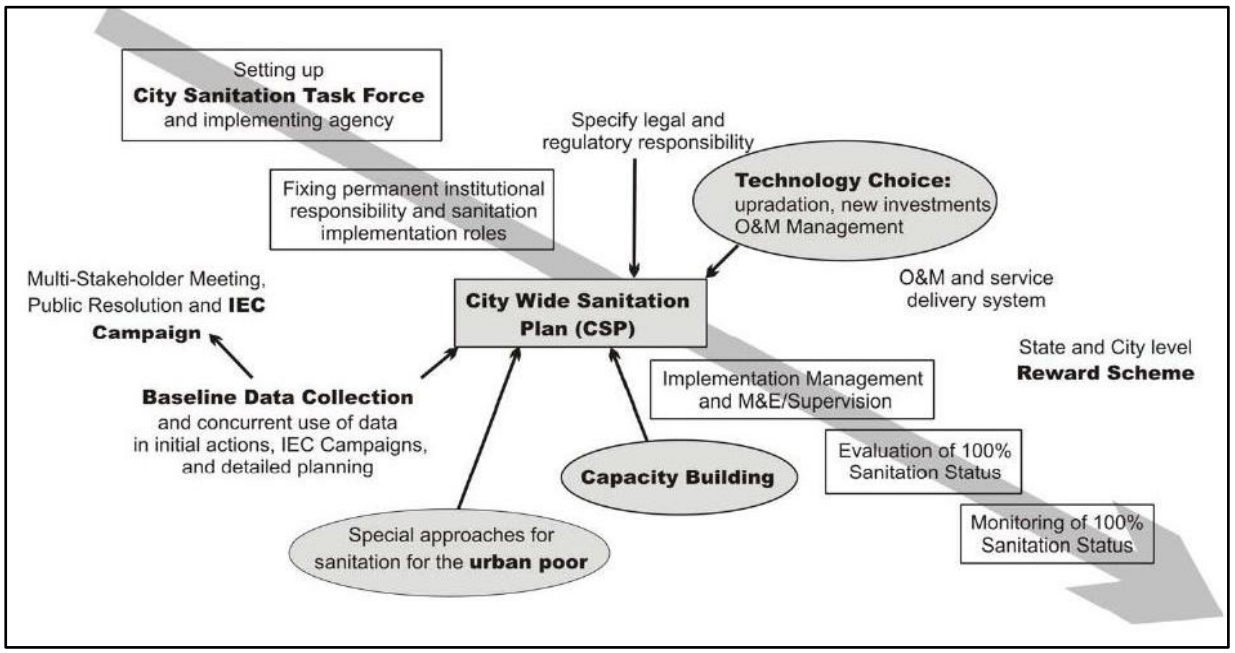
A tool to be used to identify and to study the experiences gained by the community towards community level infrastructure development.

Transect Walk: A tool to be used to identify and to study condition of existing sanitation in the neighborhood by conducting a direct observation. This tool is to be also used to assess the community satisfaction towards the existing sanitation facilities.

Problem tree: A tool to be used to identify and to study the community sanitation problems as well as the cause and effect. This tool is also used to identify priorities of how the community feels about problems.

This method is useful to assess the experiences of self-help infrastructure development, community willingness to contribute, technical feasibility for sanitation infrastructure, local institutional preparedness.

Figure No. 2.3: Flow Chart of City Sanitation Plan



Chapter 3
An Introduction to Rohtak City

3.1 Introduction

Rohtak is the central city of State of Haryana. It is the main part of National Capital Region (NCR). A Regional Plan 2001 is prepared by the National Capital Region Planning Board(NCRPB) in consultation with the State Governments. The Board was formed in 1985 in order to provide balanced development of the region.

The strategy for development of the settlement system, as per NCR Regional Plan 2021, allows other towns of the NCR to develop within their carrying capacity and development potential, as may be determined by the Development/Planning Agencies of the constituent States of the NCR. The Plan has envisaged that these regional centers will perform highly specialized secondary and tertiary sector activities for providing job opportunities that cannot be provided by the lower order centers. These centers, according to the NCR Plan, will be developed for advanced industrial and other economic activities. The concentration of administrative and higher order service functions are expected to exert an increasingly dynamic influence on attraction of investment.

Keeping in view its policies as well as increasing demand of land due to employment potentials and commercial base, the Government of Haryana notified the Revised Final Development Plan with Town and Country Planning Department, Notification No. *CCP (NCR) R-C. A./98/1464* dated the 3rd September, 1998 and published in the Haryana Government Gazette. (Extra) on 8th September, 1998 for a population of 700,000 by 2031 AD including the Controlled Areas, with gross density of 110 persons per hectare. This low density has been kept for providing more sectors for development towards Delhi side keeping in view the contemporary trend of growth.

3.1.1 Geographical Location

Rohtak city lies in the south eastern region of Haryana. Rohtak city is situated over plain area at an average height of 219.0 M above MSL. The town lies between $28^0$22' and $29^0$17' North latitude and between $76^0$9'12" and $76^0$52'30" East longitude. Rohtak is also known as political capital of Haryana. Location Map of Rohtak city is shown below in Figure 3.1

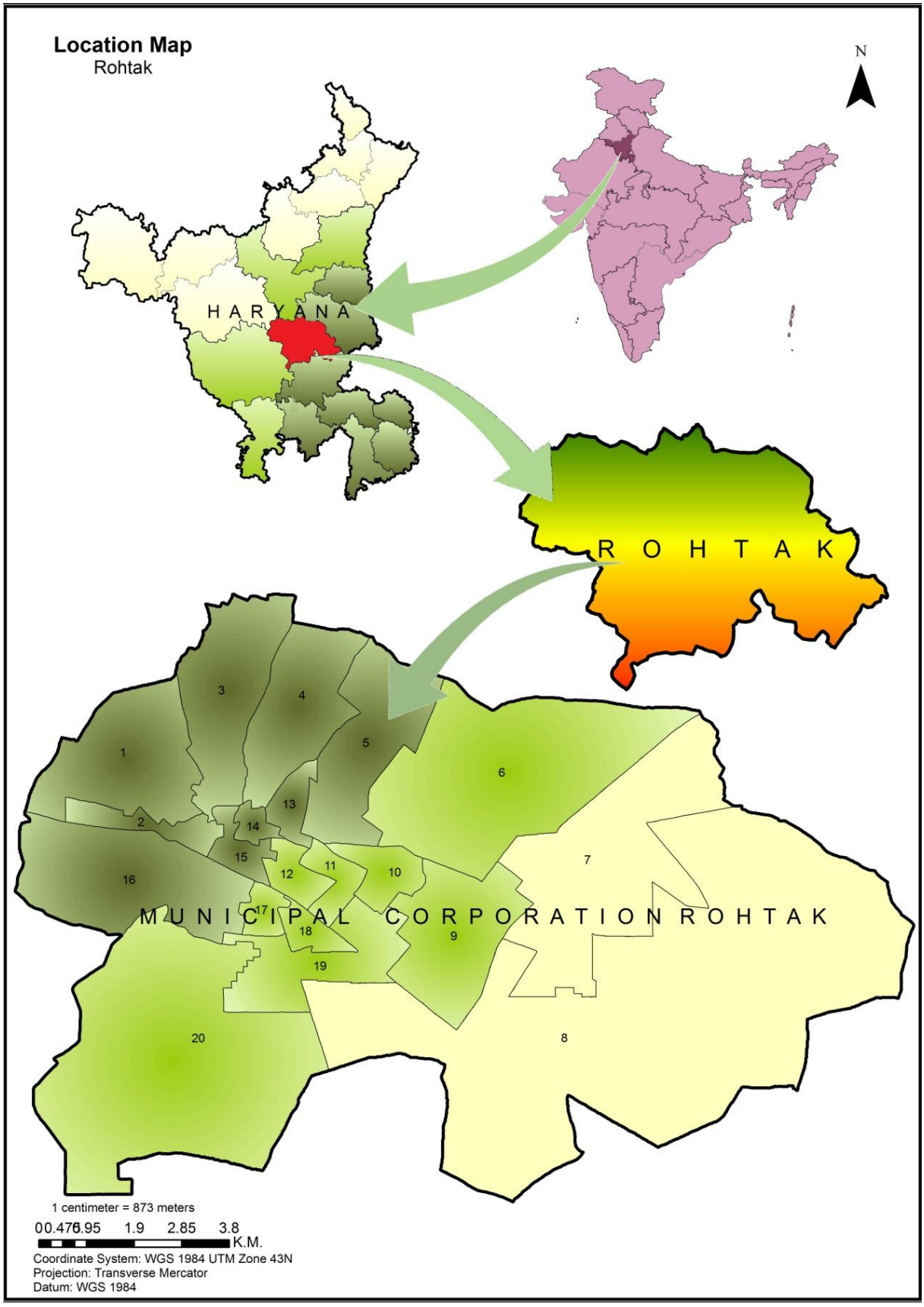


Figure No.3.1 Location Map of Rohtak City *Source: Municipal Corporation, Rohtak*

3.1.2 Connectivity

Rohtak is well connected to the Capital city (Chandigarh) and other major towns & cities of the State of Haryana, and to the Country as well, by Roads and Railways.

Roads: Roads play an important role in connecting Rohtak town to other towns and cities of the Country. National Highway (NH) and State Highway (SH) are passing through the center of the city connects the city to all major towns of State as well as capital city and other States of Country. Three National Highways (NH-10, NH-71, and NH-71A) and two State Highways (SH-16 and SH-18) pass through the city. NH-10 connects New Delhi and Rohtak with a distance of 55 KM. NH-71 and NH-71 A connects Rewari to Rohtak & Rohtak to Panipat respectively. NH-352 connects Rohtak and Jind city. Another major connectivity of city is Rohtak to Hisar and Rohtak to Bhiwani.

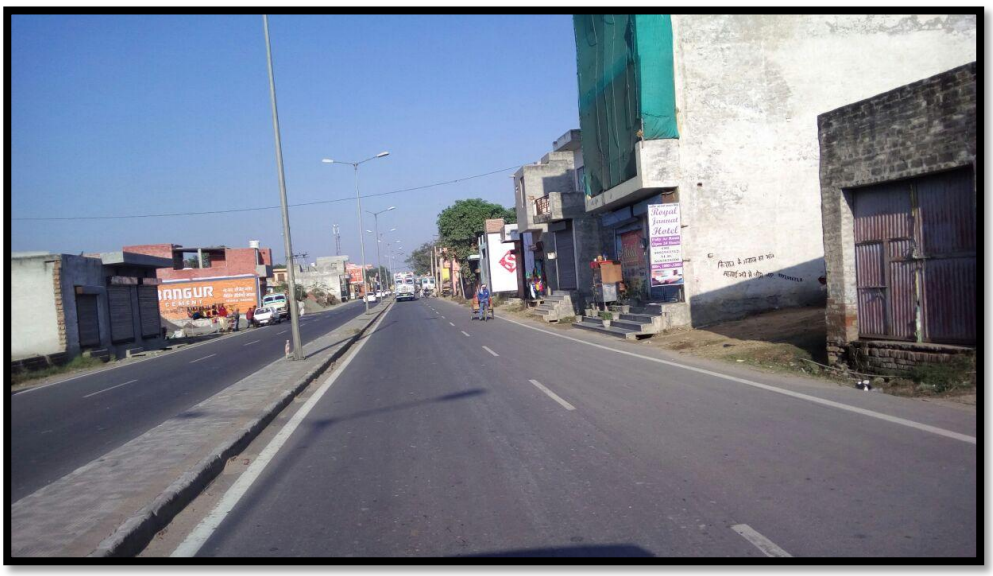


Image No.-3.1 Existing conditions of roads (Primary observation)

Railways: The city is an important station on the broad gauge line. Rohtak is connected to the major cities like Delhi (National Capital), Chandigarh (State Capital), Panipat, Rewari and Hissar (Haryana), Jaipur and Srigangnagar (Rajasthan) and Firozepur (Punjab) through railway line. Indira Gandhi International Airport, New Delhi is 70 KM away from the city location.

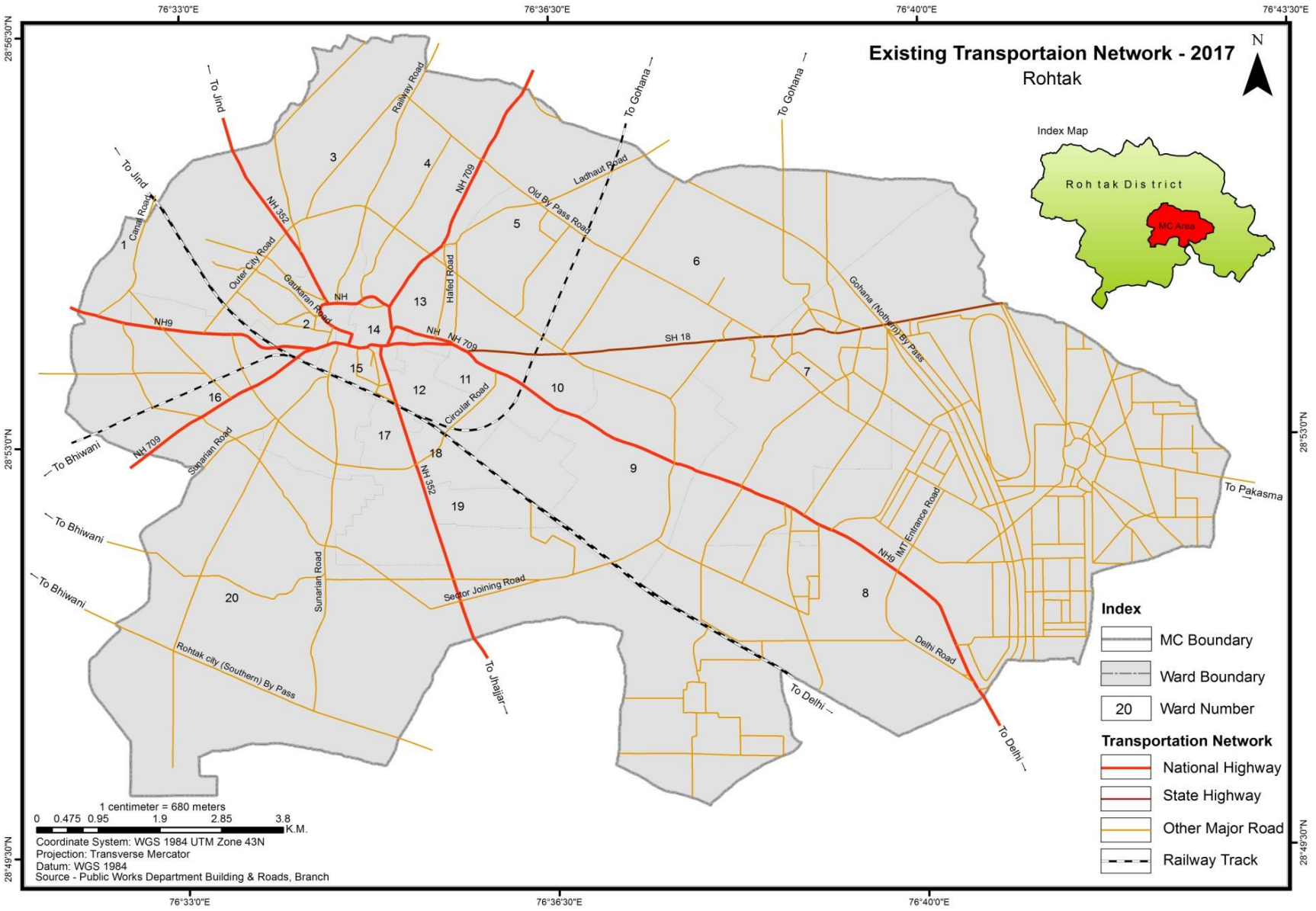


Figure No. 3.2 Connectivity of Rohtak

3.2 Physical Attributes

3.2.1 Climate

City has semi-arid climatic conditions (Koppen's climate classification "BSh"). Summers are long, hot and dry, starting in late March and lasting till the end of June. The monsoon season follows with comparatively lower temperatures. The monsoons subside in October and temperatures rise again. The brief, mild winter starts in late October and lasts until the last week of February. Summers are too hot with maximum temperature of 48 degree Celsius and winters are cold with lowest temperature of 3 degree Celsius. May and June are hottest months. December and January are the coldest months. The rainy season is from July to September. About 80% of the total rainfall is received during this period. Some rainfall is received from western disturbances during the winter season. About 790 mm of precipitation falls annually in Rohtak city.

The Climate is ideal for agricultural development. Limited rainy season, good and healthy climate is suitable for industrial development also.

Table No. 3.1 Climatic Statistics of Rohtak

Climate													
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Record high °C (°F)	30.0 (86)	34.1 (93.4)	40.6 (105.1)	45.6 (114.1)	47.2 (117)	46.7 (116.1)	45.0 (113)	42.0 (107.6)	40.6 (105.1)	39.4 (102.9)	36.1 (97)	29.3 (84.7)	47.2 (117)
Average high °C (°F)	21.0 (69.8)	23.5 (74.3)	29.2 (84.6)	36.4 (97.5)	39.2 (102.6)	38.8 (101.8)	34.7 (94.5)	33.6 (92.5)	34.2 (93.6)	33.0 (91.4)	28.3 (82.9)	22.9 (73.2)	31.2 (88.2)
Daily mean °C (°F)	14.3 (57.7)	16.8 (62.2)	22.3 (72.1)	28.8 (83.8)	32.5 (90.5)	33.4 (92.1)	30.8 (87.4)	30.0 (86)	29.5 (85.1)	26.3 (79.3)	20.8 (69.4)	15.7 (60.3)	25.1 (77.2)
Average low °C (°F)	7.6 (45.7)	10.1 (50.2)	15.3 (59.5)	21.6 (70.9)	25.9 (78.6)	27.8 (82)	26.8 (80.2)	26.3 (79.3)	24.7 (76.5)	19.6 (67.3)	13.2 (55.8)	8.5 (47.3)	19.0 (66.2)
Record low °C (°F)	−0.6 (30.9)	1.6 (34.9)	4.4 (39.9)	10.7 (51.3)	15.2 (59.4)	18.9 (66)	20.3 (68.5)	20.7 (69.3)	17.3 (63.1)	9.4 (48.9)	3.9 (39)	1.1 (34)	−0.6 (30.9)
Average precipitation mm (inches)	19 (0.75)	20 (0.79)	15 (0.59)	21 (0.83)	25 (0.98)	70 (2.76)	237 (9.33)	235 (9.25)	113 (4.45)	17 (0.67)	9 (0.35)	9 (0.35)	790 (31.1)
Average precipitation days (≥ 1.0 mm)	1.7	2.5	2.5	2.0	2.8	5.5	13.0	12.1	5.7	1.7	0.6	1.6	51.7
Average relative humidity (%)	63	55	47	34	33	46	70	73	62	52	55	62	54.3
Mean monthly sunshine hours	214.6	216.1	239.1	261.0	263.1	196.5	165.9	177.0	219.0	269.3	247.2	215.8	2,684.6

Sources: climate-data.org

3.3 Demography Details

3.3.1 Introduction

Study of population and demographic trends is crucial to understand the character of a city and its needs and demands for housing, amenities, infrastructure etc. It helps to explain the current urban conditions and to derive the future directions for planning and managing the city's growth and development.

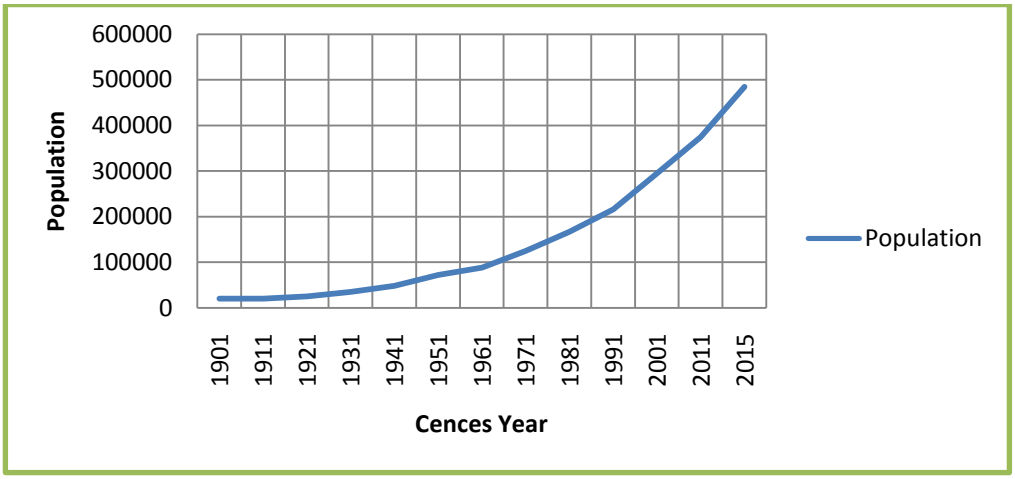
This chapter reviews the population trends over past decades and demographic patterns that influence the urban conditions in Rohtak city and its sanitation condition. Affordable population is helpful to control unhygienic sanitation condition.

3.3.2 Population

As per the Census of India, 1901 the total population of city was about 20,323 which has been continuously increased throughout the various year and has been registered to about 4,84,382 in 2014.Population growth rate 49.34 was high during 1941-1951 decades because of migrant people from Pakistan to Delhi region. City acquired the status of a Class-1 town for the first time in 1971 census with 1, 24,755 population. People are temporary migrant in 1960 from city because of flood. So, growth rate was 22.66 during this decade.

During the next decade i.e. 1961-71, the population in the city recorded a growth rate of 41.66 percent. The growth rate of Rohtak is 36.32 percent during 1991-2001. After the census 2011, Rohtak Municipal Corporation re-establishment of ward boundary with 32 to 20 wards. Now population of city is 4, 84,382(2013) and in 2017 the population of the city is 5, 12,469 (sources: MC Rohtak). In 2021 the projected population is 541522 and 2031 projected population is 614153.

Chart No. 3.1: Year wise Population



Sources: Censes of India

3.3.3 Sex Ratio

The Municipality has a sex ratio of 887 females per 1000 males. Child sex ratio is 815 girls after 1000 boys.

3.3.4 Literacy rate

Literacy rate is 84.08% in Rohtak Municipal Corporation where male literacy rate is 88.94% little higher than female literacy rate i.e. 78.68%.

3.4 Land use Distribution as per DDP 2025

Table No.3.2 Land Use Distribution

Land Use	Area within Municipal Limit (Hectare)	Area outside Municipal Limit (Hectare)
Residential	352	2388
Commercial	152	308
Industrial	163	1079
Transport and Communication	47	869
Public Utility	48	314
Public and Semi Public	132	820
Open Spaces	152	856
Special Zone	34	34
Total	1080	6668

Source : Town and Coutry Planning Department, Haryana

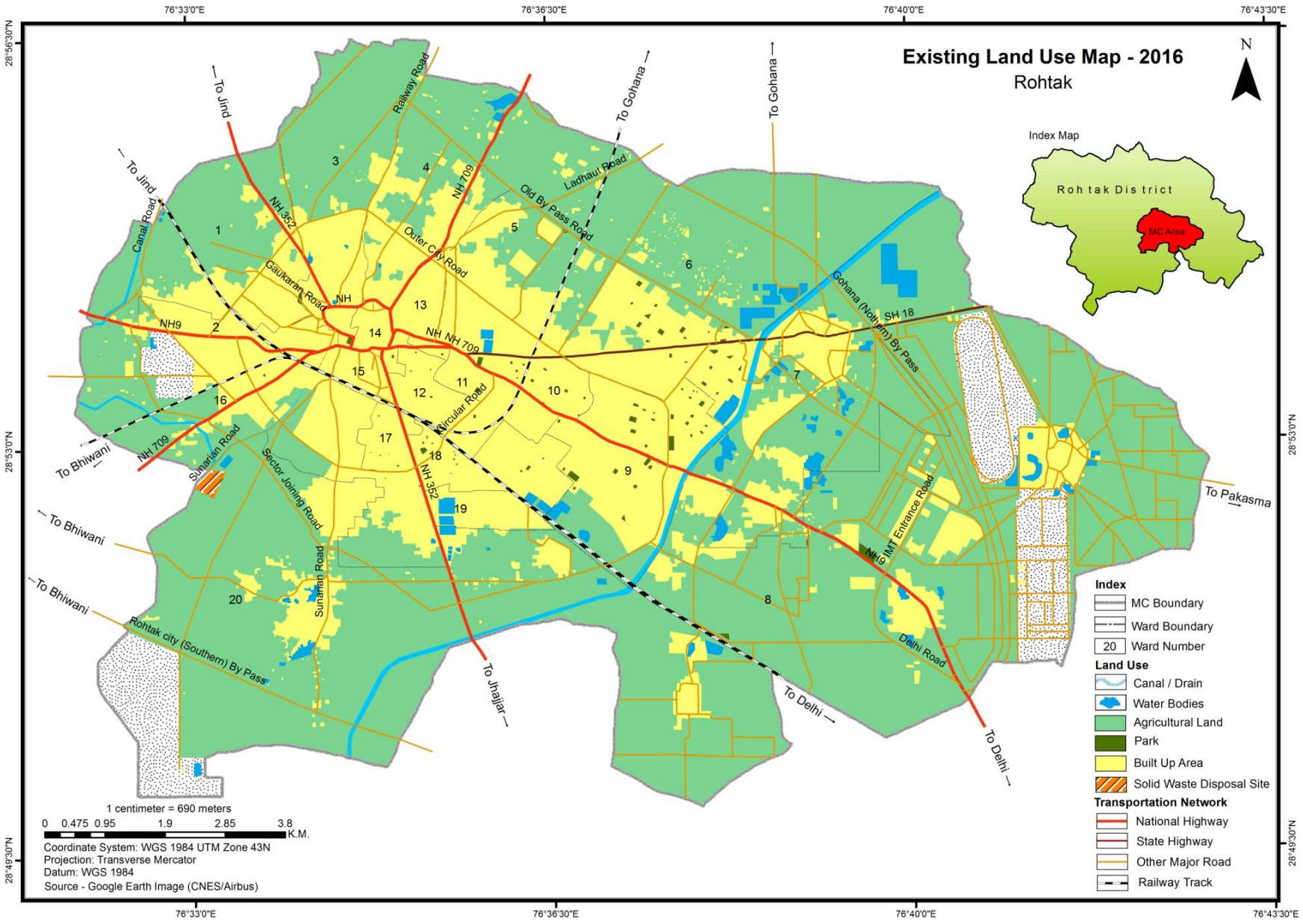


Figure no. 3.3 Present land use map 2016

3.5 Infrastructure Service Levels

Rohtak has been recognized as one of the eligible urban centre for development under AMRUT program of Government of India. Under this scheme, Water supply, Liquid and Solid Waste Management have been recognized as focus areas.

3.5.1 Water Supply System

Water is a natural resource, fundamental to life and livelihood, agriculture and sustainable development. Water Supply perhaps the most important and basic need that has to be provided with reliability, sustainability and affordability. Adequate water supply system gives better sanitation facilities in city and prevents it from unhygienic conditions.

Public Health and Engineering Department is responsible for procurement, treatment, transportation and distribution of water to the population residing within the Rohtak Municipal Corporation's boundary. The per capita supply of water is 99 lpcd as per 2016-17 (MC Rohtak)

3.5.2 Sewerage system

Sewage, also known as "wastewater", is water-carried waste, in solution or in suspension and intended to be removed from the community. Sewerage refers to the infrastructure that carries sewage. It encompasses components such as sewers, manholes, pumping station and sewage treatment plants.

It is estimated that 80% of water supplied, find its way into the sewerage system. With rise in population & depleting water resources, the need for recycling of treated waste water is becoming more important. The treated waste water can be used for irrigation, wash rooms, air-conditioning of large buildings, flushing of toilets, cooling towers, thermal power plants, motor garages for washing of cars, etc.

PHED is responsible for the management of the sewer system, collection, transportation, treatment and disposal of sewage.70% area of city is cover by sewerage network. Approximately 52 MLD sewage, is generated in the city and all this waste water along with sludge is collected in to main pumping station of STP's located at Singhpura Rohtk (10 MLD) Main Disposal Anaj Mandi Rohtak, Peer Bhodhi Gohana Road Rohtak. BOD at incoming of MPS is nearly 200-250 whereas at outlet it comes out to be 10 to 20 mg/ltr. Sewerage system comprises of house to branch connection, branch sewer to truck sewer, truck sewer to outfall sewer and outfall to sewerage treatment plant. The main

truck serer in the town is laid in early seventies. The entire sewer is gravitational maintaining self-cleaning velocity. Treated water is disposed off into drain No. 8, where it is used for agriculture as shown below.

Image No.-3.2 Discharge of Treated Waste Water in Drain No. 08

3.5.3 Solid Waste Management

Municipal Corporation is responsible for the collection, transportation and disposal of solid waste in the city. The total bulk of solid waste generated per day in Rohtak is estimated to be 250 MT. Per capita waste generation is approximately 0.22 Kg. which is more than CPHEEO norms. Waste is collected on daily basis from households and transported for disposal by trucks tractors and other four-wheelers. Sites are located in different parts of city for collection of waste. 852 Safai Karamchari are working to manage solid waste system in city. Waste from different parts of the city is transported to landfill site located about 15 km away from Rohtak at Bhiwani road. Area of Site is approximately 25 acre.

It is observed that there is no separate provision of waste collection from street vendors. Waste is choked into the Nallas of the city. It is observed that workers are not using any safety features to preserve health. Collections are opened in city and creating unhygienic conditions.

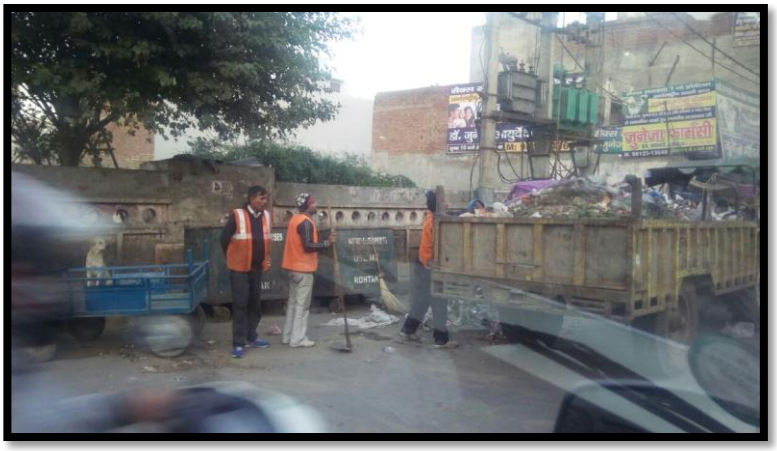


Image No.-3.3 Collection of MSW from commercial points in the city

3.5.4 Public Toilets

Municipal Corporation Rohtak is responsible to construct individual and community toilets in the City. RMC has more than 4 lakh population. There is deficiency in toilets and people practice open defecation. It creates unhygienic conditions in city. Community toilets are constructed under Swachh Bharat Mission by the Municipal Corporation.

Approximately 94% households covered by individual toilets in Rohtak Municipal Corporation. MCR have target for open defecation free city by March 2018. In a survey conducted by MCR, 1903 HHs were found without toilet. 1203 HHs covered under Swachh Bharat Mission. Remaining will complete by March 2018. Municipal Corporation Rohtak has constructed community toilets at public places to prevent open defecation.

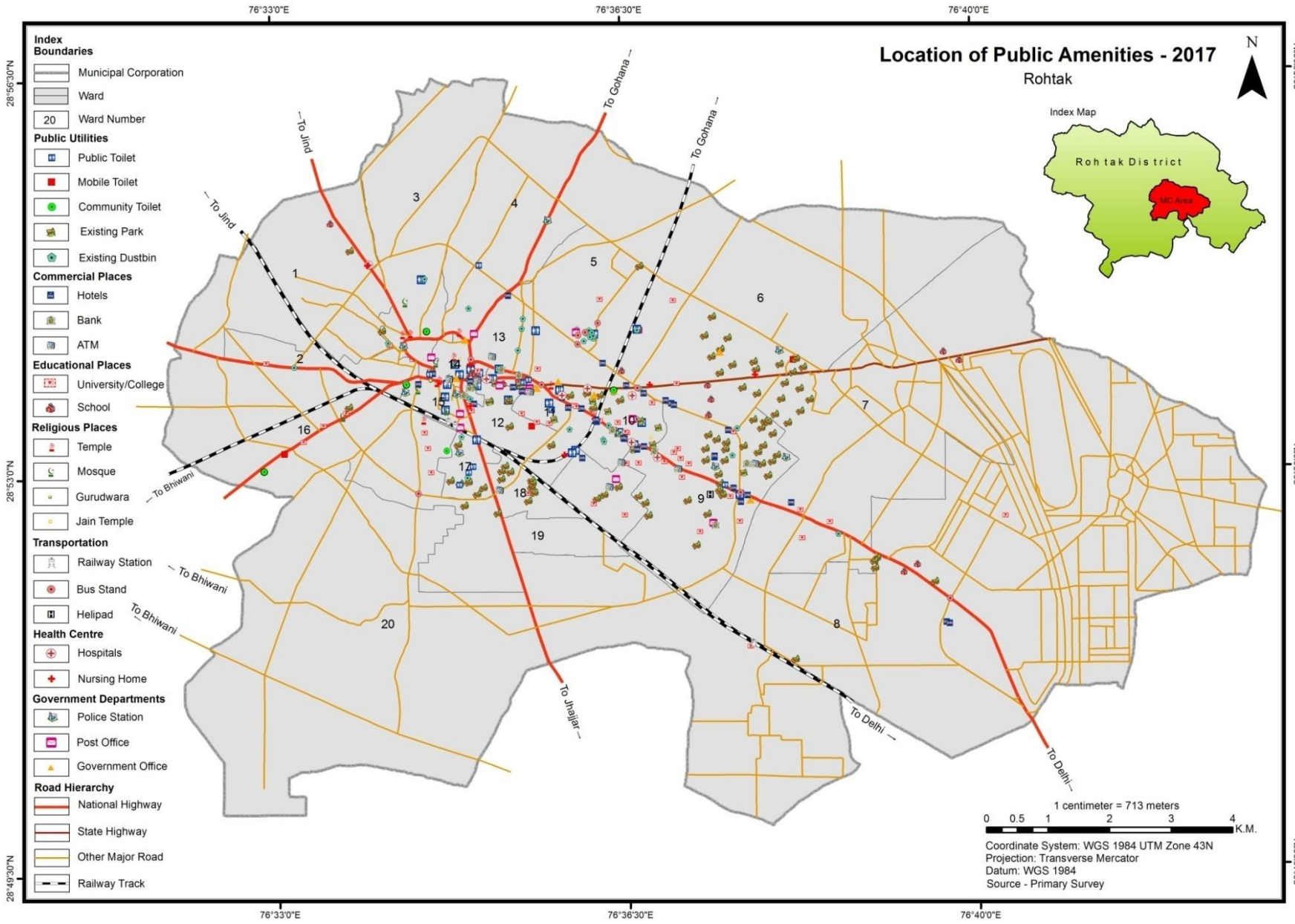


Figure No.: 3.4 Distributions of Public Amenities in MC Rohtak

3.5.5 Natural Drains & Storm Water Drainage

There is no natural drain in Rohtak city. Storm water drainage system has been laid in 60% of approval area under MCR jurisdiction. Recently 34 colonies added under MCR jurisdiction those are uncovered from storm water drainage. There is one master storm water drain in city.

Chapter 4

Demography and Population Projections

4.1Urban population and Growth rate

During the next decade i.e. 1961-71, the population in the city recorded a growth rate of 41.66 percent. The growth rate of Rohtak is 36.32 percent during 1991-2001. After the census 2011, Rohtak Municipal Corporation re-establishment of ward boundary with 32 to 20 wards. Now population of city is 4, 84,382(2013).

Table No. 4.1: Year wise Population and Growth Rate

Census Year	Population	Decadal Growth Rate
1901	20323	-
1911	20361	0.19
1921	25240	23.96
1931	35235	39.60
1941	48148	36.65
1951	71902	49.34
1961	88193	22.66
1971	124755	41.46
1981	166767	33.68
1991	216096	29.58
2001	294577	36.32
2011	374292	
2013*	484382	
2017*	512469	
2021**	541522	
2031**	614153	

*Sources: Censes of India, * MC Rohtak, 2017.*

***projected population by Arithmetical Progression Method*

4.2 Population Projection

As per Census of 2011 Rohtak has a population of 374292 souls. Population of past decades is as below as per data collected from Census database. Present population of 2013 is 484382 souls.

Table 4.2 census population of past decades

Census year	Population
1951	71902
1961	88193
1971	124755
1981	166767
1991	216096
2001	294577
2011	374292

2013	484382
2017	512469
2021	541522
2031	614153

Sources: Censes of India

The future population is forecasted as per norms of CPHEEO manual is as under.

The following methods are used for the population forecasting as;

i. Arithmetical Progression Method
ii. Geometric Increase Method.
iii. Incremental Increase Method
iv. Graphical Progression Method.

4.3 Ward wise Distribution of Future Population (include the slum population & better include surrounding villages)

In 2001 the council is formed under Nagar Parishad and distributes the wards into 31 no. and after making Municipal Corporation in 2010 they merges the wards and distributed accordingly in 20 numbers. Below the table no. 4.4 are shows the ward wise population details of 2013, 2017 & 2021, 2031.

Table No: 4.3 Ward-wise populations

Ward No.	2013	2017	2021	2031
1	25783	32245	33608	37239
2	25735	24563	25925	29557
3	25593	17607	18970	22602
4	26584	29175	30537	34169
5	26324	27152	28514	32146
6	25393	26956	28318	31950
7	22517	21160	22522	26154
8	22524	20704	22067	25698
9	25632	55937	57300	60931
10	23320	25367	26730	30361
11	26529	32039	33402	37034
12	22063	25549	26912	30543
13	24550	21115	22478	26110
14	22250	20539	21901	25533

15	24942	22763	24126	27757
16	22066	18204	19566	23198
17	24241	20770	22133	25765
18	22219	20138	21501	25133
19	22038	21645	23008	26639
20	24079	30642	32004	35636
Total	484382	514269	541522	614153

Sources: MC Rohtak, 2017

4.4 Ward wise Population density

Table No.: 4.4 population density per Acre (ward wise)

Sr. No	Ward No.	Density persons per Acre
1.	1	16
2.	2	75
3.	3	17
4.	4	21
5.	5	18
6.	6	7
7.	7	7
8.	8	2
9.	9	18
10.	10	63
11.	11	98
12.	12	84
13.	13	101
14.	14	184
15.	15	98
16.	16	11
17.	17	129
18.	18	106
19.	19	21
20.	20	5

Sources: Censes of India

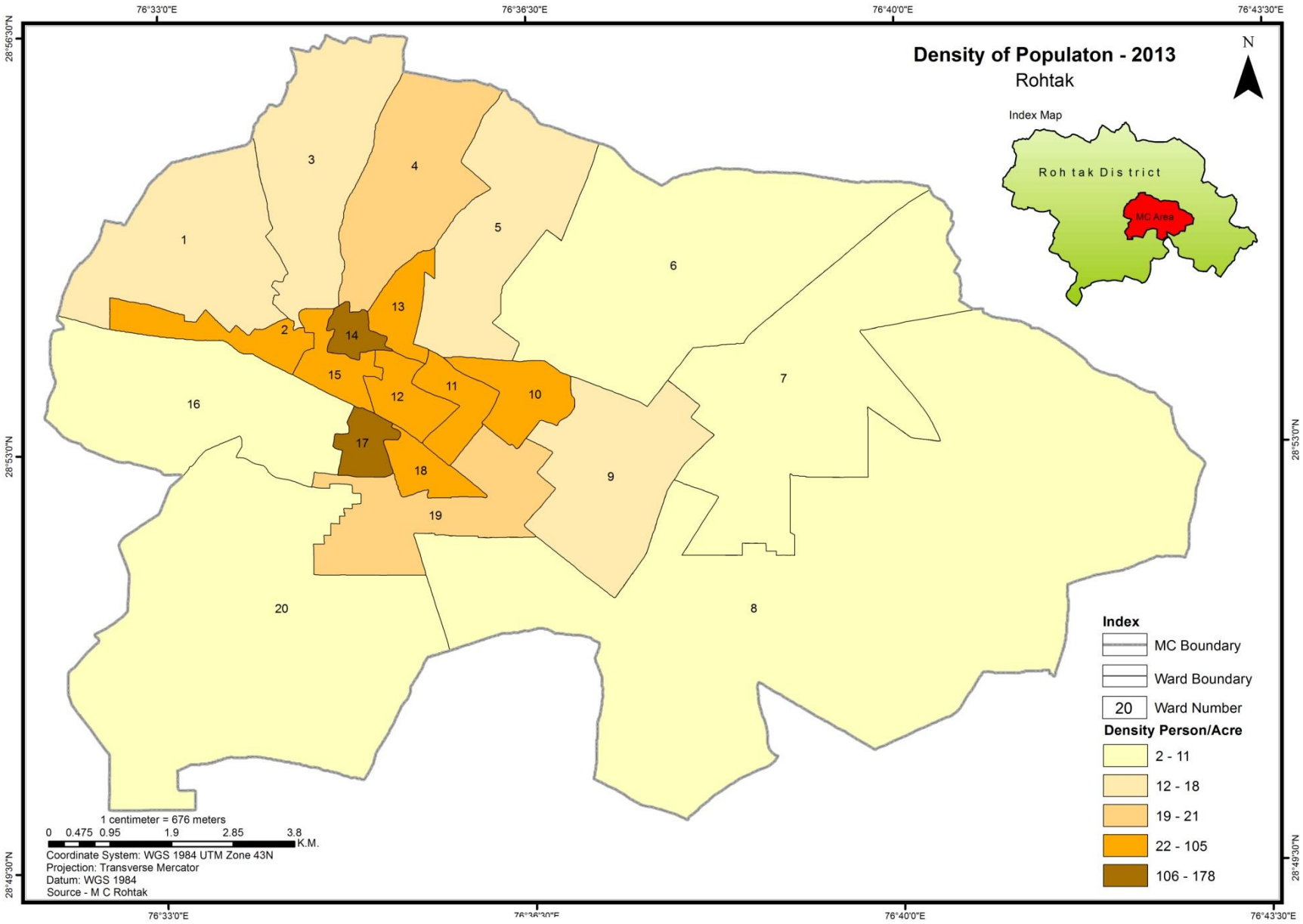


Figure No.: 4.1 Population Density 2011

4.5 Limitation of Population Projection at City and Ward levels

It is increasingly important to have high quality statistics on the population and projections of the population, for policy development and for planning and providing public services in different geographic areas. They are used for:

- Central and local finance allocation;
- Informing the provision of nurseries or day care centres;
- Informing local and national policy;
- Housing and land use planning;
- Health care planning;
- Modeling and projecting health care indicators;
- Weighting surveys;
- Benchmarking other projections and as a control for smaller area projections;
- Teacher workforce models both at a national and local level;
- Looking at the implications of an ageing population
- Making national and international comparisons, etc.

But population projections have limitations. A projection is a calculation showing what happens if particular assumptions are made. The population projections are trend-based. They are, therefore, not policy-based forecasts of what the government expects to happen. Many social and economic factors influence population change, including policies adopted by both Central and Local Government. The relationships between the various factors are complex and largely unknown.

The effect of the assumptions about future migration, fertility and mortality is often limited by the inertia in population change; the future population of an area is strongly influenced by the initial base population. As the process of change is cumulative, the reliability of projections decreases over time. Change affects some populations more rapidly and more seriously than others. Thus, projections for areas with small populations tend to be less reliable than those for areas with large populations, because the former are usually affected more by migration. Projections of the number of adults (particularly elderly people) are usually more reliable than those for children because of difficulties in projecting levels of fertility and parental migration. The size of the migration flows, and the uncertainty of future trends, mean that for many areas the migration assumptions are more critical than the fertility and mortality assumptions.

Hence the migration assumptions can have a large effect on small populations in the long-term (e.g. the Shetland Islands where there is a small population) and also for some other areas with larger populations.

Central government population projections set local and regional projected population patterns in a national context. They are trend-based. However, it should be remembered that new local planning policies are often intended to modify past trends. Structure plans may be based on reasoned and agreed departures from the projections that seem better placed to fit particular local circumstances.

4.6 Factors that can affect city level population and its spatial distribution

Population projections, like some other types of projections, may indicate that existing trends and policies are likely to lead to outcomes which are judged undesirable. If new policies are then introduced, they may result in the original projections not being realized. However, this means the projections will have fulfilled one of their prime functions, to show the consequences of present demographic trends with sufficient notice for any necessary action to be taken.

Factors that can affect the city level population and its spatial distribution are like:

- Spatial features and distribution of land values
- Regional shopping centers and the transportation nodes.
- The location factors are determined by the distribution of commercial activities.
- The characteristics of the CBD and the spatial form of the city.

4.7 Ilustrative list of situations that can alter population dynamics

Population dynamics is the branch of life sciences that studies the size and age composition of populations as dynamical systems, and the biological and environmental processes driving them (such as birth and death rates, and by immigration and emigration). Example scenarios are ageing populations, population growth, or population decline.

4.8 Projections of Water Demand and Sewerage Generation

Below table shows the existing population of 2013, 2017 with desired water supply demand and actual sewerage generation of 80% of total desired water supply with future sewerage projections of 2021. The water demand are projected as per MC

Rohtak like 99 MLD and also projected on the basis of standard 135 lpcd. And for 2021 population projection the standard water supply calculated on the basis of 135 lpcd.

Table No.: 4.5 Projection of water supply and sewerage generation

2013 Pop.	Desired water supply as per standard		Current Water supply		Existing sewerage generation @80% of water demand MLD	Projected sewerage generation @80% of water supply as per standard	2017 Pop.	Desired water supply as per standard		Existing sewerage generation @ 80% of water demand MLD	Current Water supply		A s per PH department			Projected sewerage generation @80% of water supply as per standard	Population projection 2021	Projected demand water supply as per standard		Projected sewerage generation @80% of water demand MLD
	135	MLD	99	MLD				135	MLD		99	MLD	lpcd WS per capita	lpcd	MLD			135	MLD	
25783	3480705	34.81	2552517	25.53	20.42	27.85	32245	4353086	43.53	34.82	3192263	31.92	110	3546959	35.5	25.54	34830	4702050	47.0	37.62
25735	3474225	34.74	2547765	25.48	20.38	27.79	24563	3315954	33.16	26.53	2431699	24.32	130	3193141	31.9	19.45	24094	3252690	32.5	26.02
25593	3455055	34.55	2533707	25.34	20.27	27.64	17607	2377002	23.77	19.02	1743135	17.43	105	1848779	18.5	13.95	14413	1945755	19.5	15.57
26584	3588840	35.89	2631816	26.32	21.05	28.71	29175	3938568	39.39	31.51	2888283	28.88	101	2946633	29.5	23.11	30211	4078485	40.8	32.63
26324	3553740	35.54	2606076	26.06	20.85	28.43	27152	3665453	36.65	29.32	2687999	26.88	120	3258180	32.6	21.50	27483	3710205	37.1	29.68
25393	3428055	34.28	2513907	25.14	20.11	27.42	26956	3638998	36.39	29.11	2668598	26.69	122	3288576	32.9	21.35	27581	3723435	37.2	29.79
22517	3039795	30.40	2229183	22.29	17.83	24.32	21160	2856538	28.57	22.85	2094794	20.95	121	2560304	25.6	16.76	20617	2783295	27.8	22.27
22524	3040740	30.41	2229876	22.30	17.84	24.33	20704	2795059	27.95	22.36	2049710	20.50	130	2691538	26.9	16.40	19976	2696760	27.0	21.57
25632	3460320	34.60	2537568	25.38	20.30	27.68	55937	7551484	75.51	60.41	5537755	55.38	145	8110853	81.1	44.30	68059	9187965	91.9	73.50
23320	3148200	31.48	2308680	23.09	18.47	25.19	25367	3424567	34.25	27.40	2511349	25.11	144	3652871	36.5	20.09	26186	3535110	35.4	28.28
26529	3581415	35.81	2626371	26.26	21.01	28.65	32039	4325327	43.25	34.60	3171907	31.72	132	4229209	42.3	25.38	34244	4622940	46.2	36.98
22063	2978505	29.79	2184237	21.84	17.47	23.83	25549	3449158	34.49	27.59	2529383	25.29	100	2554932	25.5	20.24	26944	3637440	36.4	29.10
24550	3314250	33.14	2430450	24.30	19.44	26.51	21115	2850576	28.51	22.80	2090423	20.90	142	2998384	30.0	16.72	19742	2665170	26.7	21.32
22250	3003750	30.04	2202750	22.03	17.62	24.03	20539	2772703	27.73	22.18	2033315	20.33	102	2094931	20.9	16.27	19854	2680290	26.8	21.44
24942	3367170	33.67	2469258	24.69	19.75	26.94	22763	3073019	30.73	24.58	2253547	22.54	105	2390126	23.9	18.03	21892	2955420	29.6	23.64
22066	2978910	29.79	2184534	21.85	17.48	23.83	18204	2457483	24.57	19.66	1802154	18.02	110	2002394	20.0	14.42	16659	2248965	22.5	17.99
24241	3272535	32.73	2399859	24.00	19.20	26.18	20770	2804001	28.04	22.43	2056268	20.56	115	2388594	23.9	16.45	19382	2616570	26.2	20.93
22219	2999565	30.00	2199681	22.00	17.60	24.00	20138	2718676	27.19	21.75	1993696	19.94	110	2215217	22.2	15.95	19306	2606310	26.1	20.85
22038	2975130	29.75	2181762	21.82	17.45	23.80	21645	2922116	29.22	23.38	2142885	21.43	110	2380983	23.8	17.14	21488	2900880	29.0	23.21
24079	3250665	32.51	2383821	23.84	19.07	26.01	30642	4136605	41.37	33.09	3033510	30.34	101	3094794	30.9	24.27	33267	4491045	44.9	35.93
484382	65391570	653.92	47953818	479.54	383.63	523.13	514269	69426372	694.26	555.41	50912673	509.13	118	60555224	605.6	407.30	526244	71042940	710.4	568.34

Sources: PHED, 2016

4.9 Future population growth trends and direction with the help of maps

Future population growth trends and direction are shown in the figure below;

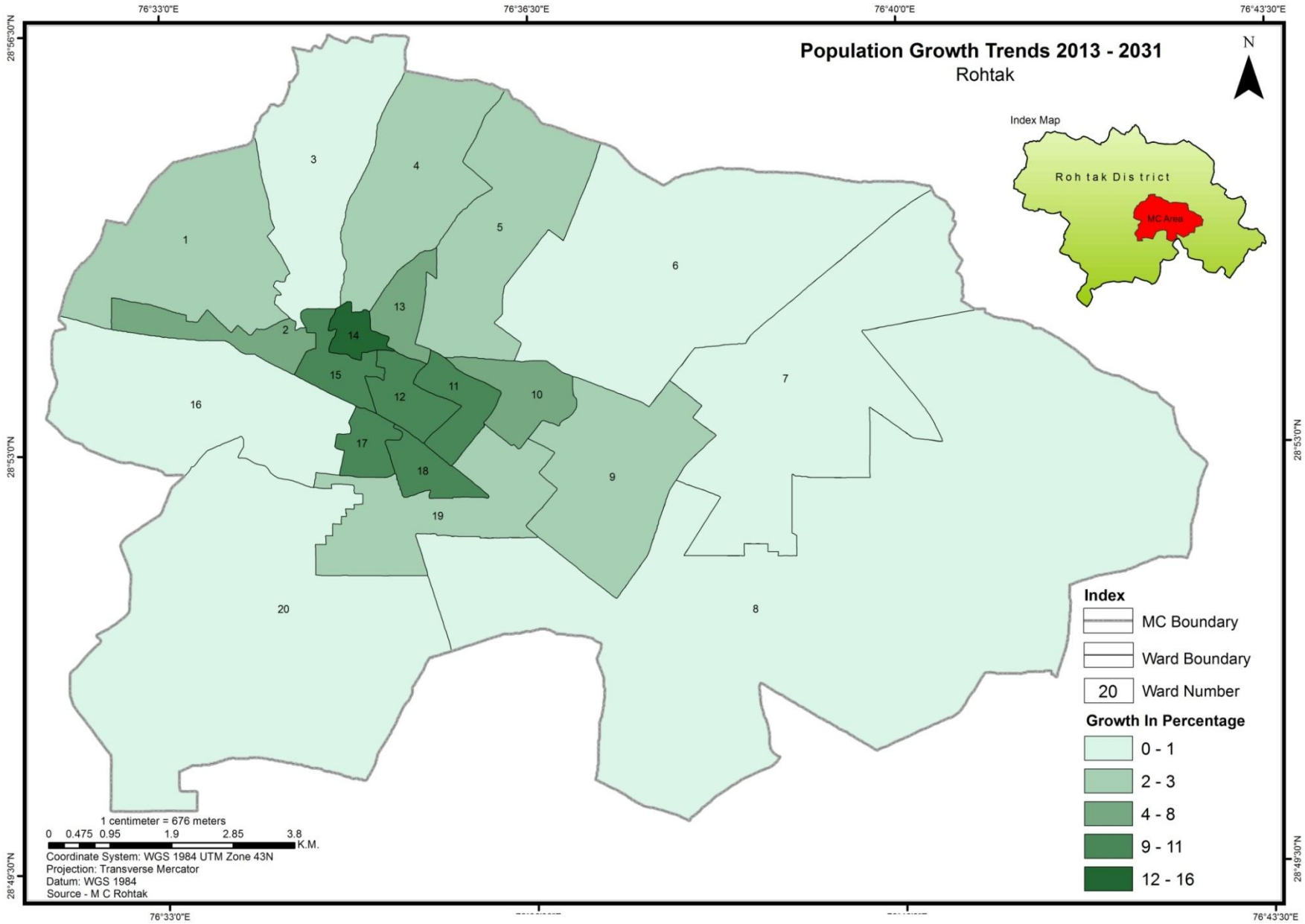


Figure No.: 4.2 Future growth pattern in Rohtak MC

4.10 Floating Population:

Floating population is a terminology used to describe a group of people who reside in a given population for a certain amount of time and for various reasons, but are not generally considered part of the official census count. A population is usually broken down into two categories—the residents, who permanently stay in an area for a considerable amount of time and are part of the official population count, and the floating types, who are in the area but do not live there permanently and are not considered part of the official census count.

Table No.: 4.6 Description of floating population

Sr. No.	year	Floating Population (15% of total population)
1	2001	44186
2	2011	56143
3	2013	72657
4	2017	77140
5	2021	81228
6	2031	92123

Sources: Censes of India

4.10.1 Basis for the assumption of floating population as described below

Firstly we calculate the floating population on the basis of thumb rule 15% of the total population, and after that the basic assumptions for the floating population is as follows:

- Rohtak is a flourishing business city and an important regional center for the wholesale and trades, particularly in grain, timber, textile, food and beverages.
- It is boast of a State University MDU(UGC), Medical College and Sports Centre with stadium facilities.
- It has a huge potential for nut bold or machinery industry.
- Availability of skilled human resources at comparatively cheaper rates.
- Inadequate infrastructure such as reliable power during working hours, good road conditions for smooth flow of traffic and its management.
- Lack of technology driven logistic arrangement for backward and forward export and import linkages.

So, these are the basic assumptions for floating population over there.

4.11 Existing Slum Survey

Rohtak city has total 26 slum pockets and 8 villages under the jurisdiction of Municipal Corporation. Slum population is 40,775 spread over in twenty wards of city.

Table No. 4.7: Slum Population in Rohtak City

No. of Slum	Name of Slum	Slum Population	No. of HHs	Private Latrines-Flush/Pour Flush & No. of Tap Points/Public Hydrants installed for protected Water Supply	Paved Roads (In Km.)
1	Surya Nagar 2	4623	808	731	5
2	Shiv Nagar	1936	418	401	4
3	Badsi Nagar	247	99	91	1
4	Sainik Colony	1515	421	399	3
5	Rajiv Vihar – 2	1472	267	251	1.9
6	Rajiv Vihar	330	102	100	1
7	Kutla Basti	479	132	102	1
8	Kacchi Gali	2502	369	351	5
9	Parvesh Nagar	786	171	164	2
10	Shastri Nagar	1239	239	213	3
11	Rishi Nagar	1179	223	201	2.5
12	Surya Nagar	619	135	120	1.7
13	Kabir Colony	917	214	204	2
14	Basant Vihar	814	163	154	2
15	New Janta Colony	644	141	125	1.5
16	Rohtak Uttam Nagar	1347	336	329	2
17	Sanjya Colony	2641	441	401	4
18	Ram Nagar	2327	500	477	3
19	Sanjay Nagar	3232	509	481	5
20	Friends Colony	263	99	90	1
21	Anand Nagar	467	96	86	1.5
22	Ambedkar Colony	1468	226	201	2
23	Sri Nagar Colony	4082	1013	990	6
24	Kamla Nagar	4251	759	706	6
25	Raj Mohalla	734	108	100	1.5
26	Rohtak Ajit Colony	661	120	104	1.5
Total		40775	8109	7572	70.1

Source: MC, Rohtak

Chapter 5

Situation Analysis

The following section provides a summary description of the status of sanitation in Rohtak. It is based on the surveys conducted by Design Point Consults in 2016 and by Institute for Spatial Planning and Environment Research (ISPER) in 2017 following the survey format provided by MC Rohtak and Guidelines of Swachh Survekshan 2017-18.

Infrastructure Service Levels

Rohtak has been recognized as one of the eligible urban center for development under AMRUT program of Government of India. Under this scheme, water supply, liquid waste management and solid waste management have been recognized as focus area.

5.1 Water Supply System

Water is a natural resource, fundamental to life and livelihood, agriculture and sustainable development. Water Supply is perhaps the most important and basic need that has to be provided with reliability, sustainability and affordability. Adequate water supply system gives better sanitation facilities in city and prevent from unhygienic conditions.

Public Health and Engineering Department is responsible for procurement, treatment, transportation and distribution of water to the population residing within the Rohtak Municipal Corporation's boundary.

5.1.1. Status of Ground Water Development in Rohtak city

The drinking water supply in the district is mainly canal water. The water supply short fall to the towns, cities and villages is met with hand pumps as a convenient source of water. The drainage system has helped in maintaining proper balance between soil moisture and air, thereby reducing water logging, salinity and marshy conditions in the district. Ground water depth in Rohtak City is 10m with fresh to marginally saline.

5.1.2 Ground Water Quality

Ground water has salinity in Rohtak and Jhajjar Districts of Haryana. Below table shows ground water particles:-

Table No. 5.1. Ground Water Quality

Sr. No	Particles	Ratio
1	Salinity	EC > 3000 µS/cm at 25 ° C
2	Fluoride	>1.5 mg/l)
3	Chloride	> 1000 mg/l
4	Iron	>1.0 mg/l
5	Nitrate	>45 mg/l

Sources: PHED, Rohtak

5.1.3 Source of Water Supply

JLN Canal, which takes off from Khubdu head is source of drinking water supply scheme for Rohtak town.BSB (Bhaulat Sub-Br) canal and Ground water are also major sources for water supply in city. Bhalaut Distributary, Jhajjar Town supply, Rohtak Town supply and Rohtak Distributaries are the other distributaries of the city Rohtak.

Table No.:5.2 Description of Water Supply

Rohtak MC	Population as per censes year 2013	No. of canal based water works	No. of tube wells	Water generation in capacity (LPCD)	Existing water supply status (LPCD)	% covered with W/S	% area covered with distribution	Nos. of Boosting station
	484382	3	0	73	136	85	90	18

Sources: PHED, 2017

Image No. 5.1 Water Pumping Station

Table No.:5.3 Direct Source Water Availability at Present

City	Surface water availability (BMC per annum)	Ground water availability (BMC per annum)
Rohtak	0.60	0.099

Sources: PHED, 2017

5.1.4 Distribution of Water Supply

PHED department is responsible to distribute water supply in Rohtak City. Per capita water supply is 135 (lpcd) which is equal to the suggested UDPFI standard guidelines of135 lpcd. Existing water supply for a population of 4, 46,146 is 77.86 MLD which

covering 94% households. Water is supplied thrice a day. Treated water is distributed through 4 no. Water Works and 18 nos. of Boosting Stations. Below table shows the Water works and busting stations list:-

Table No.5.4: Water Works Locations in Rohtak City

Water works	
1	1st (Old) water works Sonipat Road, Mansrover Park
2	2nd Water Works Jhajjar Road
3	3rd Water Works Sonipat Road, Near JLN
4	Water Works Near Jat Institute
Boosting Station	
1.	Boosting Station C.R. Statdium
2.	Boosting Station Model Town
3.	Boosting Station City Park
4.	Boosting Station Hafed Road
5.	Boosting Station T.B Hospital
6.	Boosting Station Phara Mohala
7.	Boosting Station Jind Road
8.	Boosting Station Goukaran Talab
9.	Boosting Station Revenue Colony
10.	Boosting Station Sr. Secondary School
11.	Boosting Station Old ITI
12.	Boosting Station Suger Mill
13.	Boosting Station old Bus Stand
14.	Boosting Station Indira Colony
15.	Boosting Station Jullha Wala Chowk
16.	Boosting Station Gohana Adda
17.	Boosting Station Dairy Pana
18.	Boosting Station Prem Nagar Chowk

Source: Water Supply Department, Rohtak

Image No. 5.2 Location of Boosting Station

5.1.5 Water Flow Assessment

During normal period, considering the residential and floating population in the city as mentioned in the above table, the per capita availability of water comes to 130-136 lcpd. Considering this population and available water supply, the city is getting adequate water for consumption. (Considering the norm as per PHED i.e. 135 lpcd).

As per Census, the floating population for 2011 and 2021 has been projected as 56,143 and 78936 respectively. As per the given data by MC Rohtak, the floating population for 2017 is estimated as 76870 based on this the water demand (@ 135 lpcd) for Rohtak City for Projection year is mentioned in below table:

Table No: 5.5 Description of Water Demand

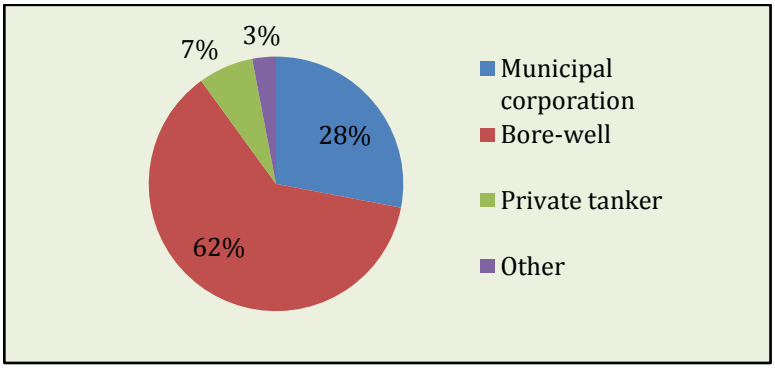
	2011	**2013**	**2017**	**2021**	**2031**
Resident Population	374292	484382	514269	541522	614153
Floating Population	56143	72657	77140	81228	92123
Total population	430435	484382	514269	541522	614153
Water Demand (MLD)	581.08	653.92	694.26	731.05	829.10

Source: PHED, 2016

5.1.6 Mode of Water Supply

In Rohtak, the most prevalent means of water supply is Bore-well (62%). Municipal Corporation (28%), Private tankers (7%) and others like community hand pump, tankers etc. is 3% of total consumer connections for water supply.

Chart No.: 5.1 Mode of water supply



Sources: Primary Observations, 2016

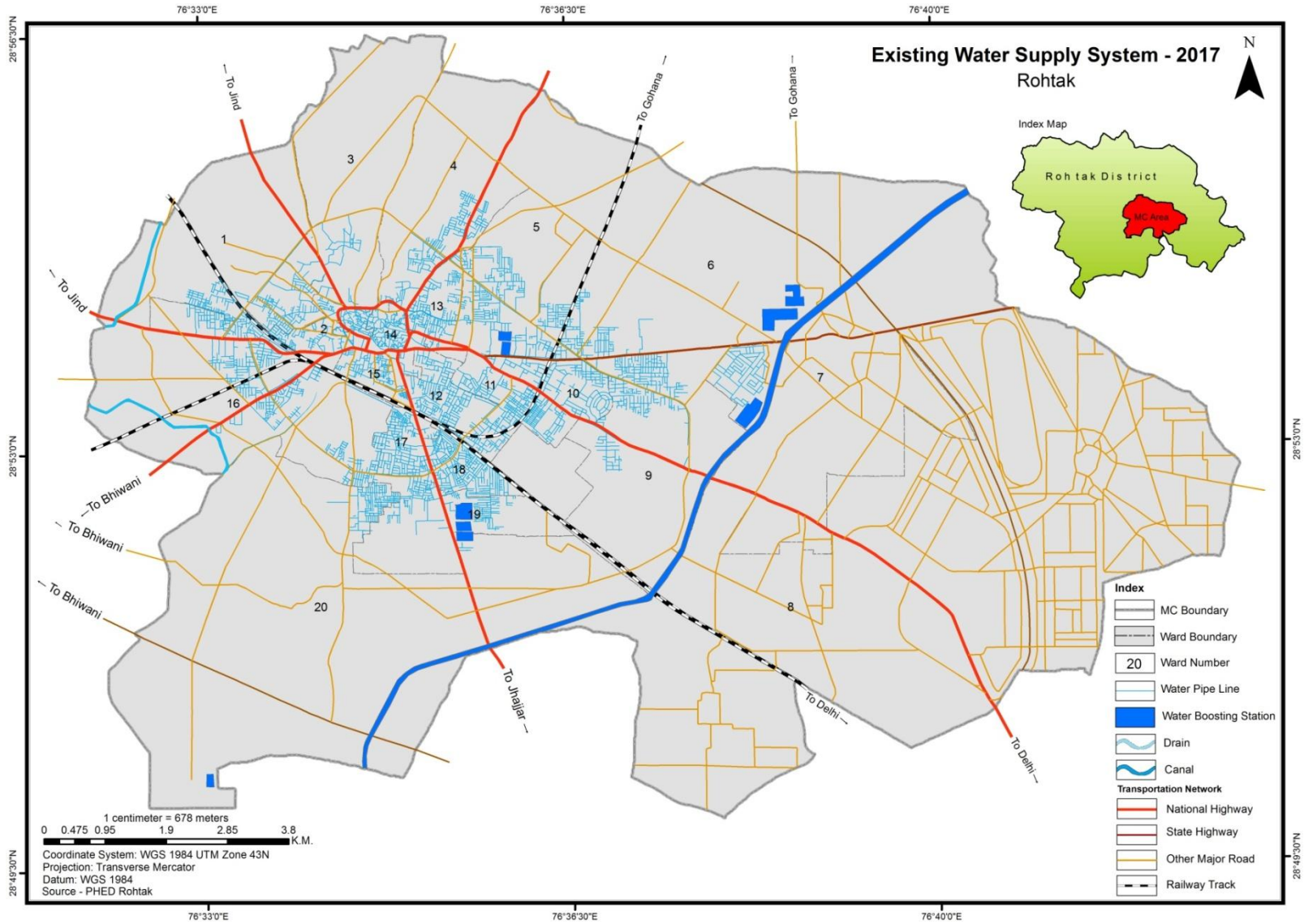
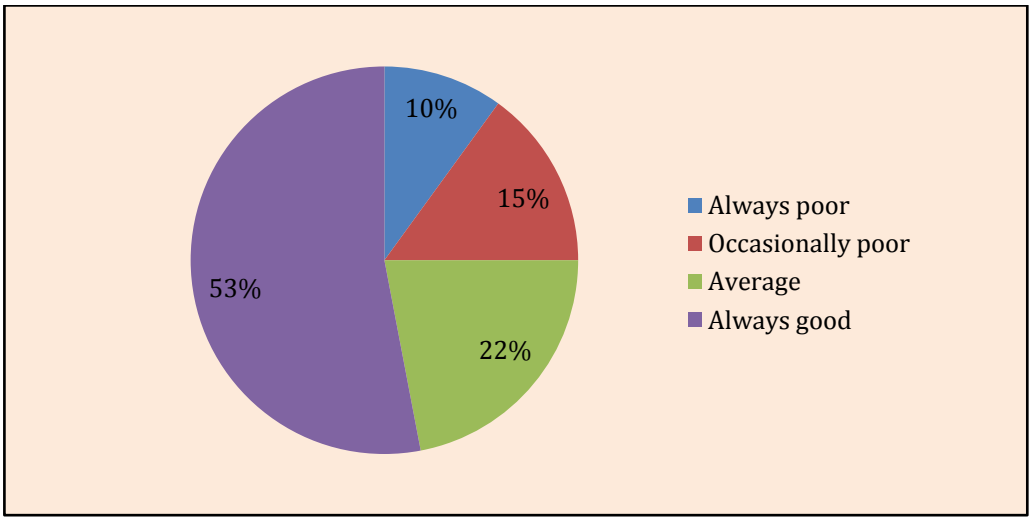


Figure No.:5.1 Existing Water Supply System 2016, MC Rohtak

5.1.7 Quality of supplied water:

Through primary survey the quality of supplied water is 53% remain always good, 22% is average, and 15% is occasionally poor and 10% always poor. Below given chart shows the distribution of the same.

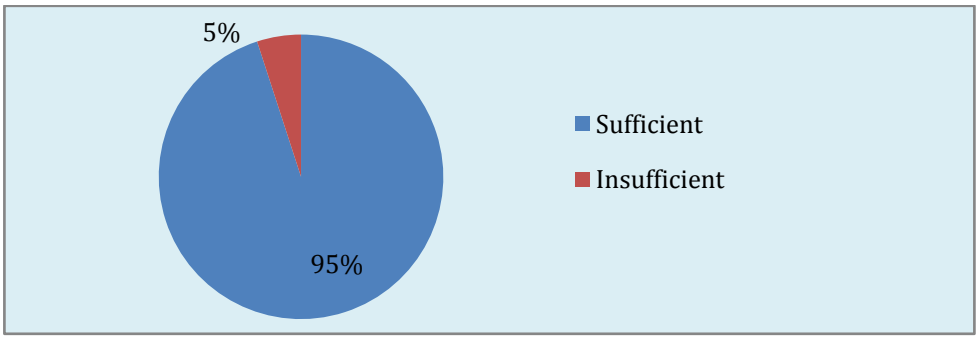
Chart No.: 5.2 Quality of supplied water



Source: Primary survey Observation, 2016

5.1.8 Adequacy of supplied water: Through the primary survey 95% sufficient water supply and insufficient is only 5%.

Chart No.: 5.3 Adequacy of supplied water

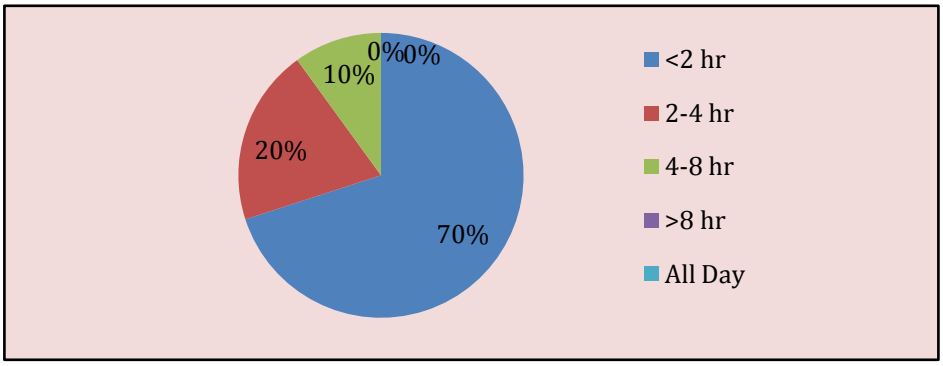


Source: Primary Survey Observation, 2016

5.1.9 Frequency of water supply per day:

In Rohtak city the frequency of water supply through primary survey we found that maximum 70% supply per day is less than 2 hrs. per day, 20% is 2 to 4 hrs. per day and 10% in between 4 to 8 hrs. per day.

Chart No.: 5.4 Frequency of Water Supply per day



Source: Primary Survey Observation, 2016

5.1.10 Water Supply and Demand

Sewage generation depends on the water supplied and it is generally considered as 80% of the water supply. It is essential to look at the water supply situation within MC of Rohtak to assess sewage generation.

Table No. 5.6 Description of Water Supply & Demand

City	Population				Water Pipe lines length (in km.)	Actual water supply in (LPCD) 2013	Actual water demand (MLD) 2013	Desired water supply demand (MLD) 2021
	2013	2017	2021	2031				
Rohtak	484382	512469	541522	614153		171	65.29	103.22
Ward No.								
1	25783	32245	34830	37239	171	2552517	34.81	47.0
2	25735	24563	24094	29557	43	2547765	34.74	32.5
3	25593	17607	14413	22602	20	2533707	34.55	19.5
4	26584	29175	30211	34169	40	2631816	35.89	40.8
5	26324	27152	27483	32146	49	2606076	35.54	37.1
6	25393	26956	27581	31950	43	2513907	34.28	37.2
7	22517	21160	20617	26154	37	2229183	30.40	27.8
8	22524	20704	19976	25698	1	2229876	30.41	27.0
9	25632	55937	68059	60931	49	2537568	34.60	91.9

10	23320	25367	26186	30361	86	2308680	31.48	35.4
11	26529	32039	34244	37034	63	2626371	35.81	46.2
12	22063	25549	26944	30543	61	2184237	29.79	36.4
13	24550	21115	19742	26110	63	2430450	33.14	26.7
14	22250	20539	19854	25533	42	2202750	30.04	26.8
15	24942	22763	21892	27757	62	2469258	33.67	29.6
16	22066	18204	16659	23198	73	2184534	29.79	22.5
17	24241	20770	19382	25765	39	2399859	32.73	26.2
18	22219	20138	19306	25133	51	2199681	30.00	26.1
19	22038	21645	21488	26639	37	2181762	29.75	29.0
20	24079	30642	33267	35636	22	2383821	32.51	44.9
total	484382	514269	526244	614153	1052	47953818	653.92	710.4

Source: MC Rohtak & PHED, 2017

Table No: 5.7 Total Domestic Water Demand: 2011 & 2021

City	**Total Population**				**Domestic demand (MLD)**		**Domestic demand (BCM per annum)**	
Rohtak	2013	2017	2021	2031	2011	2021	2011	2021
	4,843,82	5,124,69	541522	614153	117.57	174.94	0.0429	0.0639

Source: PHED, 2017.

5.1.11 Water connection charges and tariff

Table No: 5.8 Water connection charges & tariff

Sr. No.	**Type of Connection**	**Water Charges**		
		Metered Supply	Un-metered Supply	Waste Water Disposal
1	Domestic	Rs. 1 per Kilo Liter	Rs. 48 per month	25% of water charges
2	Industrial/Commercial/Institutional	Rs. 4 per Kilo Liter	-	25% of water charges

Source: PHED, 2016

5.1.12 Service level benchmark for water supply

Table No: 5.9 Service level benchmark for water supply

Indicator	Benchmark	Existing (2016-17)	Targets (2017-18)
Coverage of WS Connection (Population)	100%	97%	99%
Per Capita availability of WS at consumer end	135 lpcd	99 lpcd	135 lpcd
Extent of metering of water connections	100%	83 %	90 %
Extent of Non Revenue Water	20%	28 %	20 %
Continuity of Water Supply	24 Hrs.	10.30 Hrs.	14 Hrs.
Efficiency in redressal of customer complaints	80%	90 %	95 %
Quality of water supplied	100%	100 %	100 %
Cost recovery in water supply services	100%	44 %	60 %
Efficiency in collection of water supply charges	90%	86 %	90 %

Sources: MC Rohtak, 2017.

5.1.13 Key issues

- Varying quantum of water availability at source.
- High unaccounted for the water (UFW) due to distribution losses (old and leaking distribution system) and illegal water connections.
- Poor metering system with adequate surveillance.
- Poor water maintenances of water source and infrastructure
- Lack of water supply in villages under MCR jurisdiction and colonies.
- Water table depletion.

5.2 Sewerage System

Sewage, also known as "*Wastewater*", is water-carried waste, in solution or in suspension and intended to be removed from the community. Sewerage refers to the infrastructure that carries sewage. It encompasses components such as sewers, manholes, pumping station and sewage treatment plants.

It is estimated that 80% of water supplied find its way into the sewerage system. With rise in population & depleting water resources, the need for recycling of treated waste water is becoming more important. The treated waste water can be used for irrigation, wash rooms, air-conditioning of large buildings, flushing of toilets, cooling towers, thermal power plants, motor garages for washing of cars, etc.

Table No: 5.10 description of sewerage system

Rohtak MC	Population 2013	No. of HHs	Total length of sewer (KM)	% area covered with sewer	% population covered with sewer	No. of sewer pumping station	No. of STPs
	484382	106752	508 Km.	70%	78%	31	6

Sources: PHED, 2017.

5.2.1 Existing Sewerage System

PHED is responsible for the management of the sewer system, collection, transportation, treatment and disposal of sewage.70% area of city is cover by sewerage network. Approximately 52 MLD sewage, is generated in the city and all this waste water along with sludge is collected in to main pumping station of STP's located at Singhpura Rohtk (10 MLD) Main Disposal Anaj Mandi Rohtak, Peer Bhodhi Gohana Road Rohtak. BOD at incoming of MPS is nearly 200-250 whereas at outlet it comes out to be 10 to 20 mg/ltr.

Sewerage system comprises of house to branch connection, branch sewer to truck sewer, truck sewer to outfall sewer and outfall to sewerage treatment plant. The main truck serer in the town is laid in early seventies. The entire sewer is gravitational maintaining self-cleaning velocity.

Treated water is disposed off into drain No.-8 Rohtak, where it is used for agriculture.

5.2.2 Waste Water from Industries and other Institutions:

Industrial areas generate effluents as well as solid waste. Smaller industrial units discharge polluting effluents, which may share the infrastructure by pooling for Common Effluent Treatment Plants (CETP) while larger industries may be required to set up their own Effluent Treatment facilities. It should be mandatory to segregate and recycle solid waste. The bio-degradable waste may be treated to generate electricity.

Thus, a zero waste policy may be adopted for all industrial areas. Any hazardous waste should be governed by the Hazardous Waste Management Rules. At the moment there is no hazardous waste management site in the Sub-Region. The location of these sites is governed by the hazardous waste management rules and selection of site location should

require an environmental clearance from the MoEF. Institutional waste is produced from institutions such as schools, hospitals, or prisons etc.

5.2.3 Existing status of sewerage system in 2011

Below table No. 5.11 details are given by MCR which shows that the 2011 population is 374292 and actual sewerage generation at 80% of water supply demand is 62 MLD which covered by the 78% sewer network. Through this coverage the 60% population having the individual toilet facility. For future 2031 population projections are given further in next chapter.

Table No: 5.11 Existing status of sewerage system in 2011

city	Population 2011	Actual Sewage Generation @ 80% of Water Demand (MLD)	Coverage of Sewer Network (%)	Coverage by individual toilets (%)
Rohtak	374292	62	78 %	60 %

Source: PHED, 2017.

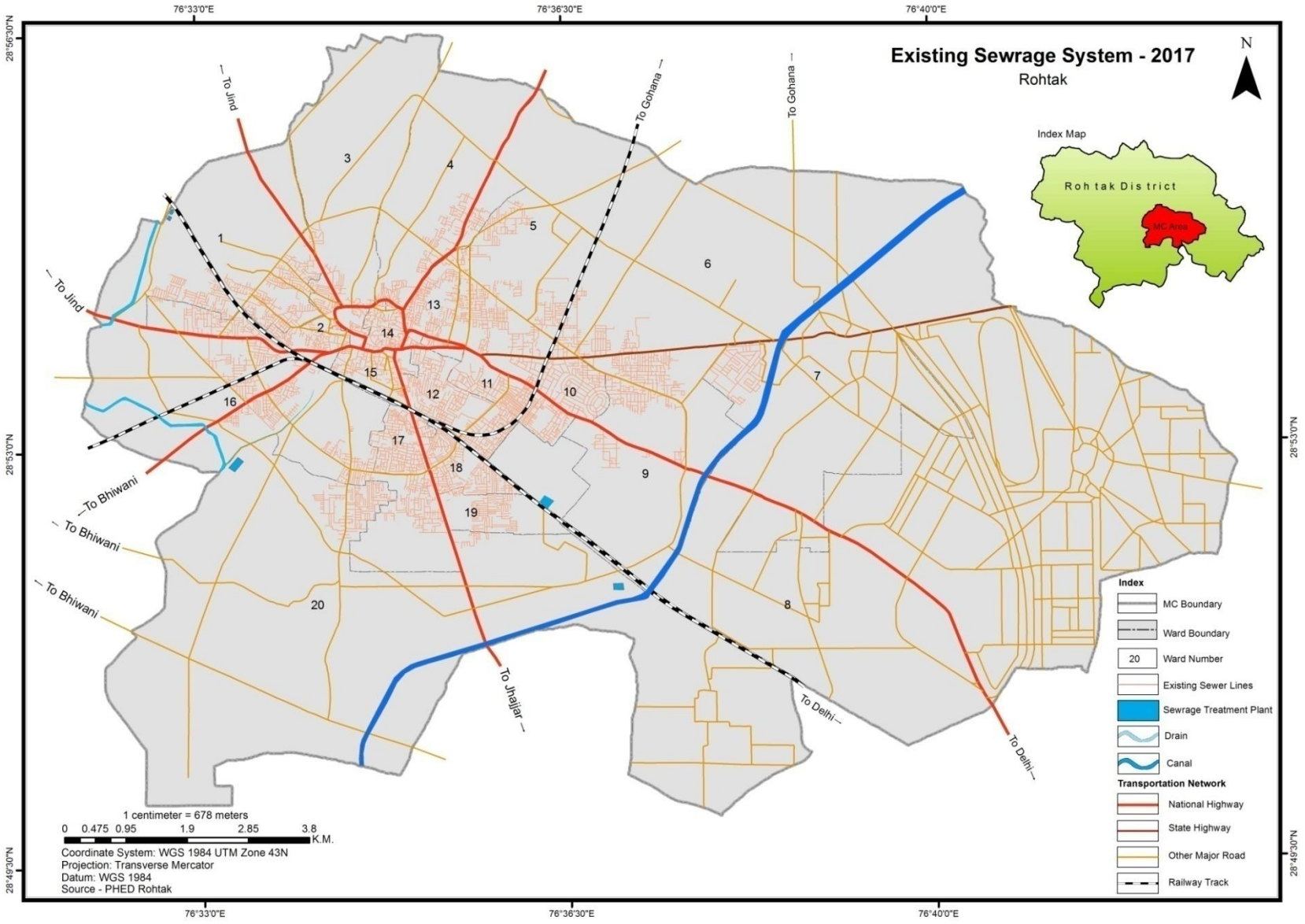


Figure No.: 5.2 Existing sewerage system Network,

Table 5.12: Present Status of Sewerage System under MC Rohtak

Ward No.	Population 2013	Length of sewerage (Km.)	Desired water supply demand as per standard (in MLD) 2013	Current Water supply (99 MLD)	Actual Sewage Generation @ 80% of Water Demand (MLD)	Population 2017	Water supply (in MLD)	Existing sewerage generation @80% of water supply as per standard	Projected sewerage generation @80% of water supply as per standard
1	25783	96	34.81	25.53	20.42	32245	35.5	28.4	25.54
2	25735	22	34.74	25.48	20.38	24563	31.9	25.5	19.45
3	25593	11	34.55	25.34	20.27	17607	18.5	14.8	13.95
4	26584	16	35.89	26.32	21.05	29175	29.5	23.6	23.11
5	26324	30	35.54	26.06	20.85	27152	32.6	26.1	21.50
6	25393	36	34.28	25.14	20.11	26956	32.9	26.3	21.35
7	22517	24	30.40	22.29	17.83	21160	25.6	20.5	16.76
8	22524	2	30.41	22.30	17.84	20704	26.9	21.5	16.40
9	25632	32	34.60	25.38	20.30	55937	81.1	64.9	44.30
10	23320	60	31.48	23.09	18.47	25367	36.5	29.2	20.09
11	26529	52	35.81	26.26	21.01	32039	42.3	33.8	25.38
12	22063	41	29.79	21.84	17.47	25549	25.5	20.4	20.24
13	24550	38	33.14	24.30	19.44	21115	30.0	24.0	16.72
14	22250	25	30.04	22.03	17.62	20539	20.9	16.8	16.27
15	24942	30	33.67	24.69	19.75	22763	23.9	19.1	18.03
16	22066	34	29.79	21.85	17.48	18204	20.0	16.0	14.42
17	24241	21	32.73	24.00	19.20	20770	23.9	19.1	16.45
18	22219	21	30.00	22.00	17.60	20138	22.2	17.7	15.95
19	22038	26	29.75	21.82	17.45	21645	23.8	19.0	17.14
20	24079	15	32.51	23.84	19.07	30642	30.9	24.8	24.27
total	484382	632	653.92	479.54	383.63	514269	605.6	484.4	407.30

Sources: MC, Rohtak & Public Health Department.

5.2.4 Ward Wise Distribution of sewerage

Table No.5.13: Ward wise coverage of Households

Ward No	Households	Households with Sewerage Network	Household with Septic Tank	Households without any outlets for toilets
1.	5185	3111	1348	726
2.	4833	2900	1257	677
3.	4731	2839	1230	662
4.	5604	3362	1457	785
5.	5150	4635	335	180
6.	6345	5711	412	222
7.	6053	4237	1180	636
8.	7188	5032	1402	755
9.	5344	5344	0	0
10.	5686	5686	0	0
11.	5414	5414	0	0
12.	4373	4373	0	0
13.	4921	4921	0	0
14.	5707	5707	0	0
15.	7565	7415	98	53
16.	5721	5149	372	200
17.	3610	3610	0	0
18.	4208	84	2680	1443
19.	3853	3833	13	7
20.	5261	3157	1368	737
Total	**106752**	**86519**	**13152**	**7082**

Sources: PHED, 2017.

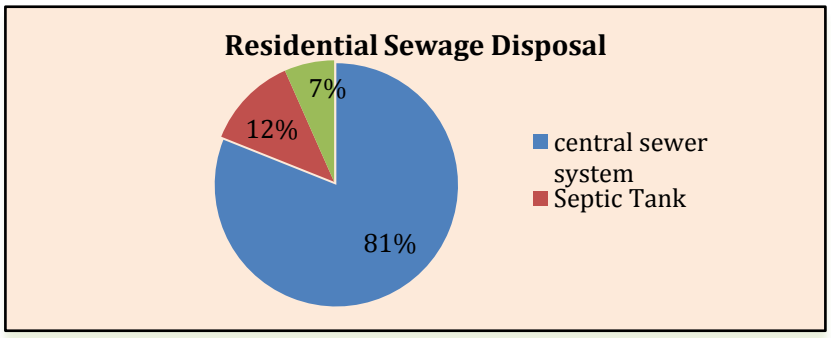
5.2.5 Sewage Collection

The result from land use survey reveals that 484382(2013) of residential population is being served by central sewer network, while 78% (13152 HHs) of population depends on septic tank for waste water disposal. The rest 22% population disposes their waste water in to open drain and 7082 HHs are not having any outlets to toilets.

5.2.6 Sewage disposal mechanism at residential level

Out of 20 wards 6 wards namely 9, 10, 11,12,13,14 are having 100% sewerage network coverage which is 30% of total ward. In residential sewage disposal 81% of households are connected to central sewer and 7% of households are neither connected to central sewer system as well as not having septic tank which are 7082 households.

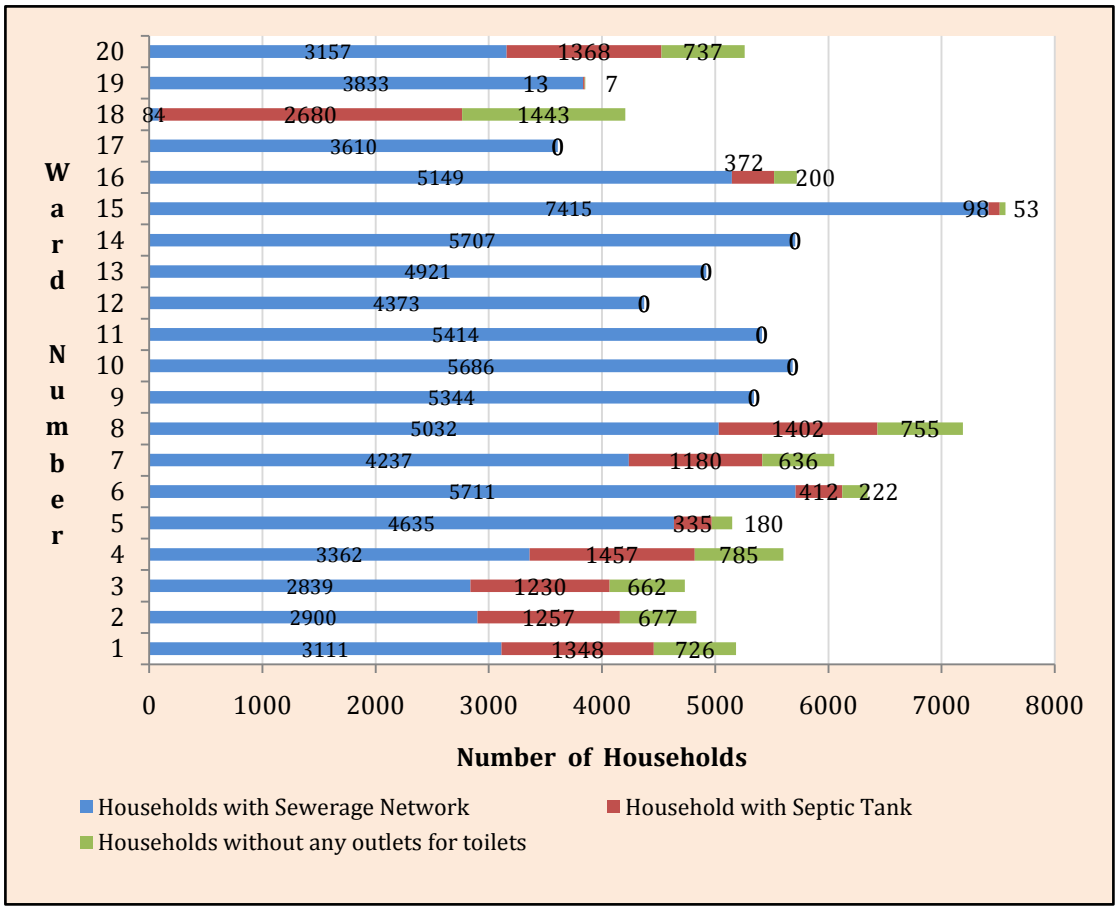
Chart No. 5.5 Residential Sewage Disposal



Sources: Primary Survey, 2017

5.2.7 Sewage disposal mechanisms ward wise

Chart No. 5.6 Sewage disposal mechanism ward-wise



Sources: PHED, 2016

5.2.8 Sewerage treatment Plant and disposal

The sewerage system was laid in 2013 for a population of about 484382 persons. The network led to disposal sites at 508 km. with a total area of 70% covered. The disposal works were based on septic tanks and sedimentation tanks which were cleaned and flushed during heavy rains. The system stood the test of time for over a hundred years and was designed as an appropriate system for plain areas with low line slopes and curves. In 2017, augmentation work was undertaken and new lines were laid and 4 sewage treatment plants were constructed and 2 are proposed. The treatment plants have a capacity of 10 - 40 MLD and the total length of the network is increased from 508 Km. The old sewerage network was tapped and connected to the new network. However, even after the construction of this new network, only about 62 MLD of actual sewerage generation is treated by the STPs. The reasons for this are attributed as follows:

I. There are many missing links where branch sewer lines of the old systems have not been connected to the new network.
II. Some of the grey-water drains may not be connected to the new network, reducing the quantity of sewage reaching the STPs.
III. Newly added municipal zones of (HUDA) have not been connected to the sewerage network.

Image No. 5.3 Waste water disposal in to drains

The treated effluents from STPs are disposed off in adjoining nallahs/drains. Sometimes this treated sewage is let into streams that are the sources of drinking water leading to incidents of jaundice and hepatitis outbreaks. The recycling and reuse of treated sewage from the STPs for non-potable purpose in the city is not feasible as the STPs are located

in the low line area and a separate distribution network will have to be constructed with pumping facilities.

Table no 5.14. Status of Existing STPs (Sewage Treatment Plants)

Location	Capacity of STPs (MLD)		Technology	Inflow in the STP (MLD)	Efficiency in %
	Operational	Under construction	USAB (unflow Anaerobic Sludge Blanket)		
Singh pura	10	73.5		9.2	100%
Singh pura	14				100%
At PGIMS	19.5				100%
Near Old Sugar Mill	40		Extended Aeration Process		100%
At Near Village Kanheli (HUDA)	10				
At peer Bhodh	14	Proposed			

Source: PHED, Rohtak 2017

- ✓ **Offsite treatment system**

  There are all the STPs having the offsite treatment system.

Image No. 5.4 Treated water disposal in Drain No. 15 / 8

5.2.9 Waste Water Disposal (Sewerage system) description:

Decentralized system:

Decentralized systems are small, individual or cluster type wastewater facilities to provide wastewater treatment services to residents. In India, more than 75% of wastewater is not addressed by centralized treatment facilities. The state of pollution of rivers and water bodies, big and small, shows that conventional, centralised approaches to wastewater management have generally failed to address the needs of communities for the collection

and disposal of domestic wastewater and faecal sludges. Rohtak MC follows the **decentralized processing system** with the capacity of 175 MT. A decentralized treatment plant provides treatment facilities close to the areas served and it is ideally offer the opportunity of wastewater recycling and reuse thus reducing water demand substantially. As septic tank systems already exist in these areas, the required investment is little more than improving the existing technology by introducing improved forms of treatment prior to disposal. The main motive of the survey was to seek out the area which can be connected to the main line or existing STP due to the area and to install **Decentralized Waste Water Treatment System (DEWATS)** along with a **Public Toilet Unit** on Pilot basis.

5.2.10: An Introduction to Decentralized Wastewater Treatment System (DEWATS):

The aim of these systems is to manage wastewater both as a resource as well as a pollutant. There is a growing body of science and practice which demonstrates the opportunities for implementing wastewater management systems, based on a decentralized approach that may lead to wastewater re-use and resource recovery as well as improvements in local environmental health conditions. These systems are designed to limit pollution by enhancing the assimilative and regenerative capacities of the natural system. Designing and managing these systems can be done at a fraction of the cost of conventional, centralized traditional sewerage system. It is widely recognized today that for areas that are not connected to centralized sewerage systems, it is more viable to look at alternative and decentralized approaches. DEWATS is an approach rather than a technical hardware package DEWATS is led by some **principles**, which are the guiding frame for designing: These are **Decentralization**, **Simplification** &**Conservation/Recycling.** The details description of decentralization is given below-

- Planning
  - ✓ Wastewater is collected from a cluster
  - ✓ Wastewater treated and disposed / reused near the source.
- Design
  - ✓ Design is for small area and simple.
  - ✓ Incremental modular expansion of system with small investment

- Construction
  - ✓ Initial investment flexible.
  - ✓ Total investment 50%
- O & M
  - ✓ System failure affect only cluster
  - ✓ Low operation and maintenance cost
  - ✓ Doesn't require skilled manpower

DEWATS: In the decentralized wastewater treatment systems (DEWATS), both aerobic and anaerobic techniques are applied. The anaerobic modules comprise of settlers, baffle reactors and anaerobic filters. The aerobic modules have horizontal planted gravel filters and polishing ponds. DEWATS is based on different natural treatment techniques, put together in different combinations according to need. It is used for recycling both "grey" and "black" domestic wastewater. DEWATS systems include:

- ✓ Primary treatment, which includes pre-treatment and sedimentation in settlement tank or septic tank;
- ✓ Secondary anaerobic treatment in baffled reactors;
- ✓ Tertiary aerobic/anaerobic treatment in reed bed system; and
- ✓ Aerobic treatment in ponds

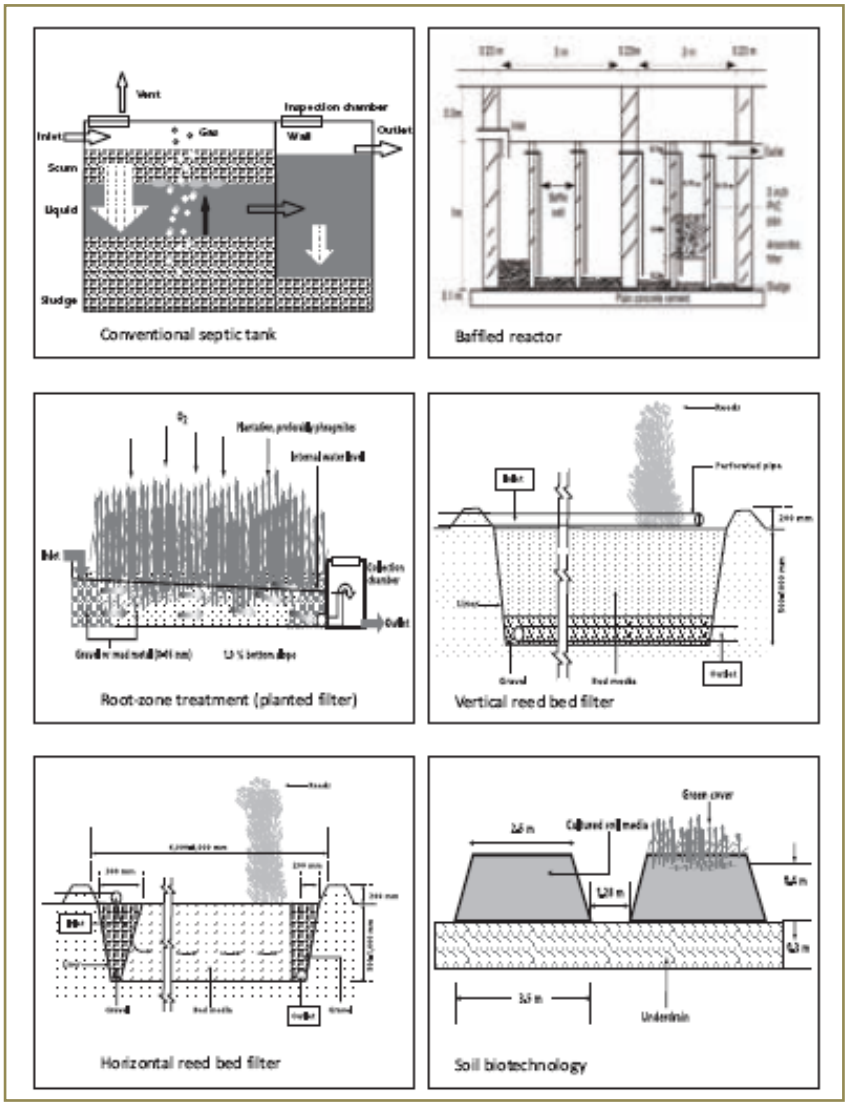
Waste stabilization ponds include anaerobic, aerobic and facultative ponds that combine aerobic and anaerobic processes. In soil biotechnology, soil is used as a media for treating the wastewater and is a synthesis process which harnesses the energy, carbon and other elements of the waste and converts them to precious "bioenergy" products like vegetation, energy rich soil, complete bio-fertilizer and water. Bioremediation uses methods that utilize the naturally occurring physical principals combined with biological activities of microorganisms.

The key features of DEWATS are:

- ✓ Can treat a wide range of wastewater types
- ✓ Does not need energy
- ✓ Low-cost and minimal maintenance
- ✓ Can treat wastewater flows from 1-1000 m^3 per day

- ✓ Tolerant to inflow fluctuation
- ✓ Wastewater is turned into a resource for irrigation or reuse of water
- ✓ Fulfils discharge standards and environmental laws
- ✓ Does not require deep sewer line construction
- ✓ Reliable and sustainable
- ✓ Can be integrated into the landscape
- ✓ Involves local communities in the management

Figure No.: 5.3 Decentralized Waste water treatment system

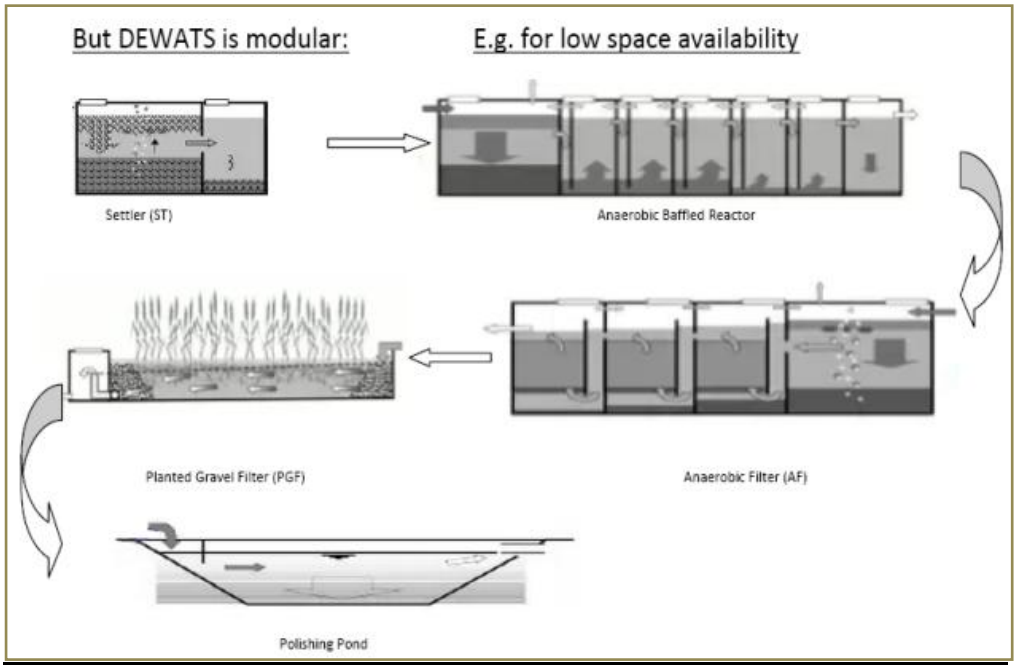


Sources: UN Habitat Good Practices of Eco-efficient Water Infrastructure

DEWATS Combinations

There are different combinations for DEWATS implementation

Figure No.: 5.4 DEWATS implementation



Sources: UN Habitat Good Practices of Eco-efficient Water Infrastructure

In the selected area where there is no Central sewer system, a particular area was selected for the DEWATS Pilot implementation for which a treatment site was finalized. Public toilets are also connected with this treatment system. Water supply in the colony is through MC & PHED and every household is having individual toilets and individual water connection, water supply. In the total built-up houses the 13152 are having their individual septic tanks. And 7082 HHs are without outlets, the grey water is flowing into the open & covered drains. It has also been observed that there is no system for empting the septic tanks and the people use the old method of manual empting of the tanks especially during the rainy season which adds to pollution of the environment and water bodies/resources in the downstream. (Sources: PHED, Rohtak 2017)

3.5.6 Evaluation of options of waste water disposal

All the waste water/storm water is disposed off into drain No. 15. The newly added zones comprise peri-urban areas where there is a good potential to use treated wastewater for

agricultural use and can thus improve agricultural productivity. (Sources: PHED, Rohtak 2017)

5.2.11 Sewerage Indicators

Table No.: 5.15 Sewerage Benchmark

Sr. No.	Indicators	MOUD Benchmark	Current (2016-17)	Targets (2017-18)
1	Coverage of toilets (individual or community)	100%	100%	100%
2	Coverage of sewerage network services	100%	100%	100%
3	Efficiency of collection of sewerage	100%	97%	98%
4	Adequacy in sewage treatment capacity	100%	98%	98%
5	Quality of Sewage treatment	100%	93%	95%
6	Extent of reuse and recycling of treated sewage	20%	0%	10%
7	Efficiency in redressal of customer complaints	80%	100%	100%
8	Extent of cost recovery in sewage management	100%	38%	60%
9	Efficiency in collection of sewage charges	90%	86%	90%

Source: MC Rohtak, 2017

5.2.12 Ongoing and Sanctioned Projects for Sewerage

Table No: 5.16 Sanctioned Project Descriptions

Sr. No	Name of Project	Scheme No.	Cost in Rs. Crore
1	Rohtak : Construction of Additional Sewerage Treatment Plant of 14 MLD capacity at Singhpura and laying of truck sewer	UNDER STATE PLAN under Sererage 4215-02-101-94-51-38-P-N-V	14.90
2	Rohtak: Construction of Additional STP of 14 MLD at STP at Peer Bhodi	UNDER STATE PLAN under Sererage 4215-02-101-94-51-38-P-N-V	13.70
3	Laying of Sewer line in various colonies/ Balance streets	UNDER STATE PLAN under Sererage 4215-02-101-94-51-38-P-N-V	9.18
4	Rohtak: Supplementary estimated for pending liabilities of contractor for master sewerage scheme 40 MLD at Old Suger Mill Rohtak	UNDER STATE PLAN under Sererage 4215-02-101-94-51-38-P-N-V	17.95
5	Rohtak : Construction of 19.5 MLD at PGIMS Rohtak	UNDER STATE PLAN under Sererage 4215-02-101-94-51-38-P-N-V	27.32

Source: PHED Department, Rohtak

5.2.13 Key Issues:

- Overflow of drainage in different parts of city
- There is no proper sewerage collection system in the ULB.
- Villages are not connected with sewer line
- Septic tanks cause of groundwater pollution
- There is no awareness campaign run by MCR.

5.3. Solid Waste Management

Municipal Corporation is responsible for the collection, transportation and disposal of solid waste in the city. The total bulk of solid waste generated per day in Rohtak is estimated to be 150 MT. Per capita waster is generated approximately 0.35 which is more than CPHEEO norms. Waste is collected on daily basis from households. Waste is transported for disposal by trucks tractors and other four-wheelers. Sites are located in different parts of city for collection of waste. 852 Safai Karamchari are working to manage solid waste system in city. Waste from different parts of the city is transported to landfill site located about 15 km away from Rohtak at Bhiwani road. Area of Site is approximately 25 acre.

It is observed that no separate provision of waste collection from street vendors. Waste is choked nallas in city. It is observed that works are not using any safety features to preserve health. Collections are opened in city and creating unhygienic conditions.
According to MC Rohtak Survey Report, 2017, waste generation in ULB is 115 (MT). Per capita waste generation is 0.22 (kg) with total number of households is 83968.

5.3.1 Waste Generator Sources under MCR Jurisdiction with their characteristics:

MSW collection is an important aspect in maintaining public health in cities around the world. The amount of MSW collected can be separated or mixed, depending on local regulations of municipality. Solid waste can be classified into different types depending on their source: Household waste is generally classified as municipal waste, Industrial, medical or other different categories, which are describe below in table No 5.17;

Table No. 5.17 Existing Waste Generation

Sector Typology	2017 (MT)
Residential waste	9200
Market waste	10-15
Industrial waste	1-2
Hotels & Restaurants waste	4 - 5
Medical waste	5 - 6
Institutional waste	0.5 - 1

Sources: Primary Survey, 2016.

Residential Waste:

The residential and commercial areas are major sources of bulk generation of solid waste. Based on the average per capita generation of municipal solid waste, it can be estimated that the waste generation from the households is about 90-100 MT. It is including kitchen waste, news paper, liquid waste, e-waste etc.

Market waste:

Major commercial area of Rohtak is Qilla Road, D-Park, Bus Stand, Railway Station, local markets, street vendors etc. , it can be estimated that the waste generation from the households is about 10-15 MT. There are daily markets found in Rohtak.

Industrial Waste:

Rohtak has major industries within MC boundary. Waste is generated from industries like 1-2 MT.

Hotels & Restaurants:

There are around 125-150 hotels and restaurants in Rohtak city. The waste generation from these hotels and restaurants is observed to be 4-5 MT. No separation of dry and wet waste separately.

Medical Waste:

Rohtak City is medical hub of Haryana state. There is around 200 hospitals and Nursing homes with PGIMR. Total medical waste is approximately 5-6 MT. No separation of biomedical waste.

Institutional waste:

Rohtak Is one of the important educational centre in Haryana with PGIMR and MDU. The city has approximately 150-180 schools and colleges. The activities of these institutions generally do not contribute much to the solid waste of the city. A quality of about 0.5 -1 MT tones generated as institutional waste

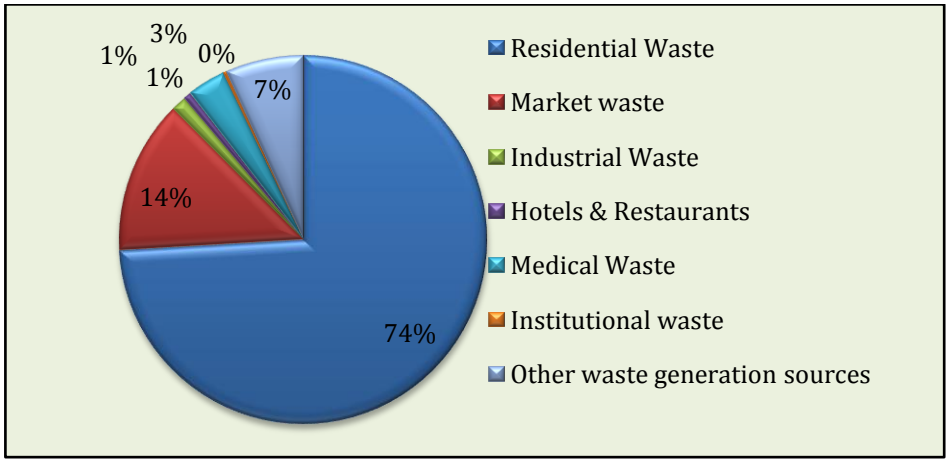
Slums:

There are 26 slums and 7 villages in city. Mostly slums have Pucca structures and no haphazard distribution of slums. Villages located within outer fringe area of city. No separate waste in slums so we are considering household waste of slums waste.

Other waste generation sources:

Dairy within city boundary is cause of hazardous conditions in city. Construction waste has also presence in city from different construction activities private as well as public. There are Cinema house, Function halls, Religious Places, Parks and gardens also giving contributing in solid waste at city level. Approximately 2-3 MT waste is generated from these sources. Below pie chart shows the sector-wise waste generation in percentage.

Chart No.5.7: Waste generator sources



Sources: Primary Survey, 2016

5.3.2 Collection of waste

5.3.2.1 Primary Collection System: Door to Door Collection (D2D)

MCR have agreement with private company for D2D collection. Labor collecting waste through Push carts, (Tricycle) Rickshaw, Auto Tipper from all 20 wards. Then waste is disposed on secondary points. Timing of waste collection is 07.00 am to 05.00 pm.

Table No.5.18 Gap Analysis of infrastructure – Door to Door Garbage Collection

Sr. No.	Functional Equipment's /Vehicles	Capacity	Requirement as per Norms	Usable Existing equipment's/vehicles	Gap	Indicative Cost (Rs.)	Fund Requirement
1	Segregation Bins	10-12 liters (2 for each HH)	167936	0	167936	80-100 Per Bin	16793600
2	Push Cart	1 for 150-200 HH (avg. 175)	480	0	480	7,000	3358720
3	Pedal Tri cycle	1 for 200-300 HH	336	150	186	18,000	3348000
4	Auto Tipper	1 for 1000-1500 HH	68	40	28	550,000	15400000

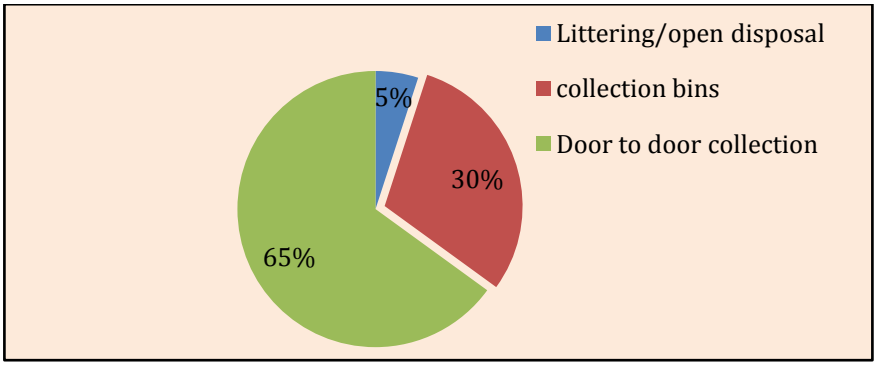
Source: MC Rohtak, 2017

There are 40 numbers of vehicles having partitions as well as GPS tracking system. Through the above analysis and the primary field observation shows that there is a good collection efficiency which is about 98-99 % and waste generated per day (250 MT) is being send to the dumping site while rest of no waste remain unattended. In 20 wards for equipments involved in D2D solid waste collection are used mechanical vehicles with partition.ULB will decide the figure of push cards, tricycle and auto tipper as per no. of ward by ward which is described in above table no. 03.

5.3.2.2 Secondary Waste Collection

The collection and transportation of waste is practiced on all the days of the year, waste stored in open spaces is either loaded manually or with the help of loader. The waste is dumped at one of the approximately 30 collection points.

Chart No. 5.8 % distribution of waste disposal practice in city- Littering/open disposal, masonry bin and Door to door collection (DTDC)



Sources: Primary survey, 2017

5.3.3 Storage of waste

Storage of waste at the source is the first important step of solid waste management. It is a day-to-day basis work. The waste should normally be stored at the source of waste generation till collected for disposal. Storage of waste is not proper and cause of drainage blocking on many places in city.

Image No. 5.5 Condition of Solid waste littering over the roads

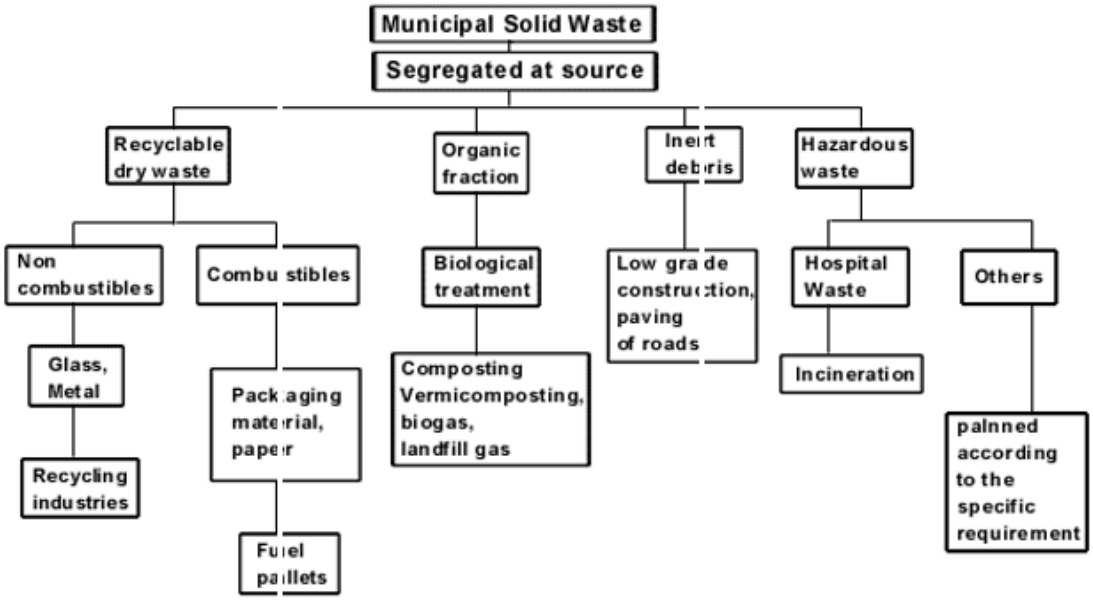
Source segregation of recyclable and biodegradable will not only provide efficient way resource recovery but will also substantially reduce the pressure and pollution at landfill sites. It is observed that segregation at source not present at city level.

5.3.4 Segregation of solid waste

At present there is no segregation at source, below through flow diagram shows the ideal condition of MSW segregation. In Swachh Bharat Abhiyan the GOI give instruction to UMBs put segregate dustbins for liquid and solid waste in Blue and green color for citizens awareness. Below image show the Rohtak City public park where they put these dustbins:

Image No. 5.6 Segregation of MSW (liquid and solid)

Figure No.5.5: Solid waste processing principal



Sources: Action Plan for Development of Integrated Solid Waste Management Project (Haryana)

5.3.5 Gap analysis of infrastructure -

The number of bins suggested below for placing along main road need to be assessed based on population density in the area and space. This is not applicable to these ULBs who have achieved high level of collection efficiency by putting more vehicles and have streamlined waste collection mechanism and have removed bins from streets.

Table No.: 5.19 Analysis of Functional Equipment

Sr. No.	Functional Equipment's/No. Vehicles	Requirement as per Norms	Usable Existing equipment's/vehicles	Gap	Indicative Cost (Rs.)	Fund Requirement *
1	Bins – 1.1 cubic meter (1 or more bin at every 1000 mt on main road depending on assessed waste collection varying from locality to locality)	100	25	75	9000	675000
2	Bins – 2.5/3 cubic meter (1 bin for operational areas of 1000 HH)	83	50	33	36000	1188000
3	Bins 4.5 cubic meter (1 bin at midpoint of 2 operational areas 1000 HH each)				58000	
4	Light commercial vehicle>700 kg capacity (1 for 1500-2000 HH)				1600000	
5	Refuse Compactors	4		4	2400000	9600000
6	Backhoe loader (JCB)	4	2	2	2800000	5600000
7	GPS (1 per vehicle)	76	42	34	8000	272000

Sources: MC, Rohtak 2017.

Image No. 5.7 Situation of Community Bins at MC Rohtak

*For procurement of above functional equipments projected timeline is March, 2018 with estimated cost is 5.62 Cr.

5.3.6 Transportation of waste / Waste lifting

Dumpers, Tractors, Tata Acres, and small Tippers transport (lifted) the garbage from storage point to dumping/ landfill site.

- Treatment, Disposal and Reuse of waste
- No treatment and segregation system of waste till now.
- Waste is disposed indirectly at landfill site.
- Reuse system of waste.

5.3.7 Existing location of dumping site and Sanitary land-fill site in the Rohtak city:

Below map shows the location of SWM plant with dumping site and landfill site.

Sanitary landfill: Landfill development strategy

Deposition of waste in conical heaps over the landfill site and spreading these heaps using a tracked bulldozer, is a low cost and easy option. However this practice will lead to highly unacceptable environmental conditions. The lower levels of waste are permanently saturated and free flow of water into and out of the dumped waste will lead to the migration of leachate into the surrounding surface and sub-surface water and there by contaminating the ground water aquifers. The other major issue of simple deposition waste will be the formation of anaerobic conditions at the site as the waste deposition

thickness increases, giving rise to the generation of landfill gas and thereby creating serious safety concerns in the immediate project influence area. Considering these aspects, the landfill development strategy for GMADA (Greater Mohali Area Development Authority) cluster is formulated, to satisfy the regulatory requirements of MoEF and the guidelines of CPHEEO (Central Public Health and Environmental Engineering Organisation), with the following objectives.

- Environmental Protection and protection from the flooding
- Physical Acceptability
- Technical Standards of Site Engineering Required
- Operational and Management Standards Desirable
- Appropriateness and Sustainability of the Method
- Volumetric Capacity of the Site
- Longevity of the Method and
- Cost Effectiveness of the Recommended Measures

Sections below discuss various measures recommended, for developing the scientific sanitary land fill to fulfill the above objectives.

Specifications of landfill development, operation and management

Development of landfill site should be subjected to rigorous planning. Key elements in developing a common scientific landfill site for Sonepat cluster will comprise,

a) Organizing the waste/ processing rejects and inert transportation practices

b) Detailed plans outlining the site development activities and

c) Detailed designs of all the engineering works

d) The overall control on the development and operation of landfill site will be the requirement to

adopt a cellular approach to land filling. The landfill development activities will comprise

- Site clearance
- Sub-division of site into major operational phases
- Progressive excavation for landfill earthworks
- Ordered development of operational phases in working land filling cells
- Advance preparation of the lining system on the landfill base

- Sequential infilling of land filling cells and operational phases and
- Early and timely capping of land filled cells

After that here we give recommended measures of containment engineering under that there are several points to be considered like: Leachate generation and treatment, Landfill gas generation, control and management, Storm water control and management and Buffer zones. In last we conduct assessment of landfill volume and life with Containment of potential pollutants.

Image No. 5.8 Landfill site in MC Rohtak

The detailed descriptions of MSW (Municipal Solid Waste) Management Plant are given below: Integrated SWM project for Rohtak cluster comprises the ULBs like Bahadurgarh, Beri, Gohana, Jhajjar, Julana, Kalanaur, Kharkhoda, Meham and rohtak itself. An integrated SWM project for Rohtak Municipal Corporation comprising 175 TPD MSW processing plant and a sanitary landfill is under implementation.

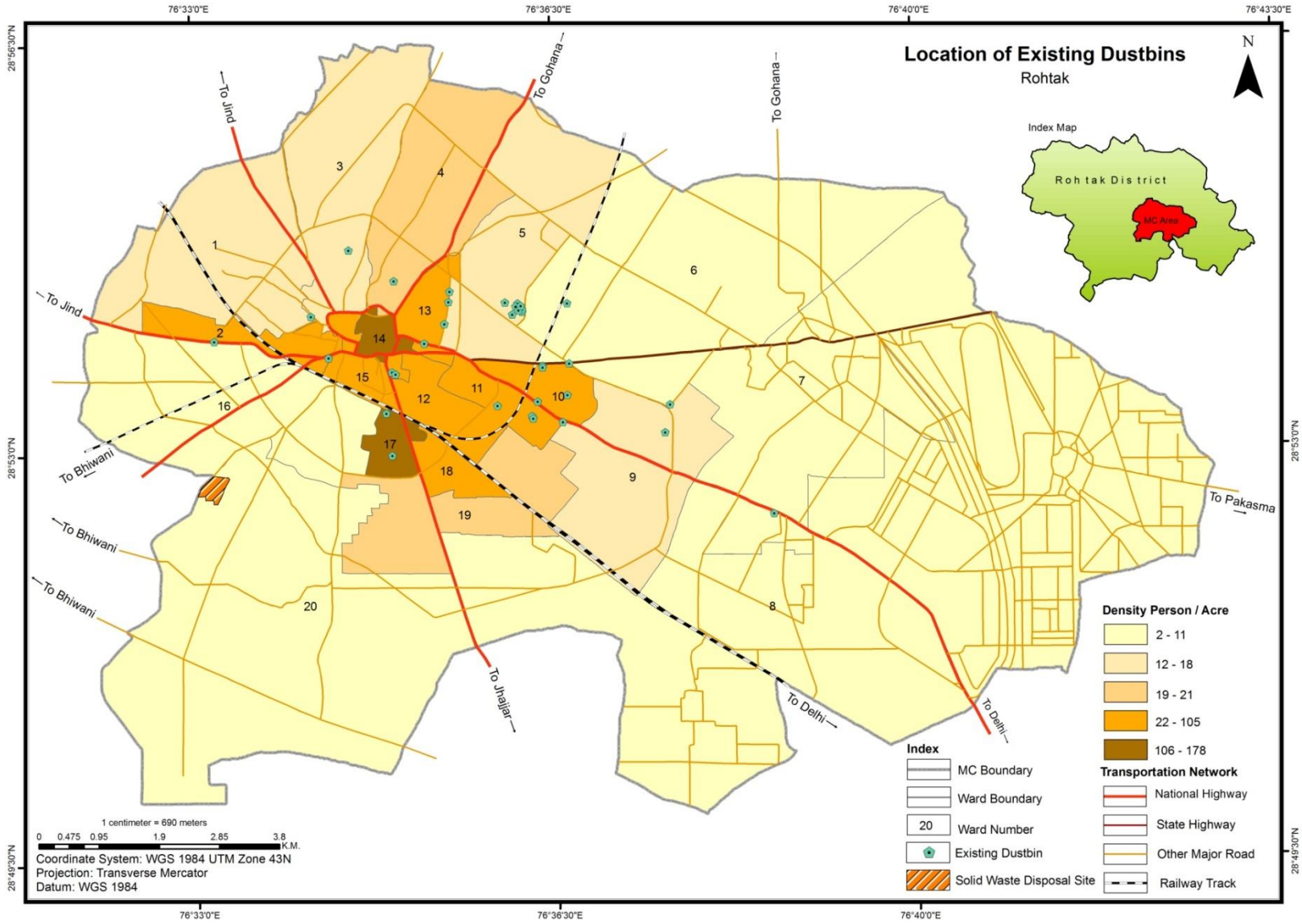
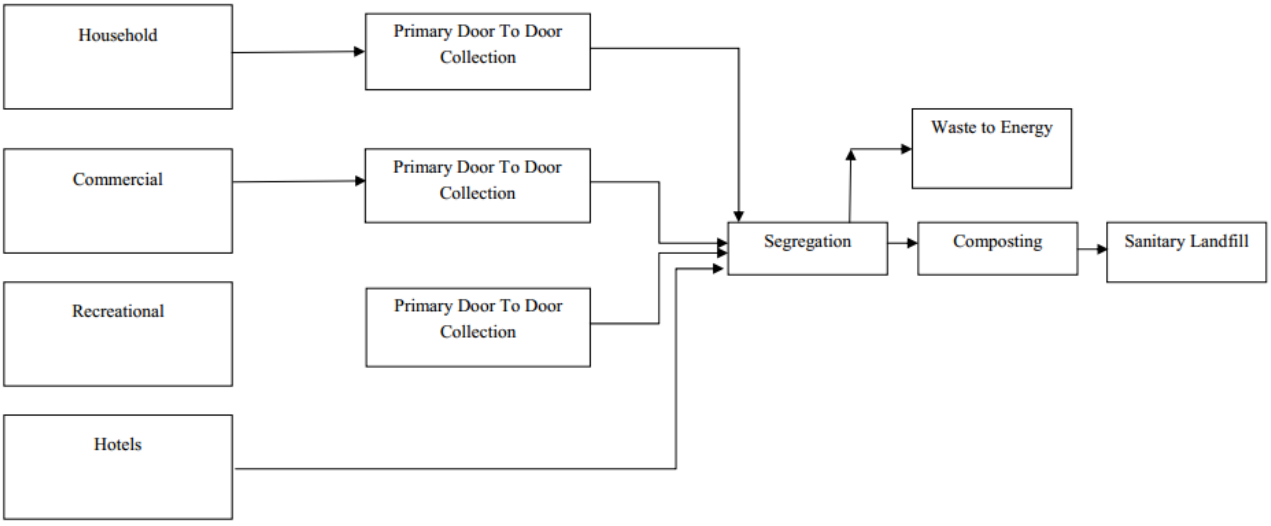


Figure No.: 5.6 Existing locations of Bins, dumping site & landfill site

Technologies used in SWM Plant are composting and waste to energy and reuse the small aprticals in formation of brick blocks. The activities planned in the proposed project include collection, transportation, treatment & disposal of municipal solid waste in compliance to the MSW Handling Rules (2016). The basic concept for the solid waste management of the Rohtak Cluster project site is presented in the form of the flow chart in shown in Figure No.: 5.7

Figure No. 5.7 Methodology for Proposed Waste Collection



Sources: Integrated municipal solid waste management project (Action Plan)

Source segregation is already adopted in some wards in all the ULBs. This may be replicated across all the wards of all the ULBs in the cluster. Waste should be segregated by waste generators into two fractions-wet fraction (green container) and dry fraction (blue container). The list of different waste bins is provided below:

Table No.: 5.20 Waste bins for source segregation of waste

Wet Waste (Green Bin)	Dry Waste (Blue bin)			
	With further sub-segregation			
Food wastes of all kinds, cooked and uncooked, including eggshells and bones, flower and fruit wastes including juice peels and house plant wastes, soiled tissues, food wrappers, paper towels	Paper, cardboard and cartons	Containers and packaging of all kinds, excluding those containing hazardous material, compound packaging of all kind	Rags, rubber, wood, discarded clothing, furniture	Metals, glass (all kinds), Inert, house sweeping,

Sources: Integrated municipal solid waste management project (Action Plan)

Image No. 5.9 SWM Plant in MC Rohtak

This project concept has been developed keeping into considerations the following design criteria, for the design period of 20 years.

- ✓ Compliance to the MSW handling rules (2016) for waste collection, transportation,treatment & disposal;
- ✓ Providing Door to door collection of waste from source in segregated manner with the introduction of 2-bin system (for green waste and dry waste);
- ✓ Introduction of an efficient secondary waste collection & transportation system.
- ✓ Adapting the 4R's principal of waste minimization through reduction, reuse, recycle and recover. Hence, proposed a mechanism for recovery of recyclables at the Processing facility and waste reuse through composting of food waste and other green waste;
- ✓ Final disposal of only rejects/Inerts at the scientifically developed sanitary landfill with an attempt to dispose not more than 25% of the generated waste quantity at the landfill.

The municipal waste received at the site is processed at waste management facility by segregating the waste into recyclable and composting material. After separation of recyclables the compostable material will be diverted to compost plant. The plant is designed to process approx. 175 TPD municipal solid waste (MSW) on per day basis and is able to process different kind of waste types. MSW processing unit would comprise of the following:

- Bio methanation plant
- Composting facility
- RDF processing facility
- RDF to power

The elements of composting facility which has been mentioned as here: fFor that process firstly we took Coarse segregation system, then Curing system, Refinement system, Packing and storage system and Leachate, litter and odour management system. In secound stage of Process monitoring & control systems – first is Yard management, Segregation plant, Removal of recyclables & processing rejects. Another stage of Design considerations of Rohtak compost plant and last stage is Compost process and material flow.

5.3.8 Gap Analysis of infrastructure – Processing and Disposal

Quality of solid waste treated currently by municipal is 115 MT per day. Type of waste treatment technology used/ available expect crude dumping & proposed as per DPR/Swachh City Plan/ Any other assessment.

Table No. 5.21 Technology used for disposal

Sr.No.	Technology	Used/Available	Proposed
1	Composting	Available	Waste to Energy also
2	Biomethanation		
3	C&D Waste Processing		
4	Mass burning based WTF processing		
5	RDF and/or WTF processing	Available	
6	Only RDF	Available	
7	Inert landfilled in SLF	Available	
8	CRUDE Dumping		

Sources: MC Rohtak, 2017

Image No. 5.10 Composting from SWM Plant

According to MC Rohtak funds requirement for treatment & Disposal is 1.92 Cr., but there is no fund availability.

5.3.9 Gap Analysis of Manpower:

Table No 5.22. Manpower Description

Sr.No.	Category / Norms	Existing Manpower	Requirement as per Norms	Gap
1	Waste collector (1 for every 1250 person)	413	410	0
2	Sweeper (1 for every 10,000 persons)	789	51	0
3	Driver (1 for vehicle)	42		0
4	Helper (1 for vehicle)	42		0
5	Sanitary Inspector (1 for every 50,000 person)	8	10	2

Sources: MC Rohtak, 2017

Timeline to fill up this gap by MC Rohtak is March, 2018.

5.3.10 Standardized Service Level Indicators

Table: 5.23 Standardized Service Level indicators of Solid Waste Management

Sr. No.	Indicator	Benchmark	Existing(2016-17)	Targets (2017-18)
1	Household level coverage of SWM Services	100 %	93%	100%
2	Efficiency of Collection of municipal solid Waste	100 %	98%	100%
3	Extent of Segregation of municipal Solid waste	100 %	35%	100%
4	Extent of municipal solid waste recovered	80 %	75%	95%
5	Extent of Scientific Disposal of municipal Solid waste	100 %	87%	100%
6	Efficiency of Transportation of waste	100 %	100	
7	Efficiency in redressal of customers complaints within service level parameters	80 %	98%	100%
8	Extent of cost recovery in SWM services	100% for O&M +20% For Capital Cost	25%	90%
9	Efficiency in collection SWM charges	90 %	25%	50%

Sources: MC, Rohtak 2017.

5.3.11 Estimated and projected waste generation trend:

Table No.: 5.24 Projection of Solid Waste Generation

Sr.No.	Particular		2001	2011	2013	2017	2021
1	Population		294577	374292	484382	514269	541522
2	Per capita waste generated(kg)	As per standard (.45kg)	132559.65	168431.4	217971.9	230611.05	344071.35
		Existing as per MC (.22kg)	64806.94	8230344.24	106564.04	112743.18	168212.66
3	Existing Quantity of MSW Generation in Ton +30% extra(Kg)		84249.02	107047.5	138533.3	146566.1	218676.5

Sources: MC Rohtak, 2017

5.3.12 Financial Expenditure (current) on SWM per annum (Rs. In Cr.):

Table No. 5.25 Current Expenditure on SWM

Capital	O&M	Salary
19.88 Cr.	1.92 Cr	-

Sources: MC, Rohtak 2017

5.3.13 Source of Funding (Rs in Cr.)

Table No. 5.26 Source of Funding

Source	Property tax	GOI	State/others
Capital		19.88	
O&M	1.92		
Salary			

Sources: MC Rohtak, 2017

5.3.14 Strategies and Proposal for Solid Waste Management in Rohtak City

Before reach to proposals and solution of SWM, It is necessary to review Solid Waste Rules, 2016 below.

Salient features solid waste management rules, 2016

The Government has revamped the Municipal Solid Wastes (Management and Handling) Rules 2000 and notified the new Solid Waste Management Rules, 2016 on April 8, 2016. The salient features of the SWM Rules, 2016 are as under;

1. Areas Cover: These rules are applicable to;

(i) Every urban local body (Mega city to Panchayat level),

(ii) Outgrowths in urban agglomerations,

(iii) Census towns as declared by the Registrar General and Census Commissioner of India,

(iv) notified areas,

(v) Notified industrial townships,

(vi) Areas under the control of Indian Railways,

(vii) Airports/ airbases,

(viii) Ports and harbours,

(ix) Defence establishments,

(x) Special economic zones,

(xi) State and Central government organizations,

(xii) Places of pilgrims,

(xiii) Religious and historical importance as may be notified by respective State government from time to time and

(xiv) Every domestic, institutional, commercial and any other non residential solid waste generator situated in the areas.

2. The Waste Generators

• Every household

• Event organizers

• Street Vendors

• RWAs & Market Associations

• Gated Community having more than area 5000 sq.m.

• Hotels & restaurants, etc.

3. Duties of Waste generators and Authorities:

(i) Every Waste Generator shall segregate waste and store separately and hand over to Municipal workers or authorized waste pickers.

(ii) Ministry of Environment, Forest & Climate Change shall constitute 'Central Monitoring Committee' to monitor and review every year.

(iii) MoUD shall frame National Policy on SWM and coordinate with States/UTs, provide technical guidelines, financial support, training to local bodies, etc.

(iv) Departments of Fertilizers & Chemicals shall assist in market development for city compost and make available to companies (3/4 bags compost: 6/7 bags Fertilizers).

(v) Ministry of Agriculture shall make flexible Fertilizer Control Order, promote utilization of compost, testing facility for compost and issue guidelines.

(vi) Ministry of Power shall fix tariff of power generation from W-T-E project and ensure distribution through companies.

(vii) MNRE shall facilitate infrastructure for waste-to-Energy plants and provide subsidy.

(viii) Secy- Incharge, UD (sate/UT) shall prepare State Policy/Strategy, adopt 3-Rs, coordinate for state planning, identification of common/regional landfills, notify guidelines of buffer zones.

(ix) District Collector/Magistrate shall facilitate identification of landfill site, quarterly review the performance of local bodies.

(x) Secretary, Panchayats: same as Secy. UD at Panchayat level.

(xi) CPCB shall coordinate with SPCBs/PCCs for monitoring and Annual Reports, formulation of standards, review new technologies, prepare guidelines for buffer zones restricting from residential, commercial and construction activities areas; and inter-state movement of waste.

(xii) Local Authority/Panchayats shall prepare SWM plan with time line and its implementation, segregate, adopt 3-Rs, material recovery, processing/ disposal of Waste, user fee and levy spot fine.

(xiii) SPCBs/PCCs shall monitor, issue authorization and regulate.

(xiv) Manufacturers/Brand owners shall facilitate collect back wastes of their products and provide pouch for packaging sanitary wastes, etc.

(xv) Industry (cement, power plant, etc.) shall use RDF within 100 km.

(xvi) Operator of facilities shall follow guidelines/standards

4. Criteria for Hilly Region**:** Avoid landfill, make waste transfer stations, strict action for littering and construct landfill at plain areas.

5. Waste to Energy plant for waste with 1500 Kcal/kg and above for co-incineration in cement and power plants.

6. Time Frame for Implementation of SWM Rules:

(a) Landfill Identification: 1 year

(b) Procurement of waste processing facilities: 2 years

(c) Ensure segregation of waste: 2 years

(d) Cities up to 1 million population: 2 Years

(e) Million plus cities: 3 years

(f) Setting up sanitary landfills: 3 years

(g) Bioremediation/capping of old landfills: 5 years

7. Review of implementation of rules at Various levels;

(a) MoEF&CC, Central Monitoring Committee : Every year

(b) District Collector review performance of Local authorities : Quarterly

(c) SPCBs/PCCs review implementation of Rules with DMA : half yearly

(d) Secretary Incharge, UD- State level Advisory Committee : half yearly

5.3.15 Doorstep for Action Plan in Haryana for SWM

Action Plan on Swachh Bharat Mission for the year 2014-15 and five years upto 2019

(i) Plan for period from 1st January to 31st January, 2015:

• ULB's staff shall be motivated to follow cleanliness in the office premises.

• ULBs sanitation staff shall be motivated to follow cleanliness in the city areas.

• Administering and public shall be pledged not to litter on road but carry and put at waste collection point and not to spit indiscriminate

• Nodal officer in all the ULBs shall be nominated for monitoring cleanliness related activities in the office and report to officers in case of deficiency

• Office premises of the ULBs inside and outside the rooms shall be cleaned.

• 10 eminent personalities from field of sports, arts & culture, civil services, defence services, social services, entertainment and any other field to monitor the "Swachh Haryana and Swachh Bharat Abhiyan" shall be identified.

• Main city roads, streets alongwith drains, open spaces and parks shall be cleaned.

• Main drains of city shall be cleaned.

• Heaps of the solid waste in main bazaars of the city shall be cleaned and disposed off on the designated places.

• Public toilets shall be cleaned.

(ii) Plan for period from 1st February to 28th February, 2015:

i. Massive public awareness campaign on cleanliness shall be taken with the help of NGOs, RWAs School Children etc.

ii. Message shall be displayed for cleanliness through sign boards at public places /markets.

iii. All city roads, streets, open spaces and parks shall be cleaned.

iv. All drains of city will be cleaned.

v. Heaps of the solid waste shall be cleaned and disposed off on the designated places.

vi. Public toilets shall be cleaned.

vii. All the public premises shall be cleaned.
viii. All obsolete items which are stacked in the corridors will be removed and corridors made free of furniture, cupboards and other items.
ix. All temporary structure in corridors will be removed to make them neat aesthetic and without obstruction.
x. Washrooms in public buildings shall be regularly cleaned and repaired, if necessary. Also Wash basins, drainage system and tiles shall be put in hygienic condition.
xi. All windows and corridors in public building shall be cleaned regularly.
xii. Repair, maintenance, cleaning & sanitizing of Public /Community toilets shall be taken.
xiii. All defective street light points shall be replaced.
xiv. Awareness shall be created on usage of Toilets to eliminate open defecation.
xv. Identification of areas being used for open defecation.
xvi. Survey shall be carried out to identify the existing dry latrines in the cities.
xvii. Survey shall be carried out for requirement of public toilets.
xviii. Process for DPRs of all the Municipal Corporations shall be prepared for conversion of dry latrines into pour flush latrines.

(iii) Plan for period from 1st March to 31st March, 2015:

Following action plan/activities have been planned for "Swachh Bharat Mission “:

i. Public / common areas of the City and Locality shall be cleaned
ii. River / Talab side waste shall be cleaned.
iii. Toilets in Government buildings/ Hospitals /Schools shall be cleaned.
iv. School children shall be educated about the importance of sanitation, through distribution of educational material.
v. Public shall be involved to organize Sanitation Marathon /Sanitation Walkathon
vi. School children shall be encouraged for sanitation through Sanitation Painting Competition.
vii. Each citizen shall be motivated to devote 100 hours in a year for sanitation.
viii. SHG shall be created/ established for maintenance of Public / Community Toilets.
ix. Swachhata Doot shall be engaged in each Ward to work as ear and eye for ULBs.

x. Massive public awareness campaign on cleanliness shall be taken with the help of NGOs, RWAs School Children etc.
xi. All city roads, streets, Open Spaces and parks shall be cleaned.
xii. All drains of city will be cleaned.
xiii. All pot holes shall be filled.
xiv. Heaps of the solid waste shall be cleaned and disposed off on the designated places.
xv. Public toilets shall be cleaned.
xvi. Cleanliness of all sewer lines with priority of cleaning blockage, if any.
xvii. Removal of bodies of dead animals and birds, if any, on priority (immediately).
xviii. DPRs of all the Municipal Corporations shall be prepared for conversion of dry latrines into pour flush latrines.
xix. Process for Sanitation plans for Corporations shall be started.

(iv) Annual Plan for the year 2015-16:

Following action plan/activities have been planned for "Swachh Bharat Mission“:

- **Period from 1st April to 30th June , 2015**

i. Doorstep collection of waste from residential minimum two wards of each Municipal Corporation and one ward of each Municipal Council/ Committee shall be started.
ii. Bid document for inviting private agencies for setting up of SWM facilities on PPP mode shall be prepared.
iii. Process for Sanitation plans for Municipal Councils/Committees shall be started.
iv. Sanitation plan for Municipal Corporations shall be prepared.
v. Ward level committees shall be constituted as per provision made in the Haryana to clean the area of the ward.
vi. DPRs of all the Municipal Councils shall be prepared for conversion of dry latrines into pour flush latrines

- **Plan for period from 1st July to 30th September, 2015**

i. Doorstep collection of waste from residential minimum five wards of each Municipal Corporation and two wards of each Municipal Council/ Committee shall be started.
ii. Tenders inviting from private agencies for setting up of SWM facilities on PPP mode shall be floated.

iii. Process for Sanitation plans for Municipal Councils/Committees shall be started.
   - ✓ Sanitation plan for Municipal Councils shall be prepared.
   - ✓ Ward level committees shall be constituted as per provision made in the Haryana to clean the area of the ward.
   - ✓ DPRs of 30 Municipal Committees shall be prepared for conversion of dry latrines into pour flush latrines.

- **Plan for period from 1st October to 31st December, 2015**

i. Doorstep collection of waste from residential minimum seven wards of each Municipal Corporation and three wards of each Municipal Council/ Committee shall be started.
ii. Sanitation plan for 30 Municipal Committees shall be prepared.
iii. Ward level committees shall be constituted as per provision made in the Haryana to clean the area of the ward.
iv. DPRs of all the municipalities shall be prepared for conversion of dry latrines into pour flush latrines

- **Plan for period from 1st January to 31st March, 2016**

i. Doorstep collection of waste from residential minimum ten wards of each Municipal Corporation and five wards of each Municipal Council/ Committee shall be started.
ii. Private agencies for setting up of SWM facilities on PPP mode shall be finalised.
iii. Regular monthly suggestions will be invited from public on cleanliness related issues to ensure proper implementation.
iv. Sanitation plan for Municipal Committees shall be prepared
v. Hiring of additional ‘safai karamcharis’ on outsourcing basis, if required
vi. All the following activities shall be carried out on regular basis:
vii. Public buildings/ premises inside and outside the rooms shall be cleaned.
viii. Public / common areas of the City and Locality shall be cleaned
ix. River / Talab side waste shall be cleaned.
x. Toilets in Government buildings/ Hospitals /Schools shall be cleaned.
xi. School children shall be educated about the importance of sanitation, through distribution of educational material.

xii. Public shall be involved to organize Sanitation Marathon /Sanitation Walkathon

xiii. School children shall be encouraged for sanitation through Sanitation Painting Competition.

xiv. Each citizen shall be motivated to devote 100 hours in a year for sanitation.

xv. SHG shall be created/ established for maintenance of Public / Community Toilets.

xvi. Swachhta Doot shall be engaged in each Ward to work as ear and eye for ULBs.

xvii. Kites Flying Celebration shall be organized with Message on Kite “Swachha Bharat Mera Sapna” during the festival of Basant Panchmi.

xviii. Massive public awareness campaign on cleanliness shall be taken with the help of NGOs, RWAs School Children etc.

xix. All city roads, streets, Open Spaces and parks shall be cleaned.

xx. All drains of city will be cleaned.

xxi. Damaged roads shall be repaired.

xxii. Round-abouts shall be beautified.

xxiii. Heaps of the solid waste shall be cleaned and disposed off on the designated places.

xxiv. Public toilets shall be cleaned.

xxv. Removal of bodies of dead animals and birds, if any, on priority (immediately).

xxvi. Cleanliness of all sewer lines with priority of cleaning blockage, if any.

xxvii. Motivation of employees of the ULBs and other departments to maintain cleanliness in the work space, and also to motivate other people under their influence.

xxviii. New street light points shall be installed on the main roads as and where required.

xxix. Toll free number shall be available in each municipality for registration of complaints regarding sanitation.

(v) Plan for the rest of period upto 2019:

i. The action plan shall be prepared on the basis of sanitation plan and will be submitted after finalising the same.

ii. 100% door to door collection of Solid Waste in segregated manner should be achieved.
iii. 100% solid waste shall be collected and disposed off at designated places.
iv. Vehicles meant for transportation of solid waste shall be covered in all manners.
v. All safai Karamcharis shall wear a fluorescent jacket displaying the name of the concerned municipality on the back side.
vi. Solid Waste Management facilities shall be provided to all the ULBs.
vii. All round about shall be beautified.
viii. 100% ban on selling and using of polythene bags.
ix. Eliminate open defecation.

5.3.16 Solid Waste Management Objective & Strategies

Solid waste must be managed in the following hierarchy with the first strategy being most desirable and the succeeding strategies to be followed only when a particular strategy cannot be employed.

Reduction at source and reuse: The most logical and preferred option is minimizing the waste production. This can be done by using better technologies, efficient packaging, reusing the waste produced at each level in some other process or activity.

Recycling: Recovery of material from the waste and reusing it again in manufacturing of some other product is recycling. Although recycling helps in recovering the material waste, energy is used in the process.

Waste to Compost: Decomposition of organic municipal waste to produce manure.

Waste-to-Energy: Production of heat, electricity or fuel from the waste using biomethanation, waste incineration or Refuse Derived Fuel (RDF).

Waste Disposal: Inert waste or the residual waste produced in the other waste management process must be disposed in engineered landfills.

5.3.17 Proposed Plan

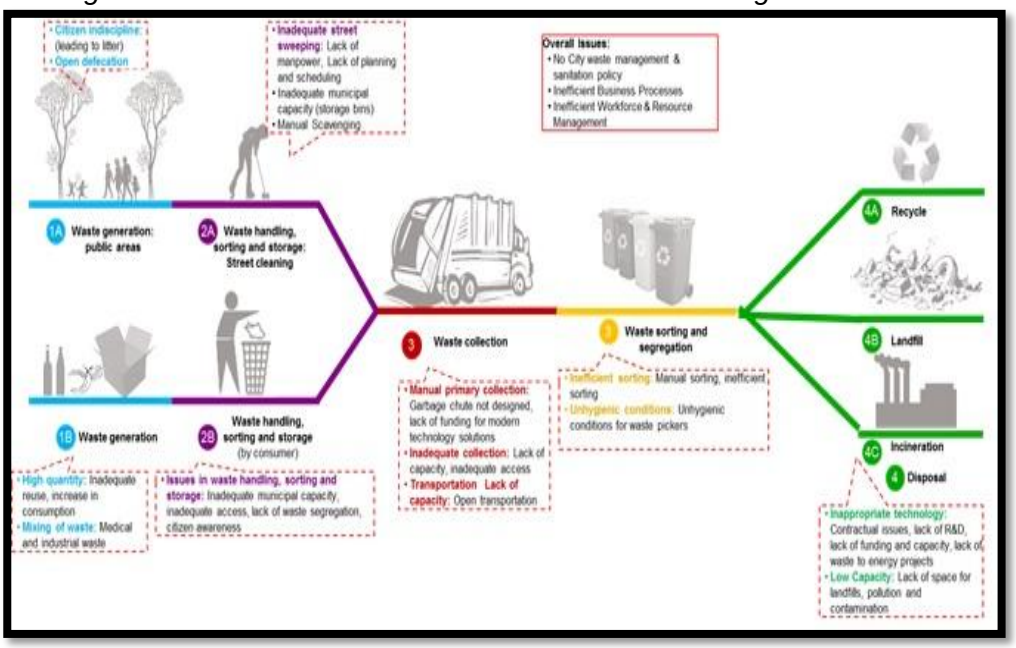
Target of Plan: To plan, develop, provide and manage an environmentally responsible and cost effective waste management system that addresses the needs and expectations of the community. Target to reduction of waste to landfill, increasing the recovery and reuse of materials from the waste stream and by aiming to reduce litter and illegal dumping.

The aspects of proposed plan including the following:-

- Compliance the SWM Rules 2016 and SWM guidelines 2013

- ICT and social media based 2-way communication with citizens
- GPS based Vehicle tracking System
- Bio metric attendance of staff at ward level
- 24x7 operations monitoring with data integration platform. Communication and Change management
- Strictly order for street vendors to keep dustbins for waste
- Mechanized Street Sweeping
- Compulsory Segregation at source
- Provision of segregation infrastructure at all stages of collection and transportation
- Operations monitoring of street waste collection and cleaning
- Fleet and Asset Management system: GPS tracking of primary collection & transportation fleet, tracking collection from all GIS mapped smart bins; route optimization, fleet and crew scheduling, Mechanized Street Sweeping
- Automation of Solid waste management
- Adequate health and safety provisions for workers
- Advocate 4R's i.e. reduce, recycle, reuse and recover material in MSW management
- Ensure economic sustainability of the proposed system by introducing PPP in MSW management
- Conduct regular internal and external independent audits on the efficiency of entire SWM system.

Figure No.5.8: Flow chart of Smart Solid Waste Management Solution



Sources: Action Plan for Development of Integrated Solid Waste Management Project (Haryana)

Domestic Waste Collection: Problems of Collection of waste in Rohtak

- Unskilled labour
- Poor working conditions
- Wrong timing on commercial sites
- On street containers and tractors
- No segregation of waste
- Low public awareness
- Limited financial resources

Objective: To provide a collection service that efficiently and effectively removes domestic waste material in accordance with the Service Charter and relevant statutory and regulatory requirements**.**

Strategic Considerations

House to house collection: Waste collectors will visit each household within Municipal Corporation Boundary to collect waste. Need to introduce feedback system.

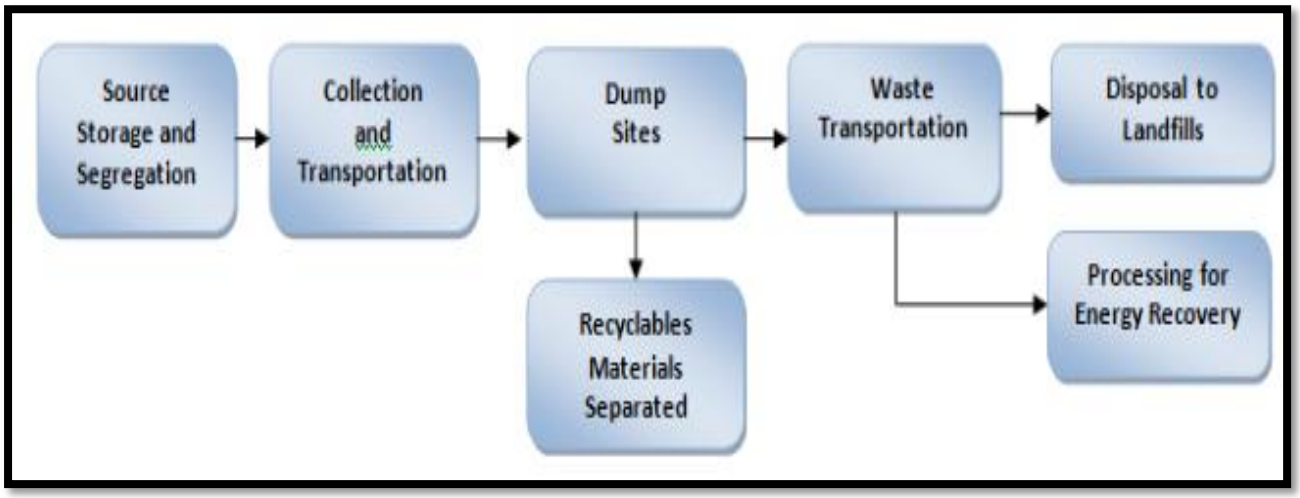
Skilled Labor: No capacity building programme is running for labor to collection of waste.

Timing of commercial waste: In Rohtak Commercial activity is started morning 9.00 to evening 9.00. So it is suggested that collection of waste and sweeping of commercial site need to work at 6 am to 10 am.

Segregation: Need to introduce segregation waste at source and collect this waste in different containers. In Rohtak 50% waste is biodegradable that can help to prepare manure etc.

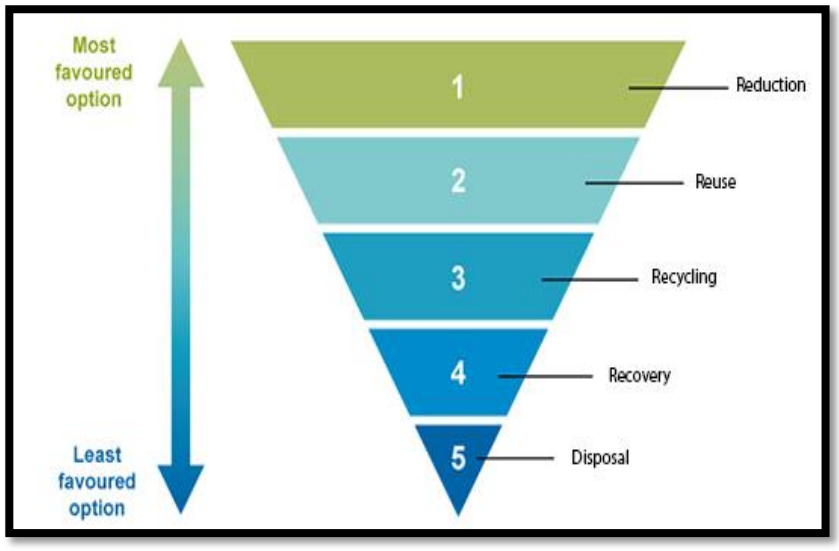
Management: Waste to be managed by adequate delegated powers.

Figure No.5.9: process of management



Sources: Action Plan for Development of Integrated Solid Waste Management Project (Haryana)

Figure No.5.10: Advocate 4R's i.e. reduce, recycle, reuse and recover material



Sources: Action Plan for Development of Integrated Solid Waste Management Project (Haryana)

Reduction

This is the best option because the most effective way to limit the health effects and environmental impacts of a waste is not to create waste in the first place. Making any new product requires materials and energy. Raw materials must be extracted from the Earth and processed, and the product must be manufactured, packaged and transported to wherever it will be sold. Each of these stages may produce solid waste as well as liquid wastes and air pollutants. If we can find ways of making a particular item whilst producing less waste in the process, this is one of the most effective ways to reduce pollution, save natural resources, protect the environment and save money. Industry has a major part to play in waste reduction. If more efficient manufacturing processes were adopted, greater quantities of products could be made without increasing the use of raw materials.

Institution waste can reduce upto 90-95% in Rohtak City. Industrial material and household waste we can reduce.

Waste reuse

Reuse can be defined as using a waste product without further transformation and without changing its shape or original nature. This is the second option in the waste hierarchy. Different types of solid wastes can be reused, such as bottles, old clothes, books and anything else that is used again for a similar purpose to that originally intended. Reuse means that less solid waste is produced. It brings other benefits by taking useful products discarded by those who no longer want them and passing them to those who do.

Benefits of reducing and reusing solid waste

Waste is becoming a bigger problem in urban areas each year. Households are producing more waste, so disposal sites are filling up and new sites are further away from residential areas. Where waste is collected and transported to a disposal site, this is becoming more expensive. Where householders have to dispose of waste themselves, they have to spend more time doing this. Anything that reduces the amount of waste that has to be disposed of helps to reduce these problems. Some other advantages of waste reduction and reuse are summarized below.

Community benefits

Reuse can be very helpful for disadvantaged people who cannot afford to buy new goods. These could include clothing, building materials, and business equipment.

Reuse centres that collect and distribute reusable goods can also provide community benefits by engaging in job-training programmes and general training for the long-term unemployed, disabled people and young people.

Economic benefits

By reusing materials rather than creating new products from raw materials, there are fewer burdens on the economy as a whole – especially if reuse results in a reduction in raw material and product imports. Reuse is an economical way for many people to acquire the items they need. It is almost always less expensive to buy a used item than a new one.

Environmental benefits

Reusing something uses little or no water, energy or other resources and is unlikely to cause pollution. As well as these benefits, reuse eliminates the environmental damage that would have been caused if the item had been disposed of, rather than reused. In contrast, manufacturing a product from raw materials (and, to a lesser extent, recycling) consumes resources, causes pollution and generates wastes

Waste recycling

Recycling waste means that the material is reprocessed before being used to make new products. The reprocessing activities can have an impact on people's health and the environment, but these impacts are usually lower than those from making the product from new, raw materials. Recycling means treating the materials as valuable resources rather than as waste. It has many benefits but it is important to have a market for the end product, otherwise the process will not be economically sustainable. The options for recycling depend on the type of waste. For example, waste paper can be broken down to its fibers in a process called pulping. The pulp is cleaned and then formed into new paper to be used for printing or packaging. Waste metals and glass can also be recycled by melting them down into new raw materials

Recovery

Recovery from different used of waste is economic viable for MCR. User charges also helpful for recovery.

Transportation of Waste

Refuse compactors may be introduced to handle increased waste generation wherever possible for safe handling of waste.

Disposal

Need automated scientific land fill site.

5.3.18 Waste management Proposals

Attained totally dustbin free city and 100% zero waste. Waste will be collect directly from primary source.

Mass awareness in citizens through Mohala Nigrani Samiti, Self Help Group, RWA's, Institutions, Anganwadi workers etc.

- Conducting IEC campaigns
- Providing access to repositories of information and resources (e.g. databases, libraries
- and web sites)
- Trainings (public, customized or on-line)
- Consultation (e.g. coaching, facilitating, expert advice and conducting research)
- Publications
- Coordinating alliances
- Web based forum for interaction among different players

GPS based tracking system of vehicles with automation of waste. GIS based mechanical sweeping of streets.

5.3.19 Key Issues

- Unscientific disposal of MSW at dump sites
- Low level of awareness amongst the citizens on solid waste
- The use of plastic bags is creating unhygienic condition in city.
- Collection points are open in city.
- No mechanized street sweeping.
- No Segregation system
- Lack of community engagement

5.4 Sanitation Components

5.4.1 Public Toilets - Existing of status Public toilets

Municipal Corporation Rohtak is responsible to construct individual and community toilets in Rohtak City. RMC has more than 4 lakh, (2013) population. There is deficiency in toilets and people are using open defection. It creates unhygienic conditions in city. Community toilets are constructing under Swacch Bharat Mission by

Municipal Corporation. Municipal Corporation Rohtak is constructed community toiled on public places to prevent open defection.

Table no. 5.27 Percentage of HHs to total HH by amenities (toilets)

Ward No.	Number of households having latrine facility within the premises	Number of households not having latrine facility within the premises	Alternative Source	
			Public toilets	OD
1	92.2	7.8	0.5	7.3
2	83.2	16.8	0.4	16.4
3	78.5	21.5	1.8	19.7
4	97.8	2.2	0	2.2
5	77.4	22.6	0.3	22.3
6	73	27	0	27
7	84.6	15.4	0.3	15.1
8	96.7	3.3	0.4	2.9
9	95.3	4.7	0.3	4.4
10	99.2	0.8	0.3	0.5
11	95.5	4.5	0	4.5
12	99.9	0.1	0	0.1
13	99.5	0.5	0.3	0.2
14	99.8	0.2	0.2	0
15	99.5	0.5	0.2	0.3
16	99.8	0.2	0.2	0
17	99.3	0.7	0.7	0
18	99.8	0.2	0.2	0
19	99.2	0.8	0.3	0.5
20	94.5	5.5	0	5.5

Sources: MC, Rohtak 2017

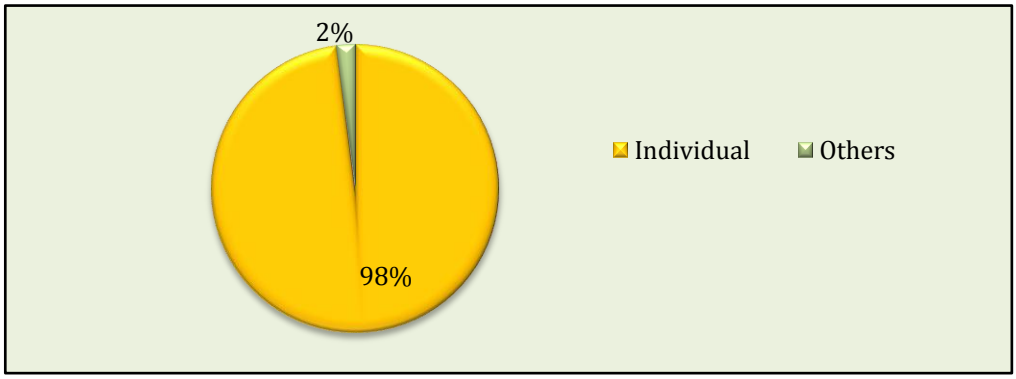
5.4.2 Access to toilets

Based on the location of toilets as mentioned in consultation with MC Rohtak, it has been observed that most of the public toilets are located in bazaar areas (Choto Ram chowk, Shori market, Palika bazaar, Prem nagar chowk, Ghanipura market, Housing

board market, Sabji mandi), commercial areas like Qilla Road, D-Park, Bus Stand, Railway Station, local markets, street vendors etc. and public places (Bus stand, Railway stations, Administrative buildings).

Based on the Primary survey, the 98% population having the individual toilet facility and only 2% people are not having any facility. So they use public toilets and resort to open defecation.

Chart No.:5.9 Access to toilet



Sources: Primary Survey, 2016

5.4.3 Estimation of demand for new HHs Toilet

As per primary survey report of MC Rohatk for Swachh Bharat Urban on 16.12.2017 the number of urban HHs restoring to open defication as per 2011 cences are 3916. And number of urban HHs having pit laterines are 9673 as per cences the projected no. upto 2019 is 4000, None of Urban HHs having insanitary latrine facility in 2011 or also for 2019. Below table no. 5.27 shows the estimate of future demand of HHs toilets for 2021 and 2031. The projected estimate on the basis of above table no. 5.26 percentage of HHs to total HH by toilets like, we take average of that total 90% HHs having toilets facility in 2013 and project on that basis.

Table No.:5.28 Estimation of future demand for HHs toilets

2013 Population	Total HHs Toilets for 2013	Projected population for 2021	Projected demand for HHs Toilets 2021	Projected population for 2031	Projected demand for HHs Toilets 2031
484382	435944	541522	487370	614153	552738

Sources: MC,Rohtak and Censes of India

As per Haryana PWD department present rate of schedule of material and labor in construction of size 3'x4' (min.) HHs toilets rate is 1000-1200/sq. ft. are chargeable

with material finish and labor, earthwork, DPC, brick work roofing or plaster cost also including in that.

5.4.4 List of community toilets under Swachh Bharat Mission

All the community toilets under Swachh Bharat Mission are operated and maintenance by ULB only, without using PPP Model or community participation. Community toilets are used basically in slum areas.

Table No.: 5.29 List of Community toilets under SBM

Ward no.	No. of functional Toilet Seats			Pay & Use toilet	Mobile Toilet (Yes/No)
	Men	Women	Total		
1	2	2	4	-	No
3	7	7	14	-	Yes
5	4	3	7	-	No
9	5	4	9	Rs. 2	No
10	10	9	19	Rs. 2	No
11	6	6	12	-	Yes
12	6	6	12	-	No
13	8	3	11	-	No
14	7	5	12	-	No
15	5	5	10	-	No
16	13	13	26	-	Yes
17	3	3	6	-	No
total	**76**	**66**	**142**	-	-

Source: PHED, 2016

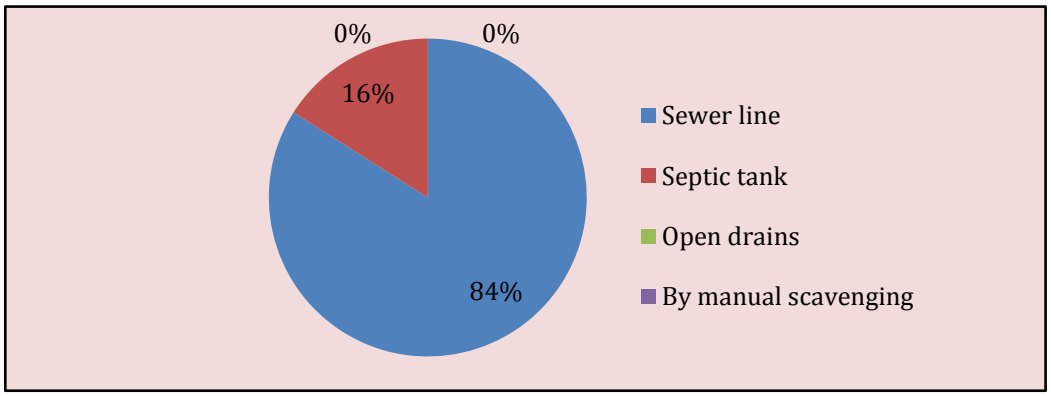
Poor people, low income group and visitors are heavily dependent on these public sanitation facilities. As a result, most of these toilets are located near place of important Chowk, Commercial areas and low income group pockets. The majority of these public facilities are located in core city area which is below shown in map with images. They are having the total 06 mobile toilets.

Image No. 5.11 Public / community and mobile toilets

5.4.5 Toilet waste disposed:

Through the Primary survey we found that 84% disposed their toilet waste through the sewer line and 16% disposed in septic tank. Others are no disposal in open drains or by manual scavenging.

Chart No.: 5.10 Toilet waste disposal



Sources: Primary Survey, 2016

5.4.6 Assessment of functioning of Public toilets

Information for each public toilet, like location, ownership, O&M agency, number of urinal and WCs, functionality aspects, adequacy of water, presence of care taker, approximate number of users and user fee was collected. Informal consultations with users were also conducted to assess the convenience/inconvenience in using the facility.

Some of the findings from the survey are as follows:

The sanitation facilities in pockets of high concentration of urban poor are inadequate and not well maintained. The toilets are in bad condition resulting in some population resorting to open defecation. Quality, accessibility and O&M of public sanitation facilities are the key sanitation issues. New constructed toilets did not match World Bank Guidelines. Low level of motivation and capacity among sanitation workers affects regular maintenance of public toilets. Sanitation workers are not sensitized on issues of working with improper equipment and practices.

There are 26 slums in Rohtak. The poor people are scattered and it is difficult to assess their specific sanitation needs. Women in slums are forced to defecate in the open, inviting trouble and loss of dignity. Many of these toilets do not have functional doors, latches and ventilators. The toilets do not have provision of dustbins and carrying a used sanitary napkin to the nearest dustbin invites comments which leave

women with no option but to throw the pads inside the toilet. As a result, sanitary napkins lay strewn all over women's toilets and also stuffed in the ventilators making the toilets dingy, stuffy and smelly.

Image No. 5.12 Internal & external condition of public toilets

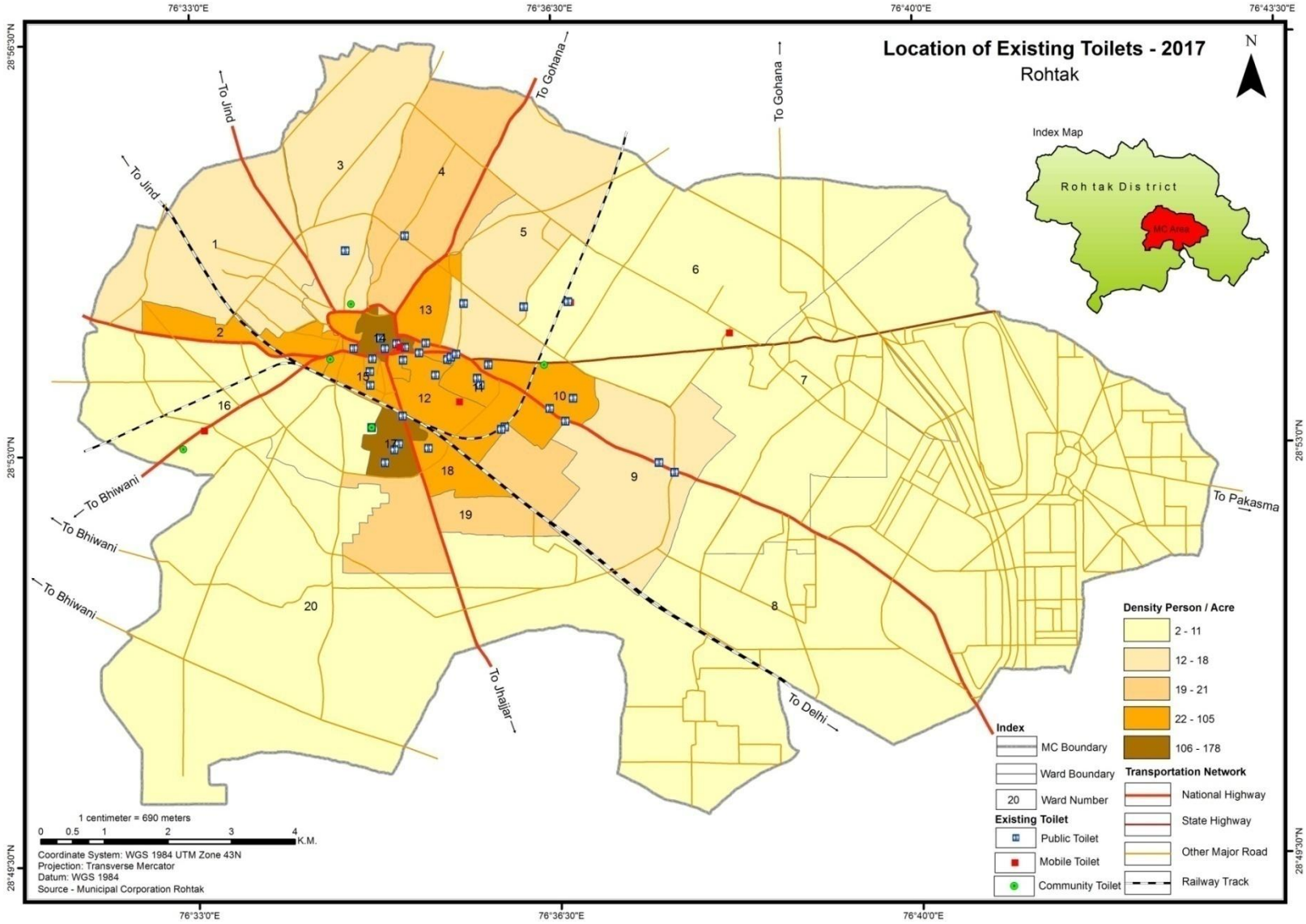


Figure No. 5.11 Location map of Public Toilets

5.4.7 Basic details of the slum area (ward-wise)

Below Table No. 5.30 shows the City Slum description, the all shows slums are not notified, the mostly system of drainage are open and drained out in drain no. 04. They don't have private Latrines community pit and any type of other service. But they having the same no. of electricity domestic connections as per public hydrants installed for protected water supply. Some are having electricity road lighting connection. So, below table shows the slum details of MC Rohtak.

Table No.: 5.30 Details of existing slums in MC Rohtak

No. of Slum	Name of Slum	Slum Population	No. of HHs	Private Latrines- Flush/Pour Flush & No. of Tap Points/Public Hydrants installed for protected Water Supply	Paved Roads (In Km.)
1	Surya Nagar 2	4623	808	731	5
2	Shiv Nagar	1936	418	401	4
3	Badsi Nagar	247	99	91	1
4	Sainik Colony	1515	421	399	3
5	Rajiv Vihar – 2	1472	267	251	1.9
6	Rajiv Vihar	330	102	100	1
7	Kutla Basti	479	132	102	1
8	Kacchi Gali	2502	369	351	5
9	Parvesh Nagar	786	171	164	2
10	Shastri Nagar	1239	239	213	3
11	Rishi Nagar	1179	223	201	2.5
12	Surya Nagar	619	135	120	1.7
13	Kabir Colony	917	214	204	2
14	Basant Vihar	814	163	154	2
15	New Janta Colony	644	141	125	1.5
16	Rohtak Uttam Nagar	1347	336	329	2
17	Sanjya Colony	2641	441	401	4
18	Ram Nagar	2327	500	477	3
19	Sanjay Nagar	3232	509	481	5
20	Friends Colony	263	99	90	1
21	Anand Nagar	467	96	86	1.5
22	Ambedkar Colony	1468	226	201	2
23	Sri Nagar Colony	4082	1013	990	6
24	Kamla Nagar	4251	759	706	6
25	Raj Mohalla	734	108	100	1.5
26	Rohtak Ajit Colony	661	120	104	1.5
Total		40775	8109	7572	70.1

Sources: SFCPoA & MC Rohtak, 2016-17

5.4.8 Provide the layout for the community toilets and individual toilets and disposal arrangements -

The assumption of community toilets per HHs under SBM (Urban), it is estimated that about 20% of the urban households in cities, who are currently practicing open defecation are likely to use community toilets as a solution due to land and space constraints in constructing individual household latrine. Community toilet blocks will consist of a given number of toilet seats, as per requirements, toilet superstructure including the pan and water closet, and a substructure shared by all the toilet seats and facilities for hand wash. ULBs should ensure that all community toilets being constructed under SBM (Urban) are built in tandem with water supply arrangements in ULBs. Suggested technical specifications, technologies and tentative cost of community toilets which are available in SBM guidelines. All community toilets constructed under SBM must have a minimum 5 year maintenance contract.

5.4.9 Norms and specification for community toilet:

A community toilet block is a shared facility provided for a group of residents or an entire settlement. Community toilet blocks are used primarily in low-income informal settlements where space and/or land are constraints.

Pour flush option is generally used in this kind of OSS systems. It is also advisable to provide facilities like washing, bathing, and a small incinerator in this block for the use of the community Public toilets are provided for the floating population / general public in places such as markets, train stations or other public areas, where there is a considerable number of people passing by.

Table No.: 5.31 Descriptions of Community Toilets

<table>
<tr>
<td>Septic tanks for public / community toilets</td>
<td>Recommended sizes of septic tanks for community/ public toilets (up to 300 users) is given below in Table 5.
<table>
<tr><th>No. of users</th><th>Length (m)</th><th>Breadth (m)</th><th colspan="2">Liquid depth (cleaning interval of)</th></tr>
<tr><th></th><th></th><th></th><th>2 years</th><th>3 years</th></tr>
<tr><td>50</td><td>5.0</td><td>2.00</td><td>1.0</td><td>1.24</td></tr>
<tr><td>100</td><td>7.5</td><td>2.65</td><td>1.0</td><td>1.24</td></tr>
<tr><td>150</td><td>10</td><td>3.00</td><td>1.0</td><td>1.24</td></tr>
<tr><td>200</td><td>12.0</td><td>3.30</td><td>1.0</td><td>1.24</td></tr>
<tr><td>300</td><td>15.0</td><td>4.00</td><td>1.0</td><td>1.24</td></tr>
</table>
(Source: Manual on Sewerage and Sewage Treatment Systems, 2013 Part A Engineering)

Note 1: A provision of 300 mm should be made for free board.
Note 2: The sizes of septic tanks are based on certain assumptions on peak discharges, as estimated in IS: 2470 (Part 1) and while choosing the size of septic tank exact calculations shall be made.
Note 3: For population over 100, the tank may be divided into independent parallel chambers of maintenance and cleaning</td>
</tr>
<tr>
<td>Community Toilet - Norms for toilet seats</td>
<td>• One seat for 35 men;
• One seat for 25 women
• Adequate bathing facilities</td>
</tr>
</table>

Sources: Manual on Sewerage and Sewage Treatment Systems, 2013

Norms for toilet sets for public toilets are given in above table:

i) It may be assumed that two-thirds of the number are males and one-third females

ii) One water tap with drainage arrangements shall be provided for every 50 persons or part thereof in the vicinity of water closet and urinals. * At least 50% of female WCs may be Indian pan and 50% EWC

iii) Separate seat may also be provided for trans-genders

iv) Special arrangements may be made for physically challenged.

Table No.: 5.32 Treatment details

	S. No / Sanitary unit / For males / For females (A) 1 / Water closet (W.C) / One per 100 persons up to 400 persons; For over 400 persons, add at the rate of one per 250 persons or part thereof / Two for 100 persons up to 200 persons; over 200 persons, add at the rate of one per 100 persons or part thereof 2 / Ablution taps / One in each W.C / One in each W.C 3 / Urinals / One for 50 persons or part thereof / Nil 4 / Wash Basin / One per W. C. and urinal provided / One per W. C. provided
Treatment units	1. Bio Digester with reed bed systems/ soak pits 2. Bio Tank 3. Septic Tank with Soak Pits

Sources: *Manual on Sewerage and Sewage Treatment Systems, 2013*

Tentative basic cost for community toilets are Rs. 65,000/- per seat and public toilets is Rs. 75,000/- per seat. However, the cost per seat would vary depending upon the construction material, quality of construction, type of treatment technology adopted and O&M for specified period etc. However the costs of toilet in bio-digester given by NBCC are as under.

Table No. 5.33 Cost Estimation and Implementation Mode

	Superstructure 5 Cubicle for 200 users Pre Painted galvanized Sheets / Masonry / Cement Board Rs 1,63,000 /- / Rs 95,000 /- / Rs 80,000 /- Superstructure 10 Cubicle for 400 users Pre Painted galvanized Sheets / Masonry / Cement Board Rs 3,26,000 /- / Rs 1,80,000 /- / Rs 1,60,000 /- Bio Digester Tank 10 KLD for every 200 users Masonry Rs 1,74,000 /- per 20 users
Additional Infrastructure	It must be ensured that adequate water supply arrangement shall be made for proper functioning and upkeep of toilets. Wherever possible, ULBs should ensure that public and community toilets are outfitted with solar panels for the generation of electricity to ensure uninterrupted power supply and bring down O&M costs.
Implementation mode	All toilets shall be constructed through PPP mode with inbuilt provision of O&M for at least a period of 5 years

Sources: Manual on Sewerage and Sewage Treatment Systems, 2013

Layout of community toilet and individual toilet are shown below:

Figure no. 5.12 layout of Community toilet

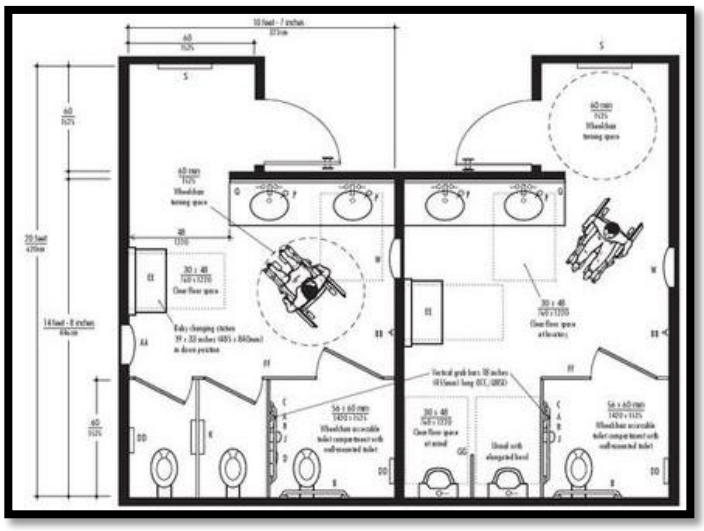


Figure No. 5.13 other layout option for community toilet

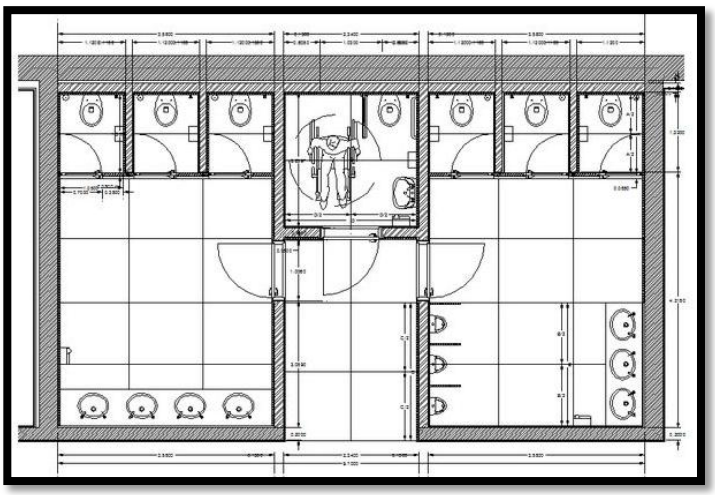
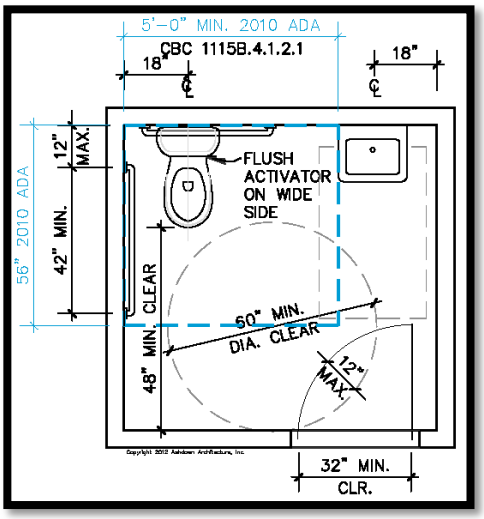


Figure No. 5.14 Detail layout of individual toilets



Disposal arrangement: There can be four alternatives for disposal of wastewater from a community toilet block.

1. Sewer
2. Septic tank with effluent discharge
3. Leach pit
4. A digester to generate biogas with effluent discharge

5.4.10 Estimation of public toilets for floating population

As per survey report the floating population is projected 2021 are 81228 (as per standard rule of 15% of total population). If we see the GOI guidelines as per Manual on Sewerage and Sewage Treatment Systems, 2013 for public/community toilets they mentioned one WCs for 35 men and one WCs for 25 women. So, as per standard the projected estimation of public toilets are given below which are also used by floating population or citizens of the city:

Table No.:5.34 Estimation of future demand for Public toilets

2013 Population	No. of WCs for 2013 in Public Toilets	Projected population for 2021	Projected demand for WCs in Public Toilets 2021	Projected population for 2031	Projected demand for WCs in Public Toilets 2031
72657	606	81228	677	92123	768

Sources: Censes of India

As per Haryana PWD department present rate of schedule of material and labor in construction of size 3'x4' (min.) public toilets rate is 2000/sq. ft. are chargeable with material finish and labor, earthwork, DPC, brick work roofing or plaster cost also including in that.

5.4.11 Key Issues:

- ✓ Impact on Environment
- ✓ The sanitation facilities in pockets of high concentration of urban poor are inadequate and not well maintained. The toilets are in bad condition resulting in some population resorting to open defecation.
- ✓ Quality, accessibility and O&M of public sanitation facilities are the key sanitation issues.
- ✓ New constructed toilets did not match World Bank Guidelines.

- ✓ Low level of motivation and capacity among sanitation workers affects regular maintenance of public toilets. Sanitation workers are not sensitized on issues of working with improper equipment and practices.
- ✓ There are huge slums in Rohtak. The poor people are scattered and it is difficult to assess their specific sanitation needs. Women in slums are forced to defecate in the open, inviting trouble and loss of dignity. Many of these toilets do not have functional doors, latches and ventilators. The toilets do not have provision of dustbins and carrying a used sanitary napkin to the nearest dustbin invites comments which leave women with no option but to throw the pads inside the toilet. As a result, sanitary napkins lay strewn all over women's toilets and also stuffed in the ventilators making the toilets dingy, stuffy and smelly.

5.5 Natural Drains & Storm Water Drainage

There is no natural drain in Rohtak city. Storm water drainage system has been laid in 60% of approval area under MCR jurisdiction. Recently 34 colonies added under MCR jurisdiction those are uncovered from storm water drainage. There is one master storm water drain in city.

The main storm water line in the town was laid in yearly seventies. The entire storm water drainage is gravitational maintaining self-cleansing velocity. The branch storm water drainage is of RCC pipe. The existing storm water drainage is designed and executed as per CPHEEO (Central Public Health and Environmental Engineering Organization) norms. The city is divided into zones & sub zones. The nodal storm water drainage flow as per population is works out & further storm water drainage is designed as per cumulative demand. The disposals have been constructed in phase to meet the growing demand as per expansion of the city. The per capita storm water drainage flow has been considered as 100% of water flow of rain water.

5.5.1 Assess the service level Gap

Table No. 5.35 Status of storm water level service levels

Sr. No.	Indicators	Sustainability standards	Black (caution for improvement)	Red (Immediate action for improvement)	Present Status (2016-17)	Target (2017-18)
1	Coverage of storm water drainage network	100%	< 75%	< 50%	50%	
2	Incidence of sewerage mixing in the drains 01	0	< 25%	< 50%	25%	0
3	Incidence of water logging/flooding 02	0	< 25%	< 50%	10%	0

Source: As per AMRUT Guidelines

Rohtak city is fast developing city under NCR area population of the Rohtak is increasing day by day due to migration skilled and unskilled labour due to this new colonies are developing around the Rohtak town with in the municipal limits. The growth of population in Rohtak town is more than state censes growth due to migration of people from rural areas. The unapproved colonies are also coming near the city. Which needs to lay the storm water drainage system in the coming days, so we needs storm water drainage system in these colonies by the year 2021?

Unapproved area needs to be provided storm water drainage system within municipal limits. There is one master storm drain existing in the city covering 100% of area.

5.5.2 Storm Water Disposal

Presently there are 15th nos. storm water disposal in running in existing storm water drainage system. Which are given in following table:

Table No. 5.36 Detail of location where storm water get mixed with sewer

Sr.No.	Location	Merging with which sewer
1	Dairies behind Durga Bihawan Mandir	Hisar road 24x36 Brik Swer Main Disposal Rohtak
2	Shri Nagar Colony	PGIMS Rohtak
3	HSEB Sub Station Office on Delhi-Hissar-Sirsa Road Opposite Model Town	Model Town
4	Rahar Johar Pond	Rahar Johar
5	Janta Colony (Kath Mandi area)	Main Disposal Anaj Mandi
6	Inner pocket of Tilak Nagar	Model Town
7	Inner pocket of Kamal Nagar	Model Town
8	Garhi Mohalla Pond	Garhi Mohalla Disposal
9	Subhash Nagar	PGIMS Rohtak
10	Ram Gopal Colony	PGIMS Rohtak
11	ROB Bangar Cinema to Hisar Road	Singhpura Disposal

12	Jind Road Rohtak	Singhpura Disposal
13	Bhiwani Road	Main Disposal Anaj Mandi
14	Sheeta Nagar	Main Disposal Anaj Mandi

Sources: PHED, Rohtak 2017

Storm water gets mixed with sewer due to available separate storm water drainage system. Below map shown the location which is merging with the sewer.

Image No. 5.13 Condition of open drain network in MC Rohtak

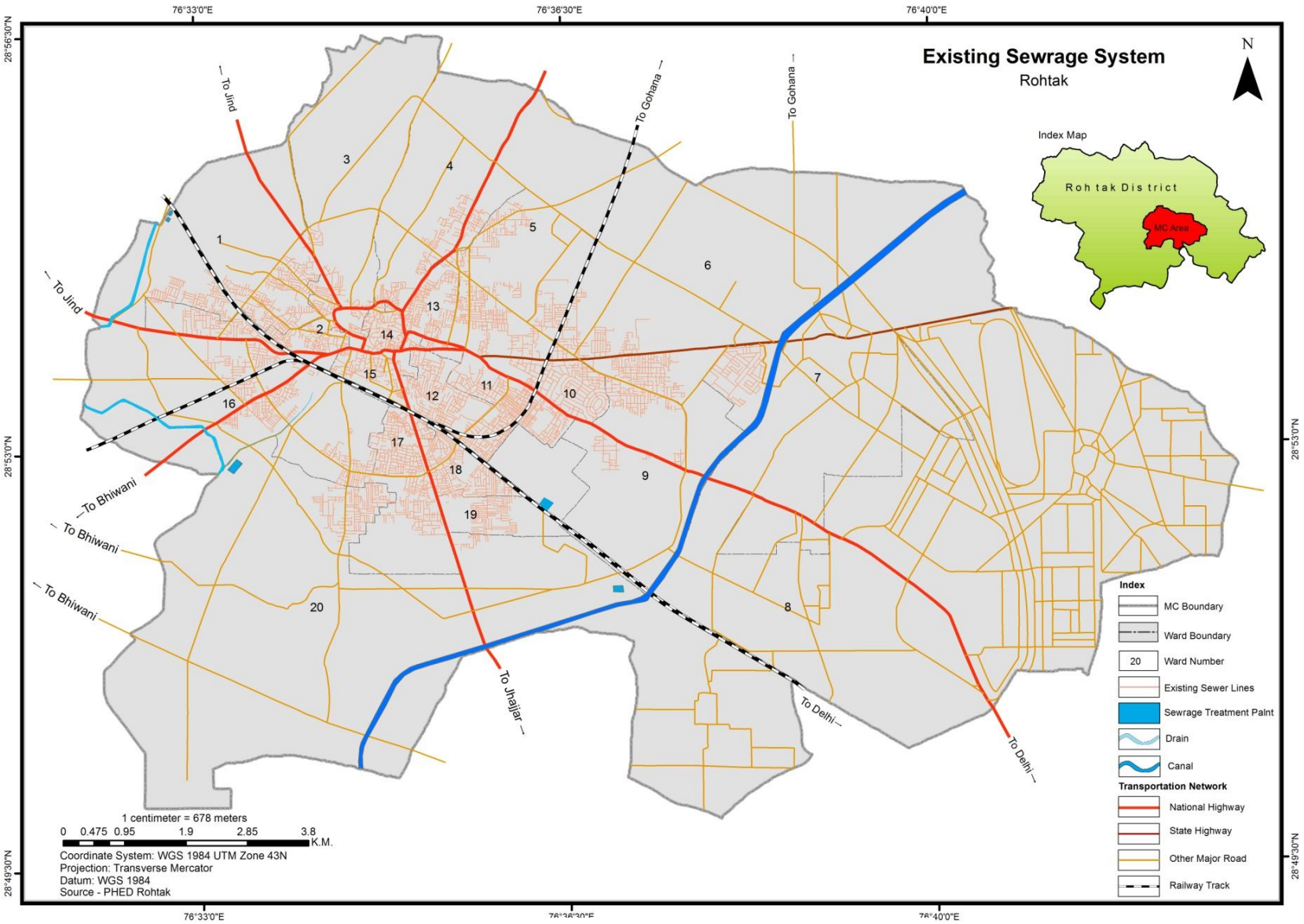


Figure No.: 5.15 existing storm water network

5.5.3 Demand Gap Assessment for Storm water drainage sector

Table No.: 5.37 Demand Gap Assessments

Component	2015			2021	
	Present	Ongoing Projects	Total	Demand	Gap
Major Drains	-	-	-	-	-
Network requirement to provide proper drainage to all identified water stagnant point flooding points up to the end discharge point (in Km.)	41	0	41	19.50	
Network length where HHs discharging waste water directly into the drains	7	0	7	26	
Rejuvenation of existing primary nallahs and primary drains including covering and installation of filter	6.09	0	6.09	19.5	

Sources: AMRUT Guidelines

5.5.4 List of projects of Storm water Drainage under AMRUT mission

Table No.: 5.38 list of projects of Storm water drainage

Sr.No.	Project name	Estimated cost (In Cr.)
1	Additional Networking of the storm water drainage including IPS (industrial pipe solutions)	9.5
2	Drainage system of open drain to storm water connection including inspection chamber	4.5
3	Arrangement for disposal of storm water	2
4	Rohtak Town : Renovation of open drain including repairing and covering	1.5
5	Rohtak Town : Renovation and repairing of IPS/MPS(Micro pollutant in storm water)/Disposal	2.5

Sources: as per AMRUT Mission SAAP Haryana

5.5.5 Key Issues

- Congestion in drains due to excessive rain falls particularly in low lying areas.
- Drains chocked due to solid waste collected in transition points.
- During rainy season the storm water flows through existing sewer and storm water.
- Due to variation in terrain the sewer drainage network overflows and create problem at rainy time.
- Use of storm water drains for laying water pipes and other utilities resulting in blockages and also possibility of contamination of water supply.

Chapter 6
City Sanitation Task Force (CSTF)

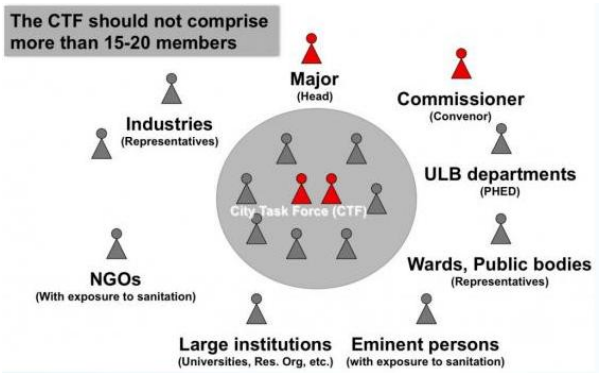
6.1 City Sanitation Task Force Formation

Under the guidelines of NUSP and with the directives of Central Govt. and State Govt. the process of preparation of city sanitation plan was initiated. As per the process, “A City Sanitation Task Force Committee” under the chairmanship of Honorable Mayor of Rohtak city will be constituted. Various stakeholders such as NGO’s, Individuals, ward members and officials will be included in this task force committee. Capacity building of various stake holders and officers will be carried out by arranging meetings and discussions time to time at Municipal Corporation Rohtak. Launching of 100% “City Sanitation Campaign” is the main challenge for the task force.

CSTF will facilitate meetings and discussions at City level for initiating the process of CSP and collecting the data from all wards. The questionnaire will be forwarded toward ward members and officers for assessment of availability of toilets and deficiency therein, Solid Waste Management, sewerage, storm water drains, water supply and environment. The main objective of collecting data is to achieve the goal of 100% open defecation free city.

Authentic data will be collected from grass root level i.e. ward wise, slum area wise. The data will be compiled and analyze thoroughly. The analysis depicting the gaps in the infrastructure and required estimates will be worked out. City sanitation plan is thus formulated with involvement of all Sanitary Inspectors, Asst Commissioners, Technical Staff and Officers from various departments of Rohtak Municipal Corporation

Figure 6.1 Member of City Sanitation Task Force



Sources: DUBE, 2012

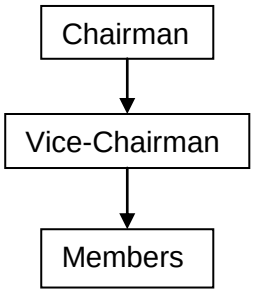
6.1.1 Recognizing the CTF

Mayor, Sr. Deputy Mayor and Deputy Mayor, MC Rohtak are authorized by a resolution passed by MC, to constitute the following Sub-Committees, as power conferred to MC by Haryana MC Act 1994 Section 40. Below flow diagram shows the name of Sub-committees with their institutional structure.

Figure No. 6.2 Recognizing the City Task Force

Sources: MC, Rohtak

Figure No. 6.3 Structure of City Task Force



Sources: MC, Rohtak

6.2 Agenda, Roles and Responsibilities of CTF

Adapted from MOUD (2008)

According to the NUSP, the City Sanitation Task Force will be responsible for.

- Launching the City 100% Sanitation Campaign to generate awareness amongst the city's citizens (see also demand creation and awareness rising in the wastewater collection).
- Providing overall guidance to the implementation agencies, approving their materials and progress reports.
- Approving the city sanitation plan for the city.
- Supervising the progress of the implementation of the CSP.
- Issuing briefings to the media and state government about progress.
- Recommending to the ULB fixing of responsibilities for city-wide sanitation on a permanent basis.

6.3 Framework for Operations

The CFT function as detailed below:

6.3.1 Appointment of Council Officer and Committee Constitution by MC Rohtak

MC Rohtak has appointed finance & Contracts Committee, Water supply, Sewerage, Drainage and Disposal Committee, Building roads Construction and electricity Committee, one committee for assessment of property tax and other various License committee, Rural and slum development Committee, Beautification and sanitation Committee, Enforcement Committee and social welfare and Pension committee formed with appointment of Chairman and one Vice-Chairman with three members.

6.3.2 Call for meetings

MC call the meetings of all committee with their Chairman and Vice-Chairman, members. They shall send invitation letters to the members of the CTF at least 1 week prior to the dedicated date of the CTF meeting. This shall include the agenda for the meeting.

6.3.3 Conducting Meetings

Each meeting shall discuss issues as per agenda laid out for the meeting. Each meeting should be presided over by a political representative and moderated by an administrative officer of MC Rohtak. Towards the end of the meeting the tentative agenda and date for the next meeting shall be decided.

6.3.4 Documentation of Proceedings

The MC Rohtak officer in-charge of the CTF meeting shall be designated for each meeting has to record the proceedings in the form of minutes, clearly outlined the summary of discussions, decision taken and action points recorded with responsibility allocation. Each 'Minutes of Meeting' shall be prepared and send to the members of the CTF within a week from the date of the meeting.

6.4 Framework for Monitoring & Evaluation

The CTF shall be recommending MC Rohtak as the key agency responsible for implementation CSP. Monitoring and evolution will be taken up by the CTF and MC Rohtak. Monitoring and evaluation can be done by CTF as follows:

- Self-assessment on sanitation achievement by CTF based on –
  1. Field visits to different parts of the city
  2. Structured feedback from community organizations and citizen's groups
  3. Data provided by MC Rohtak
  4. Share all the assessments, studies and report with the people.

Chapter 7

100% Sanitation Campaign

7.1Sanitation issues and Target Groups

Primary survey, discussion with stakeholders, discussion during CTF formation workshop and informal discussions during the primary survey has helped in identifying sanitation issues and target groups for Rohtak. Some key issues have been highlighted in below table:

Table No. -7.1 Target groups and sanitation issues

Target Groups	Toilet	Waste Water	Solid Waste	Water
Urban poor	No toilet facility, therefore, resort to open defecation/urination	Open disposal	Open dumping	Unauthorized houses, so no individual water supply system.
	Inadequacy of public toilet			
	Affordability for pay and use			
Low income groups	Dependent on public toilet	Open drains but in some areas sewer connection	Low lying settlements face solid waste accumulation in rainy season	Municipal supply, but irregular
	Inadequate and lack of O&M of public toilet			
Middle & higher income groups	No specific issues	Kitchen/other waste disposal in open drains		Irregular water supply
Tourists/Floating population	Lack of public toilet and its cleanliness		Dumping randomly	Shortage of water
Shopkeepers and market visitors	Inadequate public toilets, therefore open urination	Some areas, open disposal	Dumping randomly	
institutions	Inadequate public toilets	Some areas, open disposal	Dumping randomly	
Public toilet service providers	Lack of equipments, water to clean toilets			
	People's willingness to pay and lack of awareness among people			
MC Rohtak	Inadequacy of public toilets	Missing links of sewer lines, connecting to un-served areas	Segregation collection of solid waste. Cooperation of people and other agencies	Challenge to meet growing demand

Sources: Primary Observation, 2017

7.2 Awareness Needs

To achieve 100% sanitation, the sanitation issues and reasons creating those issues need to be addressed. These can be addressed only if the people are made aware of the reason and effects of their actions. The subsequent table illustrates aspects which require awareness. During the ward survey an attempt made to identify issues in detail and accordingly strategies will be formulated.

Table No. 7.2 Awareness Needs

Target Groups	Toilet	Waste Water	Solid Waste	Water
Urban poor	Health, hygiene & environmental impact of open defecation	Health, hygiene & environmental impacts of improper disposal of waste water	Health, hygiene & environmental impacts of improper disposal of solid waste	Health, Hygiene & environmental impact of using unclean water
Low income groups	Health, hygiene & environmental impact of open defecation	Health, hygiene & environmental impacts of improper disposal of waste water	Health, hygiene & environmental impacts of improper disposal of solid waste	Health, hygiene & environmental impact of using unclean water
Middle & higher income groups	Health, hygiene & environmental impact of open defecation	Health, hygiene & environmental impacts of improper disposal of waste water	Health, hygiene & environmental impacts of improper disposal of solid waste	Health, hygiene & environmental impact of using unclean water
Shopkeepers and market visitors	Health, hygiene & environmental impact of open defecation	Health, hygiene & environmental impacts of improper disposal of waste water	Health, hygiene & environmental impacts of improper disposal of solid waste	Health, hygiene & environmental impact of using unclean water
institutions	Health, hygiene & environmental impact of improper maintenance of toilets	Health, hygiene & environmental impacts of improper disposal of waste water	Health, hygiene & environmental impacts of improper disposal of solid waste	Health, hygiene & environmental impact of using unclean water
Sanitation workers	Use of appropriate equipment for cleaning		Health, hygiene & environmental impacts of improper disposal of solid waste	
Public toilet service	Health, hygiene & environmental	Health, hygiene & environmental	Health, hygiene & environmental	Health, hygiene & environmental

providers	impact of improper maintenance of toilets	impacts of improper disposal of waste water	impacts of improper disposal of solid waste	impacts of using unclean water
MC Rohtak	Need for adequate number of public toilets at appropriate locations	Need for proper collection, disposal and treatment of waste water	Need for proper collection, disposal and treatment of solid waste	
Ward Councilors	Requirements of an the number of toilets	Health, hygiene & environmental impacts of improper disposal of waste water	Health, hygiene & environmental impacts of improper disposal of solid waste	

Sources: Primary Observation, 2017

Chapter 8

Institutional Capacity & Municipal Finance

8.1 Rohtak Planning Area

a. The provisions of the Punjab Scheduled Roads and Controlled areas Restriction of Unregulated Development Act, 1963 and the Rules framed there under and as amended from time to time shall apply,

b. The provisions of the Haryana Development And Regulation of Urban Areas Act, 1975 and the Rules framed there under and as amended from time to time, shall apply

Rohtak planning area consists of following area:

- Hasangarh
- Kalanaur
- Maham
- Rohtak MC

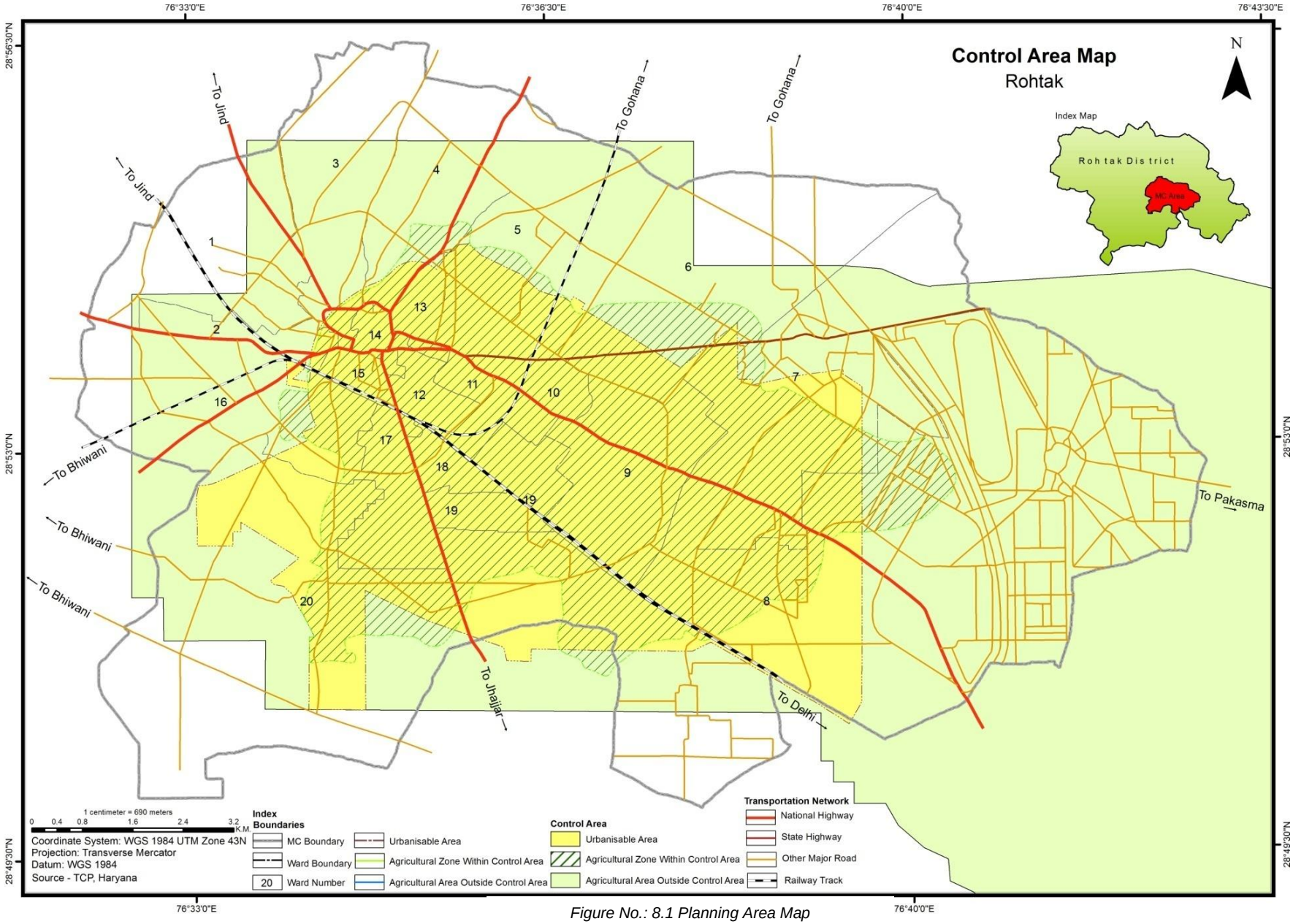


Figure No.: 8.1 Planning Area Map

8.2 Existing Institutional Structure - (Plan Support Pillars)

PUBLIC SECTOR

A. Government Department

1. Town & Country Planning - (Fire Department)
2. Department of Industrial Commerce
3. Public Health
4. Education
5. Northern Railway
6. PWD (B & R)
7. Transport Department
8. Police
9. Judiciary
10. Animal Husbandry
11. Dept. of Environment
12. Power Department
13. Irrigation & Water Resources
14. Tourism Department

OTHER THAN

15. MC Rohtak

B. Government Undertakings / Agencies

16. HUDA
17. SUDA (Special Urban Development Authority)
18. HSIIDC
19. HSAMB (Haryana State Agriculture Marketing Board)
20. National Highway Authority of India (NHAI)
21. Housing Board, Haryana
22. Haryana Pollution Control Board

COOPERATIVE SECTOR

23. Sugar mils
24. HAFED (Haryana State Co-operative Supply & Marketing Federation Limited)
25. Milk & Dairy federation, Haryana
26. Haryana Warehouse Corporation

PRIVATE SECTOR

27. Wood market

PUBLIC SECTOR

8.3 Government Department

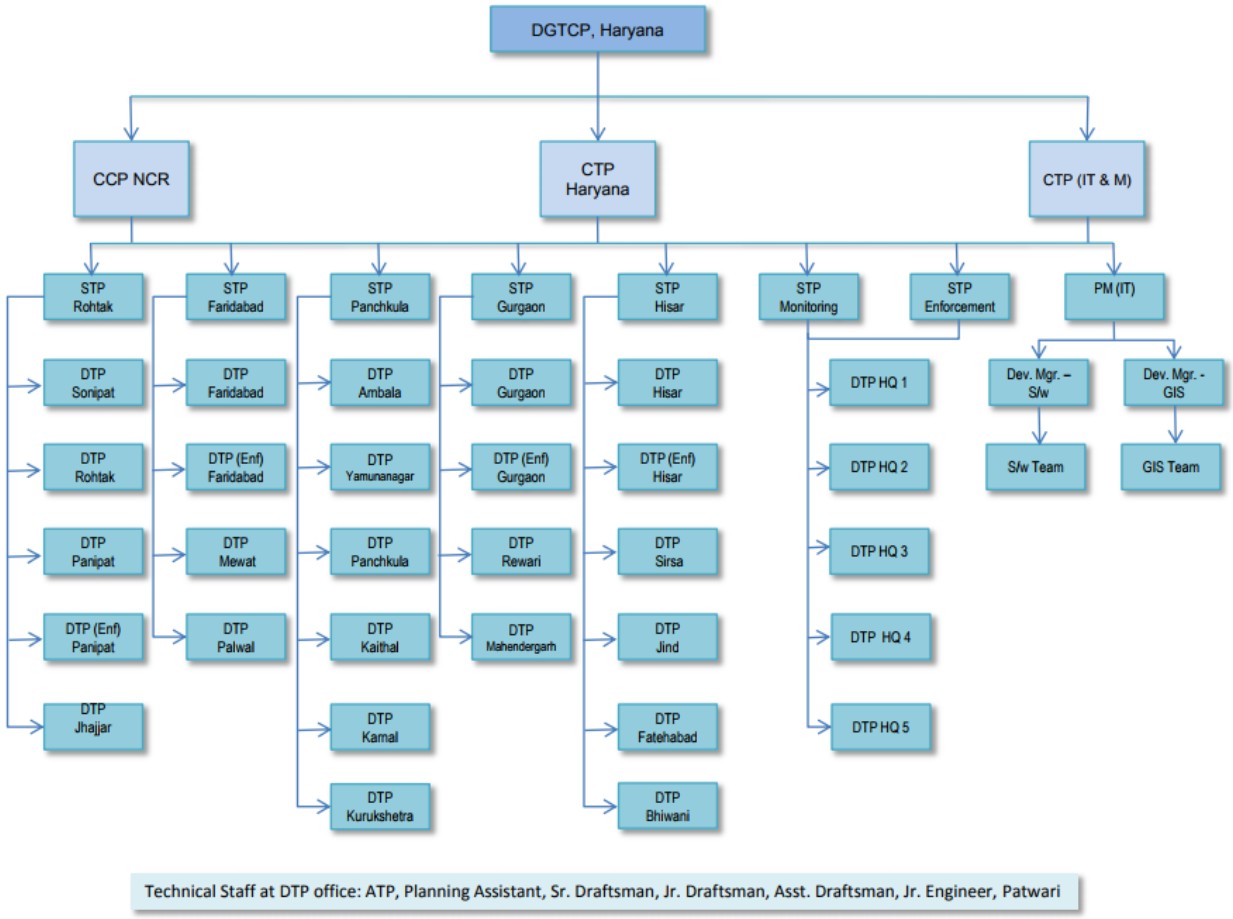
A variety of institutions are concerned with planning, development and management in Rohtak. Apart from the Municipal Corporation which is the core agency for providing public amenities and city's administration, there are other agencies/department directly or indirectly involved in Rohtak's planning and development. Those institutions involved, can be categorized as local bodies, statutory bodies and State Government Departments. While local bodies are involved in day to day administration and provision of services to people, it is the responsibility of Government departments and statutory bodies to formulate appropriate guidelines, policies and legal frameworks.

8.3.1 Town & Country Planning Department

The Department of Town & Country Planning, Haryana is the nodal department to enable regulated urban development in the State of Haryana. The policies of the department aims at encouraging a healthy competition amongst various private developers and public sector entities for integrated planned urban development. The department also renders advisory services to various Departments / Corporations / Boards such as HUDA, Housing Board, HSIIDC, and Marketing Board to name a few. Major functions of the department are given as under:-

1. Prevention of unauthorized and haphazard construction and regulation of planned urban development under the provision of Punjab Scheduled Roads and Controlled Areas Restriction of Unregulated Development Act, 1963 by declaring controlled areas around towns and public institutions preparation of their development plans and sectoral plans for planned urban development.
2. To regulate the development of colonies in order to prevent ill-planned and haphazard urbanization in or around the towns under the provision of the Haryana Development and Regulation of Urban Areas Act, 1975.
3. Prevention of unauthorized constructions and regulation of planned urban development under the provision of the Punjab New Capital Periphery (Control) (Haryana Amendment) Act, 1971 applicable around Chandigarh in Panchkula District.

Figure 8.2 Organizational structures of Town & Country Planning Department



Sources: Town and Country Planning Department, Haryana

Fire Department

The organizational structure of the fire department is like:

Figure: 8.3Organizational structure of Fire Department

Sources: Town and Country Planning Department, Haryana

The main responsibilities of the fire department are as follows:

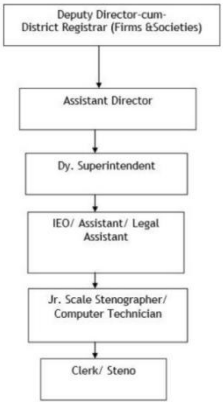
- Prevention and combating of fire incidences.
- Issue of fire safety guidelines.
- Issue of no objection certificate from the fire safety.

- Providing fire services in MCR
- Maintenance of fire vehicles/ fire training
- NOC for building
- Fire training.
- To attend fire calls.
- To maintain fire record as per occurrence book.

8.3.2 Department of Industries and Commerce

The Industries & Commerce Department, Haryana, is responsible for the development of industrial sector in the State. It functions as the nodal department to promote industries and to facilitate the entrepreneurs in setting up of Industries in the State. The role of the department is promotional and that of a motivator. Potential entrepreneurs are advised regarding availability of land, procedure for allotment of land, conversion of land use, incentives and concessions available to the industry, pollution control and other clearances required and facilities available from other Government departments / agencies. It is also the nodal department of the State for implementation of Central Government policies relating to the manufacturing and commerce. To that end, it is responsible for provision of a policy framework, facilitation and advisory services for ease of starting businesses, drive the industrial infrastructure development for provision of developed land for the industrial ventures and coordinates with various related government departments (i.e. Commercial Taxes, Labor, Town & Country Planning, Pollution Control Board etc.) for various clearances and enforcement of the regulatory requirements. Below shows the organizational setup of staff of DIC:

Figure: 8.4 Organizational Structure of Department of Industries and Commerce



Sources: Department of Industries and Commerce

Objective of the DIC are like Creation of industrial infrastructure, Estate Management activities, Facilitation - ease of doing business, Promotion/ facilitation of industries through financial assistance/ incentives, Thrust to DMIC project initiatives, To promote investments in the State, Cluster development - enabling environment for MSME Sector, Development of food processing sector, Generation of employment opportunities, Facilitation of industries through sample testing/job work, Release of R&R/Annuity benefits to land owners, To introduce efficient systems of Government Procurements.

8.3.3 Public Health

Specifically to the water and sanitation sector the Public Health Department plays a crucial role. There are some functional overlaps between the Municipal Corporation and Department of Public Health, e.g. concerning sewerage, drainage, and storm water drains where MC Rohtak and PHD are sharing responsibilities.

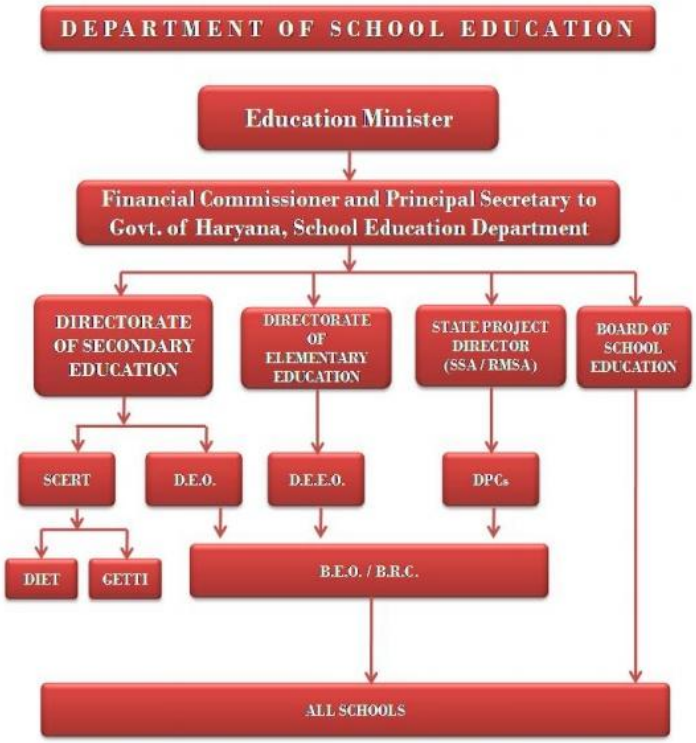
The duties of this department are as follows: Give the provision of piped Drinking Water supply in Villages & Towns, Sewerage Facilities in Towns, Storm Water Disposal in Towns, Construction of Sewage Treatment Plants, and Sanitary Amenities in Government Buildings etc. This also incorporates water obstruction, treatment, conveyance, storage and distribution to the ULBs. However there is a proposal for complete handing over of sewerage system along with operation and maintenance of STPs to MC Rohtak.

8.3.4 Education

Rohtak has 16 National Government institutes, making it one of the biggest educational hubs of the country. Rohtak Lok Sabha constituency is the only constituency in India to have AIIMS, IIM and IIT. Current renowned health university named after Haryana's first Chief Minister, Pt. Bhagwat Dayal Sharma will be upgraded to AIIMS at cost of Rs. 200 Crore. Indian Institute of Management Rohtak is currently being set up with a budget of Rs. 1150 Crore. IIM Rohtak is amongst the top management institutes in India and is positioned as analytics hub in India. Indian Institute of Technology Delhi extension campus also being set up with a budget of Rs. 50 crore. These institutes along with Haryana's biggest university according to number of students enrolled Maharishi Dayanand University and numerous other universities of fashion technology, State Institute of Film and Television make it an educational city.

Pt. B.D. Sharma PGIMS Rohtak.Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences or PGIMS Rohtak is a graduate medical institute in the city of Rohtak, India. The institute offers various courses in major specialties of medicine.

Figure: 8.5 Organizational structure of Department of Education



Sources: Department of Education, Haryana

8.3.5 Northern Railway

"After all, what other experiences do we have to compare with travel as opportunities to expand our horizons (geographically, culturally, emotionally, intellectually) to encounter people, cultures and places so different from ourselves?" This is what Mick Smith and Rosaleen Duffy conclude in their analyses of Contemporary Geographies of Leisure, Tourism and Mobility. The efficacy of travel can never be over-stated and undertaking travel in the current times is increasingly becoming effortless thanks to the commitment and Zeal on the part of Railways, owing to their improved and widespread network.

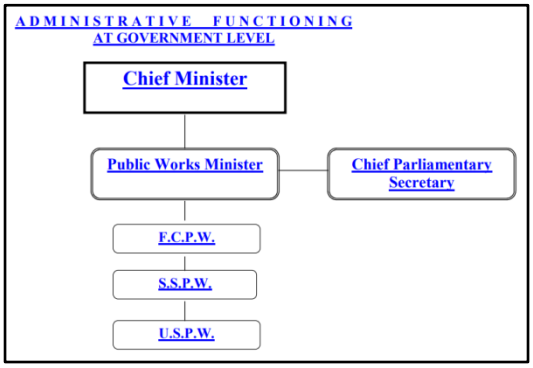
Northern Railway, the Jewel Set in the Crown of Indian Railways, has embarked on the mission to vanquish distances and create its own metaphor of existence. Formally established in the year 1952, it remains the largest zone in terms of route Kilometers, even after the re-organization of the Indian Railways into 16 zones. Northern Railway now comprises of 5 Divisions-Ambala, Delhi, Ferozpur, Lucknow and Moradabad.

Spreading across the states of Jammu & Kashmir, Punjab, Haryana, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Delhi and the Union Territory of Chandigarh, Northern Railway seems to have the vantage point of standing atop the peninsula and transposing its work rhythms to the rest of the country.

8.3.6 PWD (B & R)

Public Works Department is the premier agency of Govt. of Haryana engaged in planning, designing, construction and maintenance of Government assets in the field of built environment and infrastructure development. Assets in built environment include Hospitals, Schools, Colleges, Technical Institutes, Courts etc; assets in infrastructure development include Roads, Bridges, Flyovers, and Footpaths etc.

Figure: 8.6 Organizational structure of Public Works Department (B & R)



Sources: Public Works Department (B & R), Haryana

8.3.7 Transport Department

Vision of HRTC is to provide adequate, economical, efficient, reliable, comfortable, safe and environment-friendly modern passenger transport services for the people. Government of Haryana is committed to make endeavors towards creating social value by providing efficient, reliable and eco-friendly modern transport services for the safe movement of people and goods with liberal use of modern day Information Technology and involvement of private sector, which is considered necessary in this era of liberalization and globalization. Mission of the HRTC are describe below:

- To improve and strengthen public transportation services for rural & urban areas in the State.
- To provide bus services at reasonable cost and to create adequate infrastructure.

8.3.8 Haryana Police

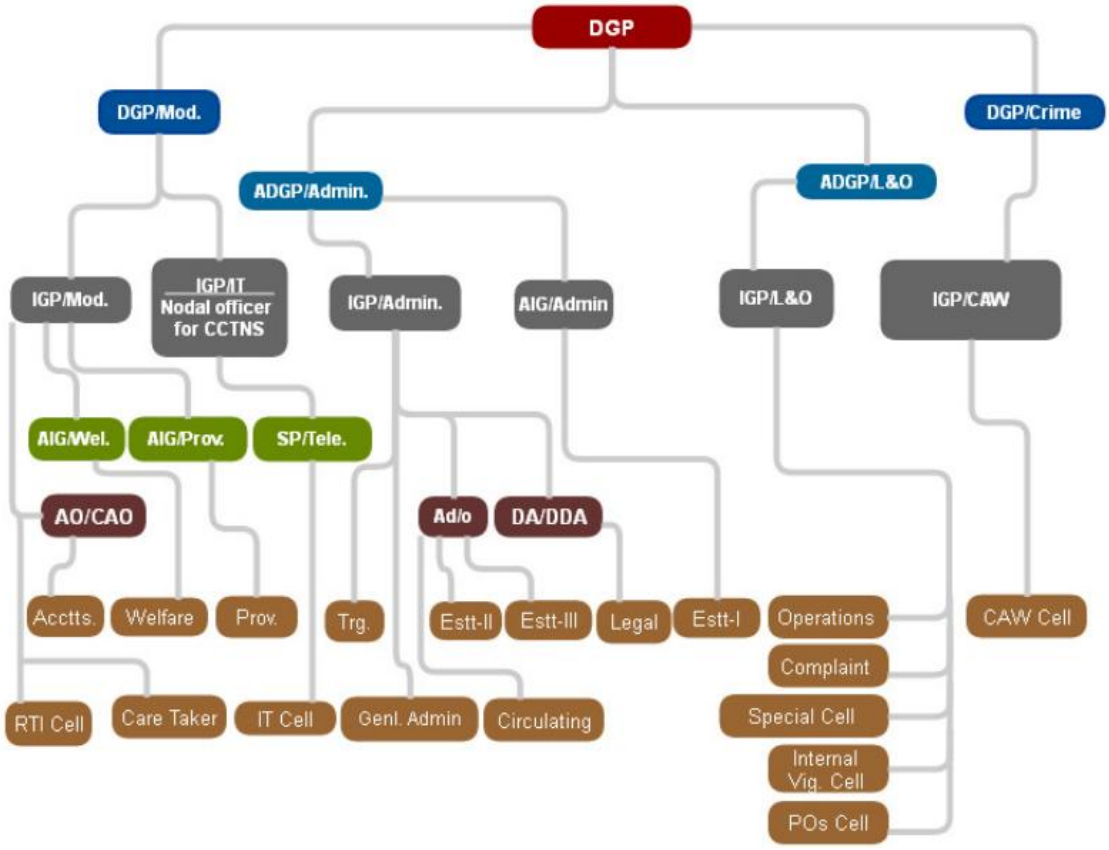
On the pattern of the colonial Irish constabulary, Sir Charles Napier established a police system in Sindh in 1843. The British Army Officers closely supervised and controlled forces which were resultantly more disciplined, efficient and not corrupt. Influenced by the success of Napier's police, the Court of Directors of the East India Company suggested that a common system of police be established on the pattern of Irish Constabulary.

The British Indian Government set up a Police Commission headed by Mr. H. M. Court in 1860. One of the policy directives to the Police Commission of 1860 was that "though the duties of the police should be entirely civil, not military, the organization and discipline of the police should be similar to those of a military body". The present police system in our country has been established under this Character.

The Punjab Police Rules were framed in 1934, which still govern the police organizations in the north Indian States of Punjab, Himachal Pradesh, Delhi, Chandigarh and Haryana

The State of Haryana was carved out of Punjab on 1st of November, 1966. At that time it comprised of one police Range and 6 districts and had strength of 12165 personnel. Today, the State is divided into 4 Ranges, 3 Police Commissionerate - Gurugram, Faridabad, Ambala-Panchkula and 17 districts besides the Railway Police district. Below the organization chart shows the detail description of police department Haryana.

Figure: 8.7 Organizational structure of Police Department



Sources: Police Department, Haryana

8.3.9 Judiciary

Public Service Commissions, both at the Union and at the State level, are amongst the most important Public Institutions with long traditions which have served well. The establishment of this Institution had its origin in the history of Indian nationalism and the persistent demand of the leaders of freedom movement for progressive Indianization of the Civil Service under British Raj. The Montagu-Chelmsford Report accepted in principle the demand for Indianization of the higher civil services and accordingly a provision for this was made in the Government of India Act, 1919. The Royal Commission of the Superior Civil Service in India under the Chairmanship of Lord Lee, in its 1924 Report, recommended setting up of Public Service Commission of India. The Public Service Commission of India was set up on 1st October, 1926 under the Chairmanship of Sir Ross Barker.

The first Commission at the provincial level was the Madras Service Commission established in 1930 under a 1929 Act of the Madras legislature. The Government of India Act, 1935 provided for the establishment of a Public Service Commission for each Province. Accordingly, under the 1935 Act seven Public Service Commissions

were established in 1937 for the provinces of Assam (at Shillong), Bengal (at Calcutta), Bombay and Sindh (at Bombay), Central Provinces, Bihar and Orissa (at Ranchi), Madras (at Madras), Punjab and North-West (at Lahore) and the United Provinces (at Allahabad). All the State Public Service Commissions including the successors of the older Provincial Public Service Commissions came to be established after the reorganization of States after independence.

The State of Haryana came into existence under the provisions of Punjab Re-Organization Act, 1966 (No. 31 of 1966), with effect from 1st November, 1966, when the Haryana Public Service Commission also came into existence.

8.3.10 Animal Husbandry

Haryana has a prominent place in the livestock map of the country in spite of being one of the smallest (1.3 % of total geographical area) States of India. The animal husbandry activities in the State play a pivotal role in the rural economy through a variety of contributions in the form of income generation, draft power, socio-economic up-liftment, employment avenues and better nutrition to human population through livestock products like milk, eggs & meat etc. Aim and Objective of the animal husbandry department are given below:

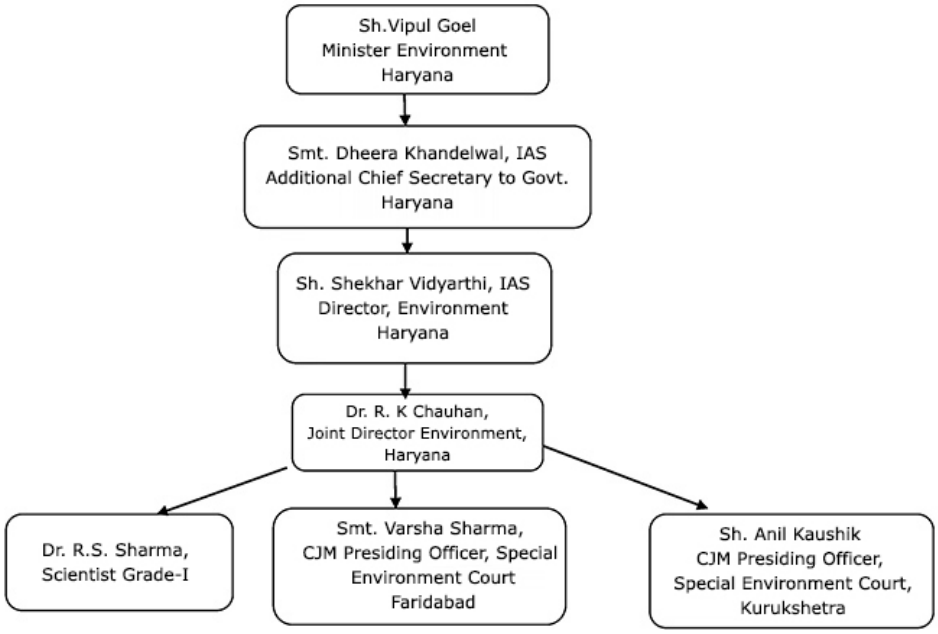
- ✓ To provide veterinary health care and diagnostic facilities.
- ✓ To provide quality breeding services to enhance productivity.
- ✓ Up-gradation and conservation of indigenous breeds.
- ✓ Quality control of Feed, Milk and Milk products.
- ✓ Veterinary Extension, Education and Training.
- ✓ Promotion of Dairying for self-employment.
- ✓ Special livestock production programme for social up-liftment.
- ✓ Fodder Production
- ✓ Misc. activities related to Livestock development in the state.

8.3.11 Dept. of Environment

The Department of Environment, Haryana is a Ministry and department of the Government of Haryana in India. This department came into existence when Haryana was established as a new state within India after being separated from Punjab. This department looks after environmental related concerns in the state of Haryana. The department of Environment is taking necessary steps for protecting and preserving our

environment. Conscious and focused efforts have been made to create awareness among the citizens regarding the urgency and importance of preserving our environment.

Figure: 8.8 Organizational structure of Dept. of Environment



Sources: Dept. of Environment, Haryana

8.3.12 Power Department

Haryana Power sector comprises four wholly State-owned Corporations viz. HPGCL, HVPNL, UHBVNL and DHBVNL which after unbundling of the HSEB in 1998 are responsible for power generation, transmission, distribution and trading in the State. These utilities and the HERC work under the administrative control of the Deptt. of Power which is headed by Principal Secretary, Power.

The State power sector was restructured on August 14, 1998. The Haryana State Electricity Board (HSEB) was reorganized initially into two State-owned Corporations namely Haryana Vidyut Prasaran Nigam Ltd. (HVPN) and responsible for operation and maintenance of State's own power generating stations. HVPNL was entrusted the power transmission and distribution functions.

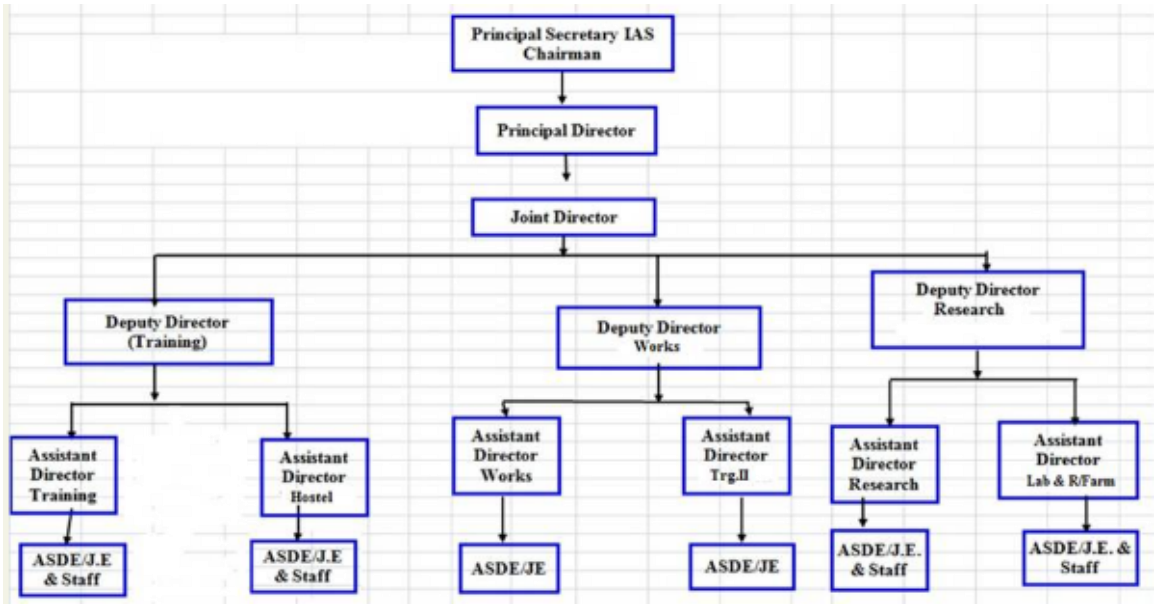
We at HPU (Haryana power Utilities) follow the P2P theory of doing business. That is 'Power to People'. State divided under two jurisdictions with district participation.

- Haryana Power Generation Corporation Limited(HPGCL) (Genco)
- Haryana Vidyut Prasaran Nigam Limited (HVPNL) (Transco)
- Uttar Haryana Bijli Vitran Nigam Limited (UHBVNL) (Disco)
- Dakshin Haryana Bijli Vitran Nigam Limited (DHBVNL) (Disco)

8.3.13 Irrigation & Water Resource Department

Irrigation and Water Resources Department is the principal department of the Haryana state for development and management of surface water resources, operation, maintenance & construction of canals and watercourses, flood control & management, river training works. One of the main responsibilities of the department is to ensure availability of water from various rivers according to the various interstate agreements & orders and further equitable distribution in the State for irrigation and other uses. For supply of irrigation water, Haryana has developed an extensive irrigation network consisting of 1479 channels having a length of 14541.81 km.

Figure: 8.9 Administrative set-up of Irrigation & Water Resource Department



Source: Irrigation & Water Resource Department, Haryana

8.3.14 Tourism Department

The primary function of the Tourism Department is to develop tourism infrastructure in the state. The development of tourism in public sector is done by way of funds received from the State Government in its annual/five year plans. In addition, the Tourism Department makes efforts to get maximum possible central financial assistance from Government of India for creation of tourism infrastructure. Once developed and furnished the tourist complexes are handed over to the Haryana Tourism Corporation for their maintenance and operation as an agent of the State Government.

The expenditure on the maintenance of infrastructure of tourist complexes is also borne by the Tourism Department for which funds are provided in the non-plan

budget every year. Similarly, funds are also provided for publicity of the tourism infrastructure of the State. As on date the department has set up a network of 42 tourist complexes spreading all over the State.

OTHER THAN

Rohtak District was given a share with four Tehsils i.e. Rohtak, Sonipat, Jhajjar & Gohana with Nahar & Meham as sub-tehsil of Jhajjar and Gohana tehsils respectively. The board function of municipal corporations are as follows, like Urban planning including town planning, Regulations of land-use and construction of buildings, Planning for economic and social development, Roads and bridges, Public health, sanitation conservancy and solid waste management, Fire services, Urban forestry, protection of the environment and promotion of ecological aspects, Safeguarding the interest of weaker sections of society, including the handicapped and mentally retarded, Slum improvement and up gradation, Urban poverty alleviation, Provision of urban amenities and facilities such as parks, gardens, play-grounds, Promotion of cultural, educational and aesthetic aspects, Burials and burial grounds, cremations, cremation grounds and electric crematoriums, Cattle ponds, prevention of cruelty to animals, Vital statistics including registration of births and deaths, Public amenities including street lighting, parking lots, bus stops and public conveniences, Regulations of slaughter houses and tanneries. Below table shows the Sub Division and Tehsil.

Table no: 8.1 Distribution of Rohtak District

Distt.	Sub Divn.	Tehsil
Rohtak	(1) Rohtak (2) Meham	1. Rohtak 2.Meham 3. Sampla 4. Kalanaur

Block	Panchayats	Villages
Rohtak	47	48
LakhanMajra	13	13
Meham	34	24
Kalanaur	24	25
Sampla	21	20
Total	139	130

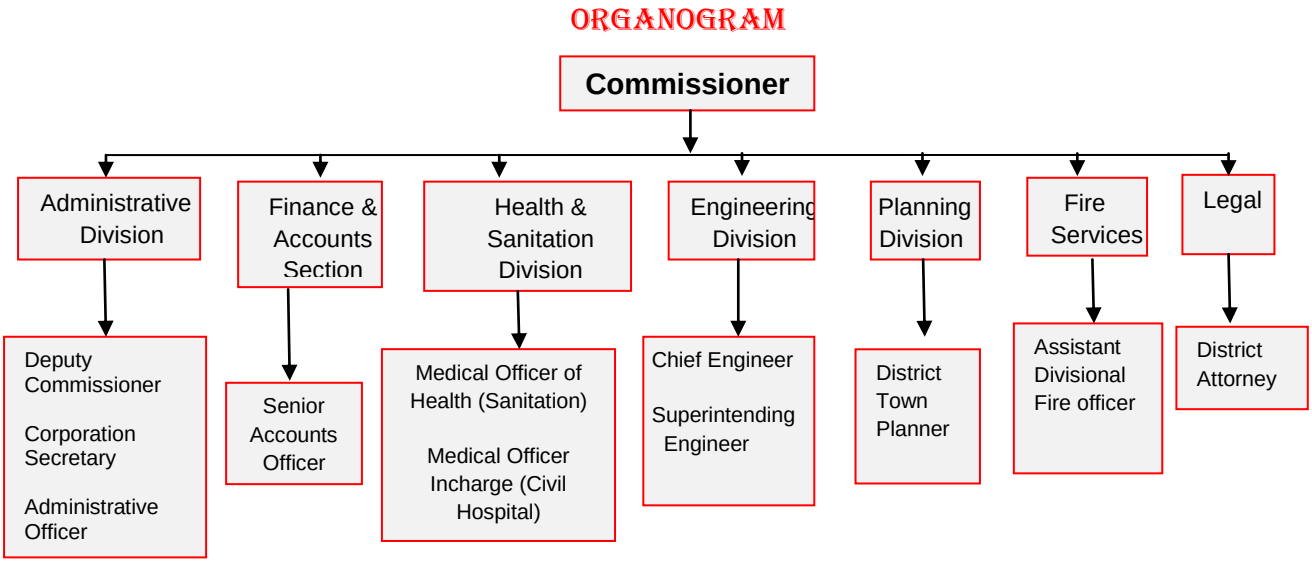
Sources: Municipal Corporation Rohtak, 2016

8.3.15 Municipal Corporation of Rohtak (MC Rohtak)

In 2001 Rohtak having the 31 no. of wards and after the formation in 2010, MC Rohtak is as the urban local body the no. of wards are merged in each other and

compiled in with notification in total 20 wards. The MC Rohtak consists of an elected body and an administrative wing. Below the organogram shows the structure of whole MC wing.

Figure No.: 8.10 Organizational Structure of MC Rohtak



Sources: Municipal Corporation Rohtak

8.4 Government Undertakings / Agencies

8.4.1 Haryana Urban Development Authority (HUDA)

The Haryana Urban Development Authority, a statutory body of Haryana Government, was constituted under the Haryana Urban Development Authority Act, 1977. HUDA is committed for acquisition of land, Planning & Urban Design Development with basic infrastructure facilities. HUDA is working also for sale of developed residential, commercial, industrial and institutional properties. HUDA is responsible for new development and functions of cities with new technologies.

8.4.2 SUDA (Special Urban Development Authority)

The State Urban Development Authority (SUDA), Haryana was constituted by Haryana Government in 1991 for the purpose of identification of urban poor families and implement various urban poverty eradication programmes launched by Govt. of India and Haryana Government from time to time. There are tentatively 80 ULBs (10 Municipal Corporations, 18 Municipal Councils and 52 Municipal Committees) in Haryana, which are either District Head-quarter towns or having urban population above one lakh as per Census-2011. However, the Mission Director, State Urban

Development Authority, Haryana (SUDA) may increase or decrease the number of ULBs/Towns as per its requirement at any time without assigning any reason.

8.4.3 Haryana State Industrial & Infrastructure Development Corporation Ltd. (HSIIDC)

As the Indian Economy continues to grow by leaps and bounds, Haryana aptly epitomizes the growth story of India. In keeping with this spirit, HSIIDC continues to drive Haryana on the roads to infrastructure and industrial development thereby catalyzing all round economic growth in the State. Right from provision of state-of-the-art infrastructure to facilitation, HSIIDC ensures a smooth start up support to the new enterprises.

HSIIDC is a company incorporated on 08.03.1967, under the provisions of the Companies Act, 1956 with the objectives to develop industrial infrastructure in the State of Haryana under the aegis of Department of Industries and Commerce, Haryana. 100% equity of the Corporation is held by the State Government and as such the Corporation is a Government Company under section 617 of the Companies Act, 1956.The vision of the HSIIDC is “Driving all round economic development in the State by providing world class infrastructure and inspiring entrepreneurship, resilience and success through timely provision of support services and facilitations.”

8.4.4 HSAMB (Haryana State Agriculture Marketing Board)

After the creation of State of Haryana in 1966, the State began its exciting and inspiring story of development. In the agricultural sector, with success of green revolution, Haryana became the second State having large agriculture surplus. State of Haryana is regarded as the wheat basket and rice bowl of India, contributing 45% of rice and 65% of wheat to the central pool and more than 5% to total food production of the country.

It was, therefore, imperative that a strong and efficient marketing infrastructure is created by setting up modern markets and evolving a feasible and efficient marketing system in the State. The pre-requisite for this was the constitution of an Agricultural Marketing Board.

Therefore, Haryana State Agricultural Marketing Board was constituted on 1st August, 1969 with its headquarter at Chandigarh, the capital of Haryana. At the time of its inception, there were only 58 Market Committees in the State with 58 Principal yards and 60 Sub Yards. Even these markets were small and congested and lacked the basic amenities and facilities for proper handling of the arrivals. The farmers had to

travel long distances even upto 50 to 60 kilometers to bring their produce and often on Katcha roads, to the Markets.

The Haryana State Agricultural Marketing Board was set up on 1st August, 1969 for exercising superintendence and control over the Market Committees of Haryana. The primary objective of the Board has been to set up a marketing infrastructure for better regulation of the purchase, sale, storage and processing of agricultural produce within the framework of Punjab Agricultural Produce Markets Act, 1961 and Punjab Agricultural Produce Markets (General) Rules, 1962. The Board, therefore, regulates the marketing of agricultural produce. It provides infrastructure for facilitating marketing of agricultural produce. It supports agricultural development. The Aims and Objectives are given below:

1. Creation of statewide agricultural produce marketing infrastructure, comprising of various market yards, purchase centers, link roads etc.
2. Profit maximization for farmers by ensuring best-possible prices for their produce at the various market yards, sub yards and purchase centers.
3. Regulation and administration of various Market Committees all across the state as per the Punjab Agricultural Produce Markets Act, 1961.
4. Collection of Market Fee and other levies from the purchasers on various transactions taking place at the Mandis.
5. Creation of additional facilities, along with expansion and maintenance works on behalf of various Market Committees.
6. Facilitating the procurement activities of organization such as FCI, Warehousing Corporation, HAFED etc. at various markets / Mandis.

8.4.5 National Highway Authority of India (NHAI)

The National Highways Authority of India was constituted by an act of Parliament, the National Highways Authority of India Act, 1988. It is responsible for the development, maintenance and management of National Highways entrusted to it and for matters connected or incidental thereto. The Authority was operationalized in Feb, 1995.

8.4.6 Housing Board, Haryana

The Housing Board Haryana came into existence during the year 1971 in pursuance of the Haryana Housing Board Act (Act No. 20 of 1971). The Act was

published in the State Government's Extraordinary Gazette of May 18, 1971. The main objective of the Board is to construct houses for allotment to the public in accordance with the guidelines issued by the State Government and the prescribed procedure. The emphasis is to construct houses for socially and economically weaker sections of the society. At the apex level, there is a Board of members appointed by the State Government under Section 3 of the Act. Chairman heads the Board. The Board so set up decides all the policy matters. Chief Administrator is its Chief Executive. The Board has set up construction divisions, design cell, and other necessary paraphernalia for carrying out various activities.

8.4.7 Haryana Pollution Control Board

This department is concerned with preventing, controlling and decreasing pollution and preparing a comprehensive program for targeting these goals. The Haryana State Pollution Control Board is the implementing agency and department of environment exercises administrative control over its functioning.

8.5 Allocation of roles and responsibilities

Governance and Institutional Framework

Municipal Corporation Rohtak is responsible for providing basic infrastructure facilities under its jurisdiction. Other state level agencies are also involved to provide urban services. The chapter shows the **roles and responsibilities** of different authorities.

8.5.1 Municipal Corporation Rohtak

- MCR is working authority for civic infrastructure for citizens. MCR is organized water supply scheme, solid waste management, street lighting
- Administrative services like maintaining public amenities, issuing certificates etc.
- Regulatory services like issuing licenses, birth certificate, death certificate, issuing notices and other certificates for taxation purposes, Building plan approval, property tax collection etc.
- Social security schemes, social welfare programme etc.

8.5.2 Haryana Urban Development Authority

The Haryana Urban Development Authority, a statutory body of Haryana Government, was constituted under the Haryana Urban Development Authority Act, 1977. HUDA is committed for acquisition of land, Planning & Urban Design

Development with basic infrastructure facilities. HUDA is working also for sale of developed residential, commercial, industrial and institutional properties. HUDA is responsible for new development and functions of cities with new technologies.

8.5.3 Urban Local Bodies

ULB have aim to provide the policy framework for the Urban Development in the State of Haryana. It is maintains authority of civic amenities.

8.5.4. Public Works Department (PWD)

PWD is responsible for maintenance of roads (Highways and District Roads) and roadside drains in urban areas. PWD has initiated improvement and maintenance of roads in Rohtak. PWD also authorized for sewerage management and construction of STPs.

8.5.5. The Town and Country Planning Organization

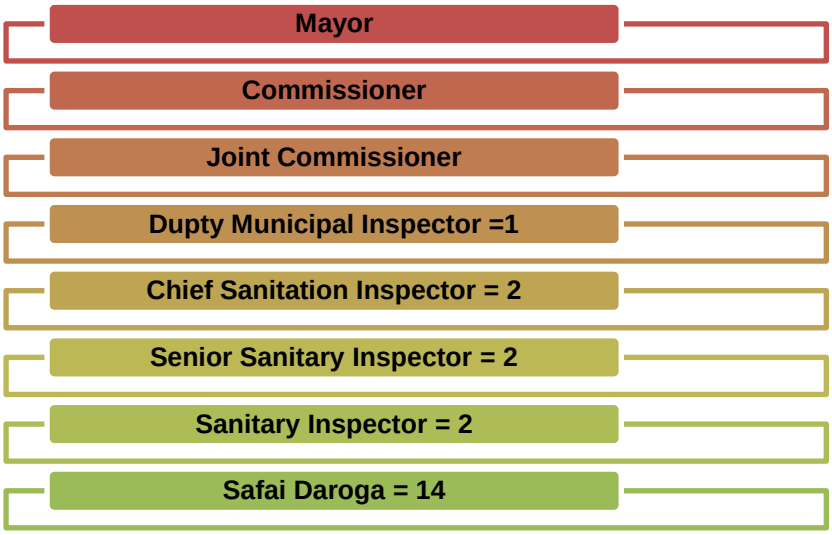
TCPO is the prime agency for providing technical inputs for the planned development of urban settlements. The TCPO a) prepares Master Plans for the State's cities and towns; b) prepares detailed development plans; c) provides guidance to local bodies and Development Authorities on plan implementation; d) prepares area development plans for controlled areas.

8.5.6. National Capital Region Planning Board

Rohtak has location in NCR jurisdiction. NCRPB is helping for prevent of pollution and another development projects.

8.5.7 Existing Institutional Frame work for Sanitation

Figure No. 8.11 Institutional Framwork for sanitation



Sources: Sanitation Department, MC Rohtak

8.5.8 Institutional Arrangement

Figure No. 8.12Institutional Arrangement

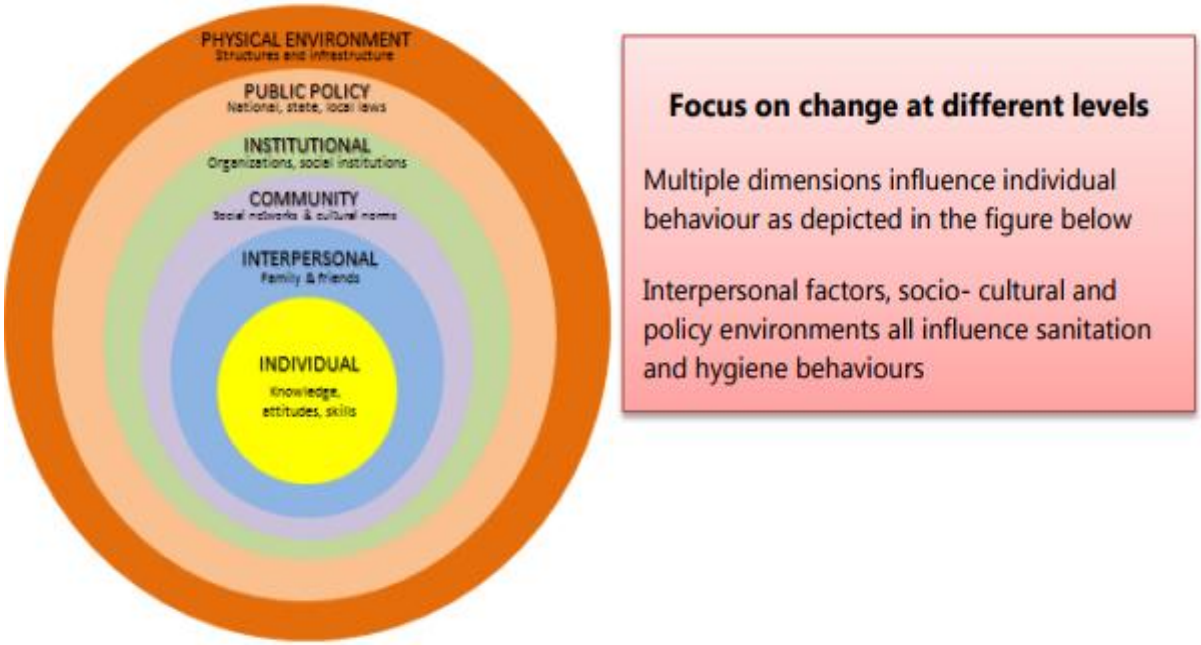
Sources: MC Rohtak

8.6 Role and Strategy for Awareness

Improved sanitation is not prioritized in many households and the links between open defecation and common diseases, including diarrhea (gastroenteritis) and other sicknesses are not understood. Practicing open defecation creates an environment where disease transmission takes place and it is young children in particular who pay the highest price. Over 80% of all deaths due to diarrhea among children under-five years of age are directly attributable to poor sanitation, unsafe drinking water and unhygienic practices. However, most communities do not view diarrhea as life threatening. So, there is urgently required to take essential steps about citizen's awareness of City sanitation plan and its implementation on social level.

For achieving a positive change in human behavior it is important to recognize that individual behavior is complex. Human behavior is determined by close social networks and also the socio-cultural and physical environment that each person lives in. Bringing about changes in an individual's behavior requires a look at the person's environment at different levels, from the household and community to the institutions responsible for support and the policy framework. Each of these levels influences how an individual behaves. Below figure shown the focus on change at different levels.

Figure No. 8.13 Different levels of social Awarness



8.6.1 Informing the community about the scope of the plan and activities.

Mobilizing communities and promoting people-centric approaches for Community groups, ranging from civic, religious, educational, commercial, sports, entertainment and other stakeholders, all can help to transform society and influence policy and behavior. People-centric approaches for hygiene, sanitation and water supply can be defined by demonstrating and applying people's rights and responsibilities to these basic services. The scope of the plan and activities will focus on advocating water, sanitation, hygiene and safe water practices and promoting of appropriate technologies such as rainwater harvesting and other people-centric initiatives. They can be mobilized by organizing awareness campaigns, holding of public rallies, debates, multi-stakeholder dialogues, staging concerts, exhibitions, competitions, drama and folk theatre presentations as well as other public awareness activities through inter-personal communications where possible.

8.6.2 Bridging gaps by sharing information, both technical and nontechnical like cleaning septic tanks

For filling the gaps by sharing information, both technical and non-technical at various stages like cleaning septic tanks, SWM and other sanitation related services. Sharing the information with the citizens through the public place advertisements such as using digital media (short movies, songs, slogans etc.), advertisements in the print media, uploading the information on official website of MCR. Involving local social groups like NGOs or CBOs, social leaders, all may help for sensitization. For sharing

of technical information the demonstrations at the public places and in the targeted groups may be organized for citizen's participation for better understanding the technical options etc. the target is to achieve 100% availability of piped water as the safe source for drinking water.

8.6.3 Capacity development on technology options like the mobile applications for monitoring and social audit.

For capacity development on advanced technology based options like mobile applications for monitoring and information may be developed so that the stakeholders (social audit) may actively participate to achieve the goal of the CSP. The following points may be applied;

- To start with as a pilot project
- Contractual agencies are hiring on PPP model basis
- Fund utilization on skilled manpower and infrastructure development
- Outsourcing :

  i. Developed by the agency and operated by the MCR

  a. Training to the Staff

  b. Hiring the skilled manpower

  ii. Both developed and operated by the for MCR

8.6.4 Building awareness among citizen's safe water, sanitation and hygiene practices and health.

First of all the belongingness with the city by the stakeholders i.e. *'This is My City, I am proud of My City'* is very important to achieve the goals of CSP. Billions of people die each year due to unhygienic environments, their food and drinking water contaminated by faeces riddled with bacteria, viruses and parasites that cause diseases such as diarrhea and other stomach related diseases, the deadliest killer of children under five in developing countries. Solving the sanitation problem and helping people to practice better hygiene can save many lives and reduce incidence of disease. Saving from this there is required to generate awareness about safe water, sanitation and hygiene practices to protect human health. Public place advertisements through digital media like films, short movies or by help of printed material, using social media i.e. creating Whats app to spread the communication related these issues. The updated information may be uploaded on official website of MCR. Different

social groups like NGOs or CBOs, special social leaders (local public faces) may help for motivation and generating gathering for focus group discussions, demonstrations at the public places and in the targeted groups may be organized for citizen's participation for better understanding the technical options etc.

8.6.5 Building an atmosphere of trust and transparency between ULBs and stakeholders

For developing trust and transparency between Urban local body and stakeholders some following points to be considered, which are given below:

- Officers accessibility at various level (monitoring and inspection)
- Efficiency in terms of time-frame manner
- Citizen engagement with PPP Model
- Public suggestions
- Hiring of contractual agencies for technical and non-technical issues
- Social audit (information given to the stakeholders, monitoring and evolution)
- Financial status (funding share display) should be periodically uploaded on website of concern department

8.6.6 Generating willingness to pay for Facilities

Willingness to pay for new sewer connection:

Key point emerging out of willingness to pay for new sewer connection are as follows:

- Out of total establishments and residents surveyed (Primary survey, 2016) which are not connected to the central sewer system, approx. 51% of the respondents are willing to pay for a new connection as per MC Rohtak.
- About one third of respondents willing to pay for new connection said they are not willing to pay, while 22% did not respond.
- 27% of the respondent willing to pay for new connection said they are willing to up till 1000 Rs. Some respondents who are not willing to pay for sewer connection also outlined the reasons for the same. About one third of them felt that since they do not have access to individual toilet facilities, they are not willing to pay for a sewer connection. Other reasons for the lack of willingness include non-affordability, doubts regarding the efficiency of the system and provision of the sewer system is responsibility of the local body so has to be free.

Willingness to pay for Door to Door Solid Waste Collection:

- The majority of those having door to door collection system are willing to opt for door-to-door collection of garbage.
- Some of the respondents also said they are not willing to opt for door-to-door collection system.
- Out of those who are willing to pay for the door-to-door collection system, the majority cited having their own staff/system for the same as a reason for their non willingness to pay. Big hotels, schools and offices are some example where there is own cleaning staff for garbage collection and disposal.
- Other reason for opting for municipality door-to-door collection include municipal bin in proximity, vehicle facility of collection system and good efficiency of the system is also made them willing to pay for SWC.

8.7 Capacity Building

8.7.1 Training

Capacity building program started by Central Level and State Level for employs and stakeholders under AMRUT, Swachh Bharat Mission and Smart Cities.

Table no. 8.2: Capacity Building process

Sanitation Component	Senior officials	Technicians/Operating Staff/ Workers
All Departments	• Municipal Legislation; powers and duties • Citizen Charter and commitments • Urban Reforms and AMRUT • Service Level Benchmarking • Procurement and PPPs • Information Systems Improvement • Use of Computers and Office applications	• Rights and responsibilities • Good Safety, Health and Environment Practices • Citizen Charter and commitments
Water Supply	• CPHEEO Manual and norms • Developing a Water Supply DPR • Benefits and approach to shift to 24x7 • Approach to conduct a Water Loss Audit • Approach to sizing Discreet Metering areas • MIS generation and SLB reporting	• Water Quality Testing methods • Guidelines for providing a ferrule connection • Installation of Meters/Reading. • Repairing water leakages • Handling pipe breaks • Field Inspections and reporting • Use of equipment

		and safe work practices
Sewerage	• CPHEEO Manual and norms • Developing a Sewerage DPR • Treatment systems including decentralized options and septage management • Recycling/Reuse and Methane Generation • Onsite sanitation options and mechanisms for monitoring compliance • MIS generation and SLB reporting	• Septage management • Water Quality Testing • Guidelines for providing connections • Repairing pipe breaks and choking • Field inspections and reporting
Solid Waste Management	• Implementing Door-to-Door collection and source segregation • Waste collection routing • Awareness generation and Community mobilization • PPPs and Contracting • Waste recovery and Landfill technologies • Toilet construction	• Optimal routing of door-to-door collection • Courteous citizen interaction • Segregation techniques Safe work practices including use of accessories, gloves and other safety equipment
Finance and Accounts	• Budget preparation and Reporting • Financial Management • Variance Analysis • MIS and Information Management • Audit and Statutory requirements	• National Municipal Accounting Manual and local accounting rules • Accrual Accounting • Accounting software

Sources: Primary Observation, 2016

8.8 Brief Assessment of Municipal Finance

This section assesses the financial performance of the Municipal Corporation of Rohtak (MC Rohtak). It will help in providing an understanding of the existing sources of revenue and expenditure as well as the receipt and payments of the corporation. Such analysis will give an indication of the overall financial health of the utility.

8.8.1 Receipts

There has been a negative change in Income of Municipal Corporation Rohtak which is described in detail below:

Table No.: 8.3 Consolidated Receipt (Rs. In Lakhs)

Receipt	2014-15	2015-16	2016-17	Actual Expenditure Aug., 2017
Stamp Duty	2786	1052	1157	0
Tax collection – House tax proposed & Arrear, Fire tax, Motor tax, Service Tax, Electricity Duty (Municipal Tax), Show Tax	476.06	1949.52	1098.24	485.04
Miscellaneous (Tower Fees, RTI, Interest Rrcvd. Tender from fess, Transfer fees)Fire charges, Fire N.O.C	497	936	782	23
Contract of Dead Animal	7	0	13	0
Development Charges	511	616	545	172
Coping Fees	12	21	20	8
Rent	129	151	170	61
Sale of Land /Auction of shops	43	13	9	19
Garden & Road Side Trees	0	0	0	0
Tehbazari	4	4	4	2
Advertisement	1	81	63	53
Slaughter House	1	0	0	0
Excise Duty	250	0	0	5
Commercial Trade License	24	26	33	8
Adv. & Dep. Earnest money & Security etc.	201	256	326	215
Cess	62	81	94	46
Total Receipts:	5005	5187	4315	1098

Sources: Budget Statement, MC Rohtak.

8.8.2 Expenditure

The total actual expenditure has been subject to different heads are given below:

Table No.: 8.4 Consolidated Expenditure (Rs. In Lakhs)

Expenditure	2014-15	2015-16	2016-17	Actual Expenditure Aug., 2017
Establishment Expenses	2742	3258	3973	1633
Office Contingency	397	241	725	86
Misc. Expenditure	767	576	915	368
Poor Relief Fund/Dev. Work	571	428	369	223

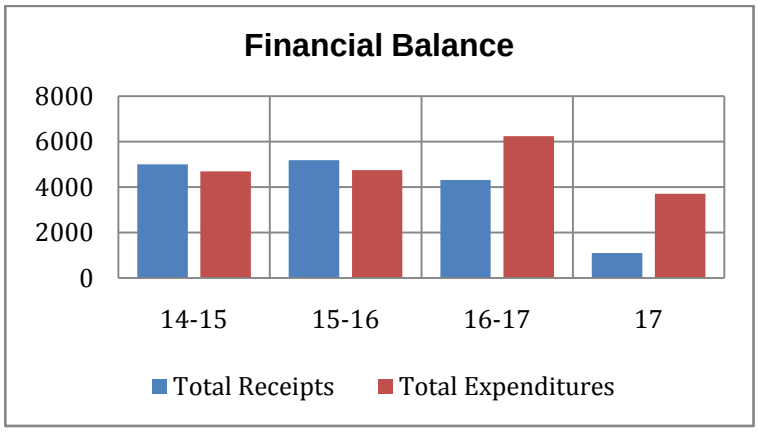
Purchase of Vehicle & Equipments	0	75	0	0
Advance & Deposited	163	147	223	75
Service Tax	46	20	32	18
Cess	11	0	0	0
Planning/Survey/Sites	0	0	0	.04
Proposed payment of sanitation	0	0	0	1303
Total Expenditure	4694	4744	6238	3701

Sources: *Budget Statement, MC Rohtak.*

8.8.3 Financial Balance

The municipal corporation of Rohtak has not managed to obtain an overall negative surplus between years 2014 to 2017. Which are detailed discussed in above tables and their financial balance should be described below. This could be an indicator that Rohtak is one its way to managing their finance in not a sustainable manner.

Chart No.:8.1 Financial Balance



Sources: MC, Rohtak

8.9Key Stakeholders in Sanitation Sector

Table no.: 8.5 Role of stakeholders in Sanitation Plan

S.N.	Stakeholders	Responsibilities (as service provider)	Responsibilities (as a user)
1	MC Rohtak	Provision of services (Water supply, Sanitation and solid waste)	
2	Other line department	I&WRD and PHD is responsible for water and sewerage (designing and laying the lines) PWD is responsible for storm water drains.	
3	NGOs	NGOs (are involved in O&M of public toilets)	Awareness generation

4	Private Sector	Working as per service assigned to them by the MC Rohtak and line department under PSP and PPP model. Currently involved in SWM also.	Adherence to the service norms set by the MC Rohtak.
5	Tourism Industry		Adherence to the norms Educating tourist to follow norms and standards set by the MC Rohtak.
6	Hospitals		Adherence to the norms of bio medical waste disposal Communicating relevant health & hygiene messages along with MC Rohtak.
7	Other Institutions Schools/Educational Institutions		Adherence to the norms set by the MC Rohtak. Proactive participation in awareness generation.
8	People		Hygienic practices, maintaining city's environment and cleanness.

Sources: Primary Observations, 2016

8.10 SWOT Analysis

Table No.: 8.6 SOWT Analyses

Key Aspects	Strengths	Weakness	Opportunities	Threats
Water	Canal water sources in form of man-made drains	Water quality due to proximity with the sewer lines.	Rehabilitation and enhancement of water distribution system under progress	
Sanitation and Sewerage System		Worn out and missing links Grey Water and yellow in some areas not going to sewer system Lack of public toilets Facilities to urban poor and migrant workers		
Solid waste	Door–to-Door system, municipal bins		PPP Technical support from bilateral	

	are in place strong policy and legal support		agencies	
Institutional Aspects	Facilitation to MC Rohtak in building institutional and financial strength by government and other agencies		PPP Technical support from bilateral agencies	
Industrial area	Maruti Milk plant			

Sources: Primary Observation, 2016

Chapter – 9

Proposal

9.1 How CSP (City Sanitation Plan) will help to improve the ranking?

On 2nd October 2014, the Swachh Bharat Mission was launched throughout the length and breadth of the country as a national movement. There are two components of the Mission, namely, Swachh Bharat Mission- Gramin for India's rural centres and Swachh Bharat Mission- Urban for India's urban centres.

"A clean India would be the best tribute India could pay to Mahatma Gandhi on his 150th birth anniversary in 2019" – Shri Narendra Modi, Hon'ble Prime Minister of India."

Swachh Bharat Mission in urban areas is focused on building Open Defecation Free towns (via construction of Individual Household Toilets, Community and Public Toilets) and 100% scientific management of Solid Waste. In order to foster a healthy competition between cities, the MoHUA started the *"Swachh Survekshan"* survey in 2016 which rated 73 cities across the country. Following the same, the MoHUA has issued guidelines for *"Swachh Survekshan"* 2018 to conduct a survey to rank all 4041 towns & cities.

The components covered in this survey are:

- Solid Waste Management (SWM) including road sweeping, municipal solid waste from Residential, commercial areas and from construction & demolition waste.
- Construction of Individual, community and public toilets
- Open defecation free city/town strategy
- Information, education and behavior change communication (IEBC) strategy, and
- ICT (information communication technology) based system to enhance Urban Local Body (ULB) operations.

The details of the survey checklist and methodology are available in the *"Swachh Sarvekshan 2018 Survey Brochure"* published by the MoHUA. Through the CSP explores the possible options for a suitable healthy hygiene environment that would manage the planning and implementation of the City Sanitation Plan and set up adequate systems for monitoring and regulation of sanitation in the city. Given the

already formulated National Urban Sanitation Programme (NUSP) guidelines, the note seeks to place the situation of sanitation management in Rohtak in context and examine the sanitation program management needs with NUSP guidelines as a starting element.

9.2 Sector Specific Strategies

The key challenge looming large at the cities is devising an implementation strategy for the City Sanitation Plan (CSP). The development of the implementation strategy entails detailed planning; initiatives supported by incentives, guidance system / sound financial systems; innovations; context specific solutions, prioritization; supportive context; and most importantly, ownership and leadership. The prime responsibility of implementation of the CSP rests with MCR, however, it is imperative that MCR shall engineer and institutionalize the collaborative efforts of all stakeholders involved to help achieve the defined goals as part of the implementation strategy.

The implementation strategy is evolved based on the detailed analysis of the situation in the major sectors of sanitation namely; (a) Sewerage; (b) Access to sanitation – toilets; (c) Storm water and (d) Solid waste. The sanitation mapping, initial and final analysis of the baseline data, and projection of demand for various sanitation services in the defined sectors have helped identify the level of deficiency in respect of sanitation in Rohtak.

A broad city level strategy for implementation of the City Sanitation Plan for Rohtak is outlined along the five strategic intervention domains namely, (1) Technology Options; (2) Financial Options; (3) Institutional and Governance Options; (4) Capacity Enhancement and Awareness Generation Options; and (5) Inclusive Approach.

9.3 Vision of Sanitation Plan for 2019 & 2031

Vision is set to achieve 100% sanitation facilities for Rohtak City. The vision for the city is:

“To provide infrastructure facilities up to service level benchmark through capacity building & participation of all the stakeholders including citizens with smartness, hence transforming city into wealthier, affordable, livable and clean city."

9.4 Mission

"Improvement of infrastructure facilities for all the communities at affordable cost with last mile connectivity by Municipal Corporation through community participation."

9.5 Goals for 2019 –

The broad goals for Rohtak City shall reflect thus -

- ✓ **Goal 1 -** The entire population of the city shall have access to toilets in the form of either individual toilets, shared toilets or community toilets, with adequate water supply by 2019;
- ✓ **Goal 2 -** All major public places shall have adequate number of public toilets in fully serviceable condition by the year 2019;
- ✓ **Goal 3 -** The quality of drinking water shall be improved and the entire population shall have access to quality drinking water by the year 2019;
- ✓ **Goal 4 -** All the households shall be connected to the sewerage network, centralized or decentralized by the year 2019;
- ✓ **Goal 5 -** All the waste water generated in the city shall be collected and conveyed through an appropriate sewer network to treatment plants, treated to acceptable quality levels and disposed, recycled or reused by the year 2019;
- ✓ **Goal 6 -** All households as well as non-residential users shall have access either to a door-to-door collection of garbage or to a secondary collection facility within easy accessible distance by the year 2019;
- ✓ **Goal 7 -** All the solid waste generated in the city shall be segregated at source, collected, transported and either processed for reuse or disposed of in a sanitary landfill by the year 2019;
- ✓ **Goal 8 -** The entire sanitation system as visualized above is socially, environmentally and economically sustainable and effectively managed by a capable team in the municipality, maintaining adequate standards of safety for the workers;

9.6 Goals for 2031

Solid Waste Management:

Parameter	Norms
HH Coverage	100 %
Waste Collection Efficiency	100 %
source Segregation	100 %
MSW recovery	80 %

Scientific Disposal	100 %
Cost Recovery	100 %
Cost Collection Efficiency	100 %
Complaints redress	100 %

Water Supply:

Sr. No.	Indicators	MoUD Benchmark
1	Coverage of water supply connections	100%
2	Per capita supply of water	135 LPCD
3	Extent of metering of water connections	100%
4	Extent of non-revenue water	20%
5	Quality of water supplied	100%
6	Cost recovery in water supply services	100%
7	Efficiency in collection of water supply related charges	90%

Sewerage:

Sr. No.	Indicators	MoUD Benchmark
1	Coverage of latrines (individual or community)	100%
2	Coverage of sewerage network services	100%
3	Efficiency of collection of sewerage	100%
4	Efficiency in Treatment: Adequacy of sewerage treatment capacity	100%

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

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

9.7 Framework

The National Urban Sanitation Policy, 100% Sanitation and the National Rating under SBM and various Award or rating Scheme for Sanitation of Indian Cities by Government of India, provide a good framework for defining the guidelines to prepare the City Sanitation Plan and its implementation strategy.

Table 9.7.1: Assumptions for Strategic Planning

Indicators as per NUSP	Guidelines for CSP
Output Related	✓ Proposals to provide safe access to household sanitation and serve entire population by toilets. ✓ Proposals for safe disposal of waste water, storm water and solid waste. ✓ Proposal to meet the national standards for safe disposal of

	liquid and solid wastes.
Process Related	✓ Proposal to ensure the efficient design of the system in conformity with applicable rule and regulations ✓ Proposals to ensure clear devolution of responsibility and accountability in the institutional system ✓ Proposals to ensure competent documentation of the operational and monitoring systems ✓ Proposals to ensure the formulation of prudent sanctions for deviances / violations of the system both at individual / institutional level and ensure the enactment
Outcome Related	✓ Proposals to ensure the systems facilitate and sustain good public health and environmental conditions

9.8 Timeline

The system shall be designed under the broad framework as per the guidelines for a design period of 13 years; however, the planning shall entail the implementation of the design in phases to meet the ultimate goals of the CSP for 2019 to 2031.

The phased approach aims to navigate through the challenges posed by the limitations in investments, institutional capacities, and community engagement in a proficient manner.

The phases and the corresponding timelines are defined as stated below –

Table 9.8.1: Assumptions for Strategic Planning

Phase	Year
Immediate-Term	2015 - 2017
Short-Term	2015 - 2019
Long-Term	2015 – 2031

Below flow diagram showing the timeline for City Sanitation plan in three parts as above describe like first is immediate term (2015-17), short term (2015-19) and long term (2015-31):

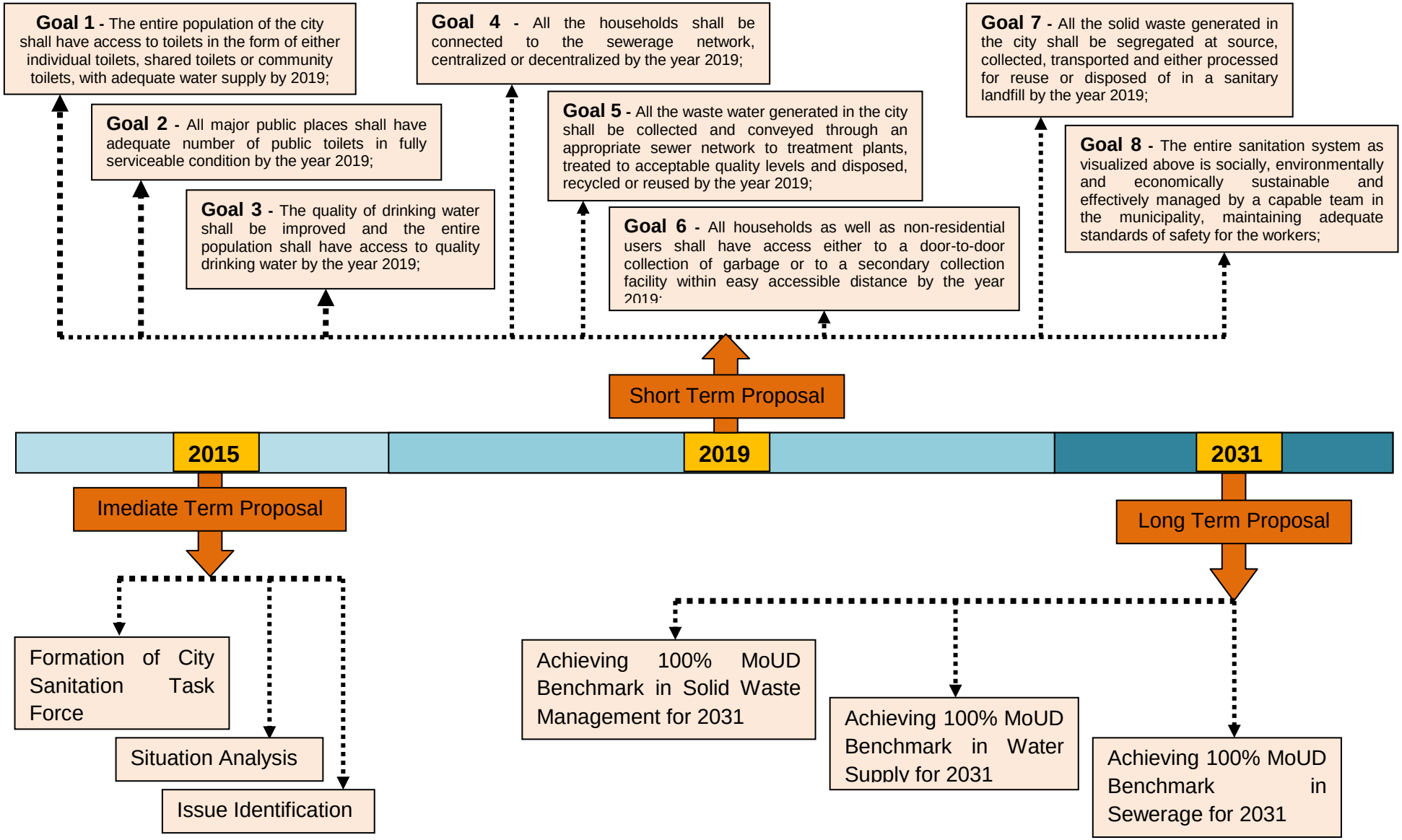

Goal 1 - The entire population of the city shall have access to toilets in the form of either individual toilets, shared toilets or community toilets, with adequate water supply by 2019;
Goal 2 - All major public places shall have adequate number of public toilets in fully serviceable condition by the year 2019;
Goal 3 - The quality of drinking water shall be improved and the entire population shall have access to quality drinking water by the year 2019;
Goal 4 - All the households shall be connected to the sewerage network, centralized or decentralized by the year 2019;
Goal 5 - All the waste water generated in the city shall be collected and conveyed through an appropriate sewer network to treatment plants, treated to acceptable quality levels and disposed, recycled or reused by the year 2019;
Goal 6 - All households as well as non-residential users shall have access either to a door-to-door collection of garbage or to a secondary collection facility within easy accessible distance by the year 2019;
Goal 7 - All the solid waste generated in the city shall be segregated at source, collected, transported and either processed for reuse or disposed of in a sanitary landfill by the year 2019;
Goal 8 - The entire sanitation system as visualized above is socially, environmentally and economically sustainable and effectively managed by a capable team in the municipality, maintaining adequate standards of safety for the workers;
Short Term Proposal
2015
2019
2031
Imediate Term Proposal
Long Term Proposal
Formation of City Sanitation Task Force
Situation Analysis
Issue Identification
Achieving 100% MoUD Benchmark in Solid Waste Management for 2031
Achieving 100% MoUD Benchmark in Water Supply for 2031
Achieving 100% MoUD Benchmark in Sewerage for 2031

Table 9.8.2: Phases and Timelines for City Sanitation Strategy

	Phase / Year	
	Short-Term (2015 - 2019)	Long-Term (2015 - 2031)
Assumptions	Initiate efforts to eradicate slums and award land tenure and achievement of eradication of slums and award of land-tenure - regular small houses replace slum settlements	Regular Houses for all
	Initiate efforts towards public outreach and education and 80% Literacy rate is achieved	90-95% Literacy rate is achieved
	Initiate efforts to generate awareness campaigns to promote better hygiene and sanitation practices and Citizens adopt the better hygiene and sanitation practices	Citizens adopt the better hygiene and sanitation practices and sustain the systems
	Initiate efforts to regularize the participatory planning and budgeting and participatory planning institutionalized	Participatory planning institutionalized
	Initiate efforts to enhance employment rates through local adaptively and productivity and 70% of the population is employed and has regular income	100% of the population is employed and has regular income
	Initiate efforts to promote 3R Principle - Reduce, Reuse and Recycle and citizens adopt the 3R Principle - Reduce, Reuse and Recycle in all sectors	Water Conservation practices are prevalent; Storm Water Source Control mechanisms are regularized; Reduction/Reuse/Recycle of liquid/solid waste is achieved
	Efforts initiated to provide 135 lpcd water supply to all citizens and water connections to all has been achieved and 135 lpcd water supply is also achieved	Water connections to all has been achieved and 135 lpcd water supply is also achieved

9.8.1 STRATEGY: SEWERAGE MANAGEMENT

Based on the comprehensive situation analysis (reference by chapter - 05) executed for the city within the sewerage sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 13 years. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of MCR, the targets are set as given in table 9.8.3 for the immediate, short-term and long-term phases of the city sanitation planning.

Table 9.8.3: Targets for Service Delivery Levels in Sewerage Management Sector

Component of Service	Desired Level of Service Delivery	Existing Level of Service Delivery (Immediate Term -2015-17)	Targets for Service Delivery Levels	
			Short-Term(2015-2019)	Long-Term(2015-2031)
Collection of Waste Water				
Coverage of Sewer Network (% of city area)	100%	100%	100% (Demand until 2019)	100% (Demand until 2031)
Properties Connection to Network	100%	98%	100% (Demand until 2019)	100% (Demand until 2031)
Compliance of Septic Tanks to CPHEEO Standards	100%	-	100% (Demand until 2019)	100% (Demand until 2031)
Conveyance of Waste Water	100%	100%	100% (Demand until 2019)	100% (Demand until 2031)
Treatment Capacity of STPs	100%	98%	100% (Demand until 2019)	100% (Demand until 2031)
Cost Recovery				
Extent of Cost Recovery	100%	38%	100%	100%
Efficiency in Collection of Sewage Charges	100%	86%	100%	100%
Customer Service				
Efficiency in redressal of customer complaints	80%	100%	80%	80%

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

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

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

9.8.1.1 Design Premises

The proposals shall be based on the following parameters –

- ✓ Projected Populations
- ✓ Projected Households
- ✓ Existing Situation vis-à-vis the Key Issues at Ward Level
- ✓ Projected Sewerage Generation*
- ✓ Existing Institutional Capacities
- ✓ Existing Financial Capacities

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

Table No.9.8.4 Design Input – Sewerage Management System

Year	Projected Population	Water Demand (MLD) (@ 135 lpcd)	Sewerage Generation (MLD) @ 80%	Solid Waste Generation (TPD)(@ 0.22 kg per capita)
2013	484382	653.92 MLD	383.63 MLD	106564.04
2017	514269	694.26 MLD	484.4 MLD	113139.18
2021	541522	731.05 MLD	584.84 MLD	119134.84
2031	614153	829.10 MLD	663.28 MLD	135113.66

9.8.1.2 Design Phases

Table No.9.8.5 Design Phases – Sewerage Management System

PHASES	DESIGN COMPONENTS
Immediate Term (2015-2017)	✓ Initiate primary collection and conveyance system; ✓ Initiate septage management system; ✓ Feasibility study for decentralized waste water treatment systems as a permanent solution; ✓ Connections to the households;
Short Term (2015-2019)	✓ Finalize collections to households and the conveyance system ✓ Intermittent decentralized waste water treatment systems for existing waste generation; ✓ Finalize decentralized waste water treatment systems if found feasible ✓ Treatment and Disposal ✓ Septage Treatment & Disposal
Long Term (2015-2031)	✓ Augmentation of the system to meet the demands of the growing population ✓ Replacements of components and operation & maintenance

Recommendations -

- ***Immediate Action Directives***

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

As an immediate measure, it is recommended that MCR procure septage suction vehicles *and* engage a private service provider (PSP) to implement the septage clearance for the existing septic tanks; the disposal site may be decided in consultation with STP or integrated solid waste management facility operators. The decision shall be based on the following factors – (**1**) septage characteristics; (**2**) potential of waste to energy options for septage; and (**3**) availability of land/capacity to integrate septage treatment in the respective processes.

1. MCR shall facilitate the IEC campaigns to educate the residents on the benefits of compliance of septic tanks to the prescribed guidelines by CPHEEO.
2. Through the IEC campaigns MCR shall disseminate the incentive mechanisms for compliance to standards.

- ***Administrative and Regulatory Measures***

Institutionalizing of the Household Connection Mechanism–The connection will be undertaken by certified plumper, who is authorized by MCR. Training courses for the plumber is to be organized by MCR at the end of which the '***certification and license***' shall be provided.

Institutionalizing Monitoring and Evaluation (M&E) Mechanisms – M&E mechanisms for the design implementation/asset development as well as operation & maintenance of the assets shall be developed under the technical wing of MCR supported by a dedicated team of engineers and laborers to handle the O&M of the system. '***Training and certification***' of the technical team and laborers shall be organized by MCR which shall include the use of sophisticated instrumentation required for the O&M.

Develop and Regularize Municipal Bye-Law– Municipal Bye-Laws or Building Codes shall be introduced to make connectivity mandatory for grounds situated in a defined distance from the next sewer line. Grounds, with exceeding distance maybe allowed installing onsite systems. Connectivity applies for all black or grey water outlets.

Develop and Conduct Awareness Generation Campaigns– Campaigns shall be conducted to propagate the benefits of better hygienic and sanitation practices and also advocate the efficiency and benefits of the sewerage management systems

designed for the community. Through the campaigns, MCR shall encourage the residents to connect to the existing and proposed network through financially sustainable mechanisms and cross-subsidy mechanisms;

Ring Fence Sector Specific Budgets–Budgets shall be established and the dedicated Sewerage Sectoral Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities) in order to promote efficient '***cost recovery mechanisms***'. '***Impact benefit tax***' is also proposed to be levied upon regularization of services.

Establish Connection Fee – Each ground will be provided with a nominal connection fee, which is to be reinvested into the system for capital investment and not for O&M cost. Connection for lower income groups shall be subsidized.

Develop and Conduct Awareness Generation Campaigns– Campaigns shall be developed and conducted to propagate the benefits of integration of the existing septic tanks into the off-site sewerage systems so it may increase the acceptance of the procedures by the community and their willingness to pay for the management services may be reinforced;

Regularize Municipal Bye-Laws and Building Codes – Municipal bye-laws and building codes shall be developed and enforcing mechanism shall be institutionalized by MCR to promote sustainable septage management system for the city. The directive shall (**1**) mandate the stringent compliance mechanism for the design of septic tanks along with the approval of new constructions; (**2**) Regulatory oversight mechanisms to penalize the citizens violating the establishing regulation and standards; (**3**) Approve construction of septic tanks only if CPHEEO guidelines are followed

(certification mechanism), which include - (**i**) includes only the discharge of black water (toilets), (**ii**) does not exceed population density of 300 capita/hectare, (**iii**) exclude use of soak pits in areas with impermeable soil, hard rock or high groundwater table.

Institutionalize Incentive Schemes–Incentives shall be introduced in the form of property tax rebates in order to achieve connectivity can be linked with sewerage issue.

- ***Feasibility Study***

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

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

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

The scope of the feasibility study shall include –

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

9.8.2 STRATEGY: ACCESS TO TOILETS

Based on the comprehensive situation analysis executed for the city within the access to toilet sector and the identified gaps in the level of service delivery, the targets for

service delivery are set across the planning horizon of 13 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of MCR, the targets are set for the immediate, short-term and long-term phases of the city sanitation planning.

Table 9.8.6: Targets for service delivery levels in access to toilets sector

Component of Service	**Desired Level of Service Delivery**	**Existing Level of Service Delivery (Immediate Term -2015-17)**	**Targets for Service Delivery Levels**	
			Short-Term(2015-2019)	**Long-Term(2015-2031)**
Coverage of Toilets				
Individual Toilets ***(toilets per every household)***	1	0.54-0.75	1	1
Community Toilets ***(seat per every user)***	1 in 35	1 in 150	1 in 35	1 in 35
Public Toilets ***(seat per every user)***	1 in 100	1 in 320	1 in 100	1 in 100
Condition of Toilets				
Individual Toilets ***(% in working condition)***	100%	50%	100%	100%
Community Toilets ***(% in working condition)***	100%	50%	100%	100%
Public Toilets in ***(% in working condition)***	100%	50%	100%	100%
Toilets in Schools ***(% in working condition)***	100%	85%	100%	100%

The strategy adopted to achieve the aforementioned targets in the service delivery shall include the rehabilitation and up-gradation of the existing sanitary facilities for use in the immediate phase while engaging in the assessment of further requirement in the

individual and community category as well as toilets in municipal schools, commercial and market areas.

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

9.8.2.1 Design Premises

The proposals shall be based on the following parameters –

- ✓ The Population Densities
- ✓ Development Pattern of the City – Present & Future(Master Plan 2031) Land-Use
- ✓ Opportunities of means of livelihood
- ✓ Existing Institutional Capacities
- ✓ Existing Financial Capacities
- ✓ Existing Situation vis-à-vis the Key Issues at Ward Level

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

Table 9.8.7 Assumptions for provision of Toilet facilities in Slum Areas

Percentage of households without access to toilets	Strategy
30 %	Develop individual toilets w/support of different schemes ILCS/RAY/KAY/BSUP
20 %	Develop shared toilets - 1 toilet amongst 5 HHs
20 %	Willing to develop individual toilets if assured water supply / sewerage management
30 %	Develop Community Toilet Complexes - 1 seat per every 35 users

Based on the above assumptions, the design inputs for the interventions to improve the access to toilets in the city of Rohtak are presented in Table 9.8.8 Zone-wise strategy –

Table 9.8.8: Design inputs - Access to Toilets Strategy

Slum Areas	
Population	40775
HHs	8109
Households having private Latrines Flush facility	7572

Sources: MCR, 2016-17

9.8.2.2 Design Considerations

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

1. Location
   - ✓ Proximity to settlements – preferably 100-200 m
   - ✓ Visibility
   - ✓ Safety aspect
   - ✓ Near sewage lines
   - ✓ Co-location – compatible use
2. Signage
   - ✓ Directional and Labelling
3. Gender Sensitive Design
   - ✓ Women and children specific
4. Disability Access
5. Elderly User Access
6. Well-lit / ventilated
7. Environmentally Sustainable
   - ✓ Energy Considerations

- High degree of natural lighting
- Low energy light fittings
- Use of solar power
- Passive ventilation
- Recycled, Recyclable, Renewable and locally sourced source materials

✓ Water Considerations

- Grey Water Flushing
- Low-flow/water less urinals
- Recycling of storm water for flushing

9.8.2.3 Design Phases

Table: 9.8.9: Design Phases - Access to Toilets Sector

PHASES	DESIGN COMPONENTS
Immediate Term (2015-2017)	✓ Detailed survey of existing facilities to initiate rehabilitation and augmentation ✓ Repairs and up gradation of the existing toilets; ✓ Design & Construction of the new facilities in areas with no sanitation facilities ✓ Initiation of septage management
Short Term (2015-2019)	✓ 100% coverage and infrastructure development ✓ Design of System to handle the human excreta
Long Term (2015-2031)	✓ Finalization of septage management ✓ Augmentation of the system to meet the demands of the growing population ✓ Repairs & Maintenance

Recommendations:

Immediate Action Directives

✓ It is recommended to release a notice to invite expression of interest for the design, rehabilitation and up-gradation of the existing toilet facilities on a Rehabilitate, Operate and Transfer (ROT) basis in People Public Private Participation (PPPP*) mode in the immediate phase with a horizon of year 2014 in the wards listed below.

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* In the PPPP mode, people shall be treated as customers rather than as beneficiaries and hence shall contribute towards both the capital and O&M investments as far as possible. People shall also be actively involved in the O&M activities leading to an enhanced sense of ownership and ultimate sustainability. The capital investment may also be in the form of labor, material as well.

The community toilet facilities in the listed wards are in need of repairs and have inadequate capacity and design to handle the expected demand in the urban poor

areas in compliance to established design guidelines by Ministry of Housing and Urban Poverty Alleviation and the design standards through relevant Government Orders. The scope shall also include the survey of the remaining city and ascertain the exact numbers and location for rehabilitation and up-gradation sanitation facilities.

- ✓ Launch a pilot project for the usage of mobile toilets as (a) temporary solution for CTCs wherever in-situ development of slums or relocation of the community is planned under RAY or areas where land tenure issues are flagged, (b) seasonal need for additional toilet seats is prevalent in area with floating population and (c) place constraint does not allow any permanent solution. The project can be trialed in model Wards and will provide (A) a need assessment at the outset (B) develops an Operator model and a Financial Model for the capital investment as well as O&M cost, (C) prepares a septage management plan (if direct connection to the sewerage system is not given) and (D) implements the Ward level pilot project.

Feasibility Study

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

Administrative & Regulatory Measures

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

- ✓ **Develop and Conduct Awareness Generation Campaigns**– Campaigns shall be conducted to propagate the benefits of better hygienic and sanitation practices and encourage the residents to adopt toilet facilities through financially sustainable mechanisms and cross-subsidy mechanisms. Along the lines of the National School Sanitation Initiative (NSSI), the awareness campaigns to promote behavioral change shall lay emphasis on personal hygiene, proper sanitation, clean toilet habits, safe drinking water, separate toilets for girl child, disposal of waste water, human excreta disposal/toilets, waste water recycling, waterless urinals, waste segregation, and compositing, food hygiene and creation, and conservation of green spaces. Schools shall be adopted as the prime media for the campaign;
- ✓ **Regularize Municipal Bye-Laws and Building Codes**– Municipal bye-laws and building codes shall be developed to encourage "Water Reuse Strategy," for utilization of the recycled water/waste water in the operation and maintenance of the toilet facilities; punitive measures shall be enforced to discourage the open defecation practices; Building codes enforced to adopt the prescribed design standards for toilets;
- ✓ **Develop and Institutionalize MIS System**– MCR shall promote the documentation and mapping of the system. An asset register shall be maintained and the computerized maintenance management plan shall emphasize on the preventive and corrective maintenance; this system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance;

Financial Mechanism Interventions

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

financing in areas lacking the basic services in the immediate and short-term phase with a horizon of year 2017;

9.8.3 STRATEGY - STORM WATER MANAGEMENT

Based on the comprehensive situation analysis executed for the city within the storm water management sector and the identified gaps in the level of service delivery, the targets for service delivery are set across the planning horizon of 13 yrs. Based on the existing sanitation situation, demographic profile of the city including the population density patterns, the socio-economic profile, the topography, and the financial aspects of MCR, the targets are set for the immediate, short-term and long-term phases of the city sanitation planning.

Table 9.8.10: Targets for Service Delivery Levels in Storm Water Management Sector

Component of Service	Desired Level of Service Delivery	Existing Level of Service Delivery (Immediate Term -2015-17)	Targets for Service Delivery Levels	
			Short-Term(2015-2019)	Long-Term(2015-2031)
Coverage of Drainage Network	100%		70 - 80 %	100%
Incidences of Water Logging / Flooding	0			0

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

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

The objective of the said approach is to reduce storm water flow into the centralized storm water drain system while increasing soil infiltration and pollutant removal,

providing urban ecological restoration opportunities, and increasing overall green spaces within watersheds. *This shall facilitate the ground water recharge.* There are three major source control techniques – (**a**) detention, (**b**) retention, and (**c**) bio-retention / bio-filtration and available technological source control measures include blue roofs, rainwater harvesting, vegetated controls, permeable pavements, and green roofs. Each source control technique provides certain benefits that can be matched to the city's needs. Potential source control strategies and initiatives are listed as below –

Table 9.8.11: Source Control Strategies

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

Table 9.8.12: Source Control Initiatives

STRATEGY	DESCRIPTION	EFFECT
Blue Roof 2-in / 1-in Detention	Install roof top detention systems	Cost Effective method to detain water
Green Roof	Install a green roof on at least 50% of a roof	Cost- effective storage or removal of runoff from new rooftops
Rain Water Harvesting	Methodologies to capture run - off	Cost- effective storage or removal of runoff from impervious surfaces
Side walk Bio filtration	Vegetated Controls	Reduction in annual run-off from catchment area
Greening of Parking Lots	Implements vegetation and storm water controls in new parking lots	Reduction in annual run-off from catchment area
Porous Parking Lots	Commercial and community facility parking lots to plant street trees and perimeter and interior landscaping that will detain water or infiltrate to the soil as feasible.	Reduction of storm water and reduction in run-off

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

Recommendations

Immediate Action Directives

- ✓ It is recommended that MCR coordinate with the sewerage & solid waste management department and prioritize the activity of prevention of indiscriminate dumping of solid waste and waste water discharge into the drains;

- ✓ It is recommended that MCR release a notice to invite EoI for the protective works of the storm water drains.

- ✓ It is recommended that MCR implement a pilot project to promote low impact development (LID) and 'wet weather green infrastructure*. The pilot project shall address these concerns through a variety of techniques, including strategic site design, measures to control the sources of runoff, and thoughtful landscape planning. Considering a greater measure of the storm water management infrastructure is in need of replacement or repair and the communities are not equipped to financially support the development, MCR needs to consider resilient and affordable solutions that meet many objectives at once and green infrastructure is one such solution.

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

Feasibility Study

- ✓ It is proposed to conduct a study to ascertain the feasibility of integrating the water bodies in the city into the future storm water drainage network system as rain water harvesting (RWH) structures to reduce the capacity requirement encumbrance on man-made drains as well as create a continuous drainage network;.

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

Administrative & Regulatory Measures

- ✓ It is recommended to establish a dedicated unit for Storm Waste Sector under the Sanitation Department to streamline the design, construction, operation & maintenance processes within the sector; personnel management system & Sanitation worker's training program shall be implemented to conduct occupational safety and health training campaigns to educate the sanitary workers with respect to the benefits of adopting best operating practices;

- ✓ Municipal Bye-Laws shall be enforced to encourage the residents to adopt the practices of source control initiatives to promote reduce, reuse and recycle principle; Regulatory Mechanisms (polluter pays) shall be enforced to discourage open dumping of waste;

- ✓ Awareness generation campaigns shall be conducted to propagate the benefits of source control initiatives;

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

Financial Mechanism Interventions

- ✓ It is recommended to initiate incentives for adopting the source control initiatives;

- ✓ Sector specific budgets shall be established; and the dedicated Storm Water Sectoral Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities on area up-gradation plans) in order to promote efficient cost recovery mechanisms. Impact benefit tax is also proposed to be levied on properties in areas where services are provided.

9.8.3 STRATEGY - SOLID WASTE MANAGEMENT

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

Table 9.8.13: Targets for Service Delivery levels in Solid Waste Management Sector

Component of Service	Desired Level of Service Delivery	Existing Level of Service Delivery (Immediate Term - 2015-17)	Targets for Service Delivery Levels	
			Short-Term(2015-2019)	Long-Term(2015-2031)

Household level Coverage of Solid Waste Management Services	100%	93%	100%	100%
Efficiency of collection of municipal solid waste	100%	98%	100%	100%
Extent of segregation of municipal solid waste	100%	35%	100%	100%
Extent of municipal solid waste recovered	95%	75%	95%	80%
Extent of Scientific disposal of municipal solid waste	100%	87%	100%	100%
Extent of cost recovery in solid waste management services	90%	25%	90%	100%
Efficiency in collection of solid waste management charges	100%	25%	50%	100%
Efficiency in redressal of customer complaints	100%	98%	100%	80%

Source: MCR, 2016-17

Recommendations:

Immediate Action Directives

- ✓ Integrated Solid Waste plant work has to be started at the earliest in all aspects.
- ✓ Cost recovery has been observed to be very low, for which the local body has to be more proactive in collection of charges from the community for more efficient services.
- ✓ In order to achieve 100% coverage the private concessionaire who holds the contract for the city shall enforce measures to implement the services per the contract.
- ✓ IEC campaigns shall be initiated to promote segregation at source and also support the primary collection and secondary collection processes.

Administrative & Regulatory Measures

- ✓ It is recommended to establish a dedicated unit for Solid Waste Management Sector under the Sanitation Department to streamline the design, construction, operation & maintenance processes within the sector; personnel management system & Sanitation worker's training program shall be implemented to conduct occupational safety and health training campaigns to educate the sanitary workers with respect to the benefits of adopting best operating practices;
- ✓ Municipal Bye-Laws shall be enforced to encourage the residents to adopt the practices of source control initiatives to promote reduce, reuse and recycle principle; Regulatory Mechanisms (polluter pays) shall be enforced to discourage open dumping of waste;
- ✓ Awareness generation campaigns shall be conducted to propagate the benefits of source control initiatives.

Financial Mechanism Interventions

- ✓ It is recommended to initiate incentives for adopting a regular & timely payment of waste charges.
- ✓ Sector specific budgets shall be established; and the dedicated Solid Waste Management Sectoral Unit under the Sanitation Department shall develop the costs and the tariff structures in consultation with the Finance & Accounts Department and the Strategic Communications Cell (working closely with the communities on area up gradation plans) in order to promote efficient cost recovery mechanisms. Impact benefit tax is also proposed to be levied on properties in areas where services are provided.

9.9 Action Plans

9.9.1 Technology Options

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

9.9.2 Financial Options

The implementation of the City Sanitation Plan necessitates substantial financial resources and the corresponding strategic planning for resource generation. The financial strategy shall encompass Capital Investment Plan, Operations & Management (O&M) Expenditure Layout and the financial assessment for the critical support activities like Community Mobilization, Awareness Workshops and Capacity Enhancement to ensure sustainability of the planned sanitation services. The strategy shall align itself along the paradigm that the resource generation shall broadly target the funds earmarked for water and sanitation development within MCR and the Haryana State Government budgets; however, it shall also access the funds from the 13th Finance Commission and other Center and State schemes for sanitation improvement.

9.9.3 Capital Investment Plan

A conceptual capital investment plan is presented in chapter 08 which is corresponding to the strategic actions in the various sectors that are defined in the earlier sections. This section outlines the annual capital expenditure with receipts of last 2-3 years.

9.9.4 Cost Recovery Options

It is recommended to explore the possibility of levying user charges for the services, globally; user charges for sewerage disposal services are normally based on water charges i.e., a set percentage of the water charge that has typically varied between 50-80% of user water charges. It is proposed that MCR shall levy a 50% sewage disposal surcharge to the user water charges. As regards MSW services, it is recommended that MCR levy a monthly user fee as indicated in the table chapter 05, this fee could vary for users belonging to various economic slab and would also depend on the land-use category is it for domestic use or commercial use. However, it is recommended that user charges for the urban poor shall be levied with effect i.e., after Rohtak's citizens have witnessed a significant improvement in waste water disposal services. With the above indicated user charges, MCR would generate substantial revenue per annum, which shall enable MCR to undertake capital expenditure programs.

It is further proposed that MCR shall investigate the possibility of a judicious alignment of impact benefit fee closely with expected property owner benefits. The total revenues

thus generated shall aim to cover annual O&M expenditure, and also partly/substantially fund capital replacement in the long-term. The recommendations are presented thus –

Table 9.9.1: Property based Tax options

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

9.9.5 Financing Sources

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

Table 9.9.2: Financing source and related options

FINANCING SOURCE	OPTIONS
13th Finance Commission	Pooling of the 13th Finance Commission Grants for Sanitation Services Improvement Projects;
State Finance Commission	The grants from State Finance Commission support the operational revenue expenses of the corporation while funding the provision of basic services to Urban Population including urban poor;
Jawaharlal Nehru National Urban Renewal Mission (JNNURM), GOI	The Urban Infrastructure and Governance component of JNNURM has fund allocations for developing sanitation services.
Urban infrastructure Development of scheme for small And medium town (UIDSSMT)	The funding supports infrastructure development for water supply, sanitation and solid waste management.
Ministry of Housing and Urban Poverty Alleviation (MoHUPA)	The construction of individual and shared toilets finds funding through the schemes of MoHUPA
Integrated Low Cost Sanitation (ILCS), MoHUPA	Funding for the development of basic sanitation services Central Contribution - 75% of Capital Expenditure; State Contribution 15% of Capital Expenditure; Beneficiary - 10% of Capital Expenditure; Currently ILCS supports the construction of individual toilets for economically weaker sections of society.
Rajiv Awas Yojana (RAY), MoHUPA	RAY assures Central Grants for slum redevelopment and achieves basic sanitary services in an inclusive approach; the possibility of the financial support under the IHSDP/RAY schemes of GoI for waste water disposal and MSW within Rohtak's urban poor settlements may well be examined.
Sarv Shiksha Abhiyan (SSA), Ministry of Human Resource Development	MoHRD is developing a manual on school sanitation under the SSA component. The SSA component has considerable funding for school sanitation.

(MoHRD), GOI	
International donors/funding Agencies	Funding from World Bank, ADB, WWF and the likes shall be aimed at and considerable efforts made to bring in the funding to develop sanitation projects in an inclusive approach.
Urban Local Bodies (ULB) Equity	ULB shall earmark an explicit budget for the sanitation services improvement; It shall establish tariff structure for the sanitation services provided and levy sanitation cess as part of the property tax; the user charges and the sanitation cess revenues hall be directed to the sanitation department for utilization for funding sanitation improving projects in the long-term besides tackling the O&M costs.
Public Private Partnership (PPP)	PPP shows greater promise in bringing in major capital investment and finances required to develop basic sanitation services for the urban population including the urban poor. The following PPP options shall be considered to employ their services appropriately - (a) service contracts; (b) performance-based service contract; (c) a management contract for operations and maintenance (O&M); (d) BOOT/BOT/ROT Contracts; (e) Joint Ventures between State Government/ULB and the private company. In the event of weak financial situation and greater financial burden on the Municipal Finances, PPP model shall be explored to support the equity contribution of ULB in the total capital expenditure.
Beneficiary contribution - Public Private People Partnership (PPPP)	PPPP shall be promoted as a sustainability model in order to garner support of the beneficiaries in both the capital investments and the O&M investments. This shall aim at increasing the sense of ownership and hence ensure sustainability of the services; In the event of weak financial situation and greater financial burden on the Municipal Finances, PPPP model shall be explored to support the equity contribution of ULB in the total capital expenditure. This move shall be supported by reforms in the Governance structure that involves greater community participation and hence promote greater accountability and transparency.
NGO	NGO involvement shall be encouraged in the sanitation services sectors especially the access to toilets; Appropriate contract models shall be developed to attract their contributions in both the development and O&M activities.

9.9.6 Institutional & Governance Options

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

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

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

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

Figure 9.9.1: Broad Instrumental Outcomes - Institutional & Governance Action Plan

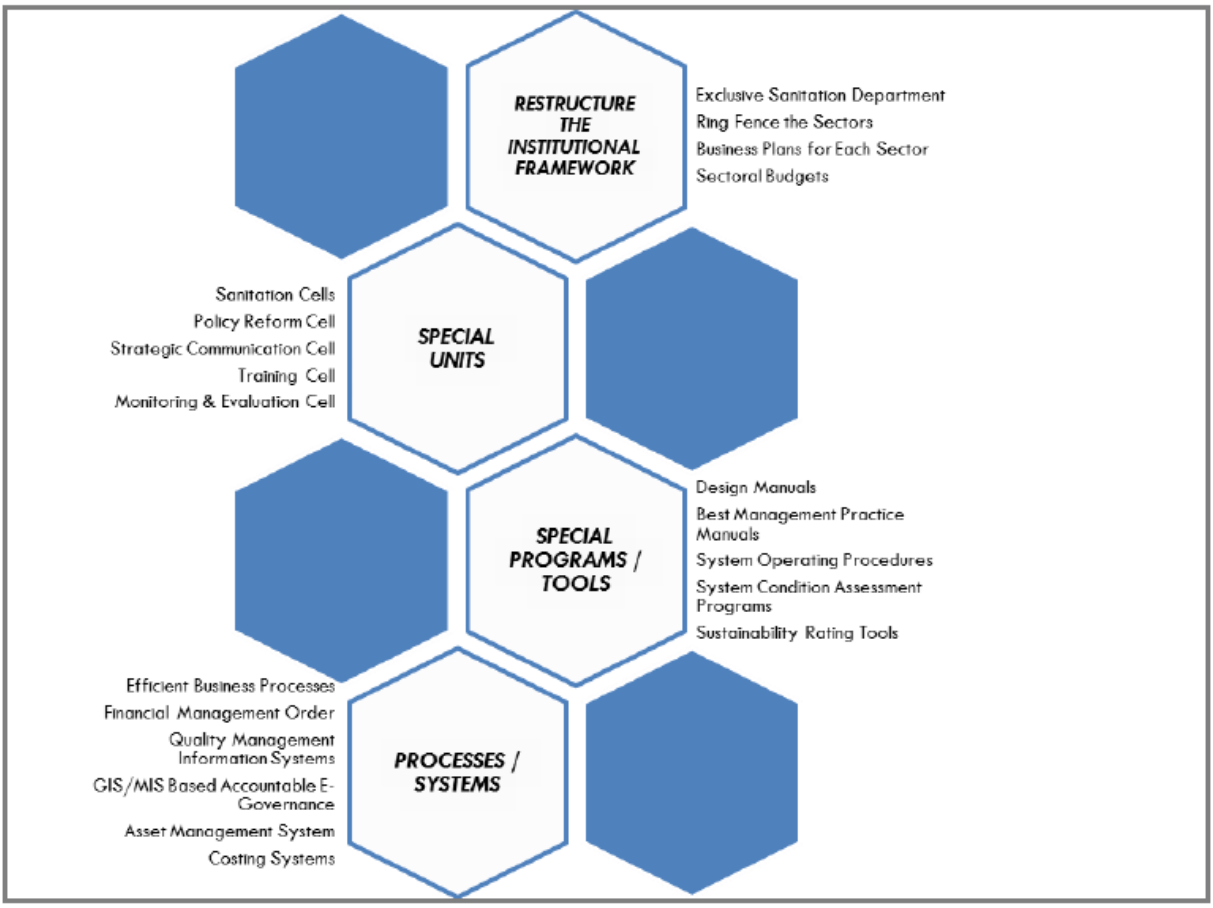

Table 9.9.2: Institutional and Governance Action Plan

PHASE	COMPONENTS
Short-Term 2015-2019	◘ Initiate the restructuring of the institutional framework as per the recommendation in the CSP with the help of institutional development expert and streamline the operations ◘ 'Ring Fence' the sectors (Water Supply & Sewerage, Solid Waste and Toilets) with supporting technical services and O&M units ✓ Establish Sectoral Budgets ✓ Create Business Plans for each units ✓ Develop Costing systems (costs & tariff structures) in collaboration with the Finance & ✓ Accounts Department, Startegic Communication Cell working with communities ✓ Develop Asset Management system ◘ Establish a dedicated 'Policy Reforms' unit to continually implement policy reforms that will support accountable governance and regulatory oversight of the local bodies, service providers and the citizens as well to achieve sustainability of the ever dynamic infrastructure development ✓ Achieve the objectives of Model Municipal Law through incentivized transition plan resulting in devolution of fiscal powers and authority ✓ Achieve the E-Governance using GIS/MIS ✓ Sector Regulations – Quality & Fiscal Standards ✓ Enforcement Mechanisms - of rules, by-laws, municipal codes & building codes ◘ Develop the strategic communication cell that shall ensure community participation and implement participatory planning – ✓ Confederate community representatives and link to city Ward committees; ✓ Form neighborhood groups; ✓ Organize focused group discussions regularly and steer meetings to plan area upgrading solutions; ✓ Promote community oversight committees and community contracting arrangements to involve the community in implementation activities – means of livelihood, sense of ownership and sustainability of systems in the corresponding areas; ✓ Pave way for community O&M systems; ✓ Promote system to utilize community to collect user charges; ◘ Revamp the business processes and the financial management order of the 'Finance & Accounts Department' by putting in place new accounting standards as per the directive of C&AG – 'Accounting and Budget Formats for Local Bodies' ✓ Implement Double Entry Accounting System (DEAAS) ✓ Revamp Audit & Account Procedures for each sector ✓ Adopt Budgeting and Accounting Formats for each sector ✓ Set up quality management information systems (MIS) ✓ Set up & develop contract management team ✓ Develop financial operating Plans (FOP) for each sector ✓ Develop the design manuals, best management practices (BMP) manual, system operating procedures, O&M Manuals, Condition Assessment Programs (CAPs'), sustainability rating tools for each sector in collaboration with the technical and O&M experts; ✓ Initiate the empanelment process for technical experts, third party technical review agencies to assist with the preparation of design manuals/BMP

	manual/O&M Manuals/SOP/CAP and periodic reviews of the efficiency of the systems ◘ Establish Monitoring Cell and develop the M&E mechanisms and the coordination framework with Parastatal and State agencies ◘ Establish the training cell and implement capacity enhancement strategy ✓ Establish Capacity, Management, Operation & maintenance Program (CMOM) ◘ Initiate the staffing plan for the various sectoral units through re-organization of existing staff, new hires and transfers from state agencies – ✓ Fill the top hierarchical level of both the technical services and O&M unit ✓ Initiate the staffing up to 50% at the mid-hierarchical level and supplement with the private consultants ✓ Initiate the staffing up to 70% at the low-hierarchical level and supplement with the staff of the private service provider/concessionaire ◘ Complete the staffing plan for the Finance & Accounts departments – ✓ Accounts Specialist ✓ Financial Analyst ✓ Tax Expert ✓ Public Finance & Legal Advisor – Financing arrangements/Concession Agreements Infrastructure Insurance Experts ✓ Micro-credit Product Development Specialists ◘ Complete the staffing plan for the Strategic Communication Cell – ✓ Community Organizers ✓ Social Development Experts ◘ Finalize the staffing plan for the Policy Reform unit – ✓ Planners ✓ Policy Advisors ✓ Legal Advisors / Retired Judges / Policy Analysts ◘ Finalize the staffing Plan for monitoring cell which will work with external sector specific experts and third party agencies ◘ Establish the sanitation cells at the city level as part of the state sanitation strategy
Long-Term 2015- 2031	◘ Finalization of the staffing plan across all sectors and departments ◘ Review the procedures and implement amendments ◘ Review the Policy Reforms and implement amendments ◘ Reprocess the empanelment ◘ Review and update the various manuals and operating procedures ◘ Review and reengineer the M&E mechanisms ◘ Finalization of Review and update mechanisms ◘ Finalization of successful Institutional Structure and business operations & processes ◘ Achievement of Municipal Model Law objectives in totality ◘ Successful implementation of City Financial Viability Mechanism ◘ Establishment of Participatory Planning Process ◘ Establishment of accountable governance framework

9.9.7 Capacity Enhancement & Awareness Generation Options

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

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

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

Table 9.9.3: Capacity Enhancement Action Plan

PHASE	CAPACITY ENHANCEMENT
Short-term 2015-2019	◘ Establish HR Working Group and a State Level Steering Committee on Human Resource Development (HRD) ✓ Initiate the formation of HR Department, and design of HR Policies, Performance linked Incentive Programs; Induction Program; ✓ Finalize the Formulation of HR Policy for the ULB and Finalize the Induction Training Curriculum; ✓ Develop Staffing Plan & Strategy and initiate recruitment in accordance; ✓ Initiate the development of HR Information System ✓ Initiate the assessment of the training needs regularly and to develop training calendar and program to impart trainings to staff across all categories; ✓ Budget allocation for training and Environmental activities; ✓ Initiate the creation of a training database capturing a record of the name, position and function of the employee as well as the content, duration and date of the training programme participated in including participant feedback about the relevance and efficiency of the course to the roles and responsibilities; ✓ To implement an internal and external communication protocol and train the ULB staff in accordance to the plan; ◘ Initiate the development of Knowledge Exchange Mechanism among cities using the web based knowledge platform ◘ Environmental Awareness Workshop for the ULB staff and elected representatives resulting in identification and prioritization of all environmental aspects; ◘ Prepare a City level Urban Management Plan; ✓ Training Programme and training on Urban Management for the ULB ✓ Establishment of a State level Urban Management Institute ◘ Monitoring of cities with the ICD

Long-Term 2015 - 2031	◘ Lateral recruitment of key positions ◘ Update and upgrade Training Calendar and Training Programs ◘ Update the HR Policies and Incentive programs ◘ Conduct Environmental Workshops ◘ Update the City level Urban Management Plan ◘ Update and upgrade Monitoring & Evaluation Systems

9.9.8 Inclusive Approach

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

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

Table 9.9.4: Inclusive Approach Action Plan

PHASE	COMPONENTS
Short-Term 2015-2019	◘ Community Mobilization Strategy shall be defined by the Strategic Communication Cell, MCR; ◘ Implement the Community Mobilization Mechanism to enable the inclusion of the needs & demands of the community in the CSP – ✓ Transect Walks, Social Mapping and Ward & Slum Profiling; ✓ Social and Gender Audits; ✓ Confederating Community Groups & Linking to Ward Committees ✓ Development of a SHG for each ward ✓ Form Neighborhood Groups ◘ Initiate GIS based information management systems to create central repository of community ideas, needs and prioritization of projects information ◘ Institute Community Oversight Committees & Community Contracting Cell to involve communities in construction & O&M activities; ◘ Design & Implement Participatory Planning Process in line with the Participatory Law, JNNURM Reforms, MoUD; ✓ Initiate the institutionalization of the periodic meetings between Local Government and the community as part of participatory planning and review; ✓ Identify NGO's with community mobilization skills, planning & implementation experience and establish contracting mechanism to institutionalize their participation; ◘ Establish guidelines to translate the community participation into budget allocations and formalize the participatory budgeting; ✓ Allocate budgets to implement pilot scale projects with Community based organizations; ✓ Allocate budgets to establish and institutionalize CBOs'

	◘ Initiate the development of microfinance model to enable the urban poor to extend services within their areas; ◘ Awareness Campaign to encourage households to invest in connections and in-situ work of basic services; ◘ SHG to help with group loans and savings accounts of individuals that serve as collaterals; ◘ NGO's and the Strategic Communication cell to help State owned Banks to establish community mobilization cells to help design interventions and ensure high repayment rates; ◘ Initiate the development of a revolving fund for poor through State Urban Infrastructure Fund to help with the micro-financing options; ✓ Establish Guidelines and Initiate the Microenterprise Models in the service delivery ✓ Provide Basic Services as microenterprises ◘ O&M shall be the SHG/CBO's responsibility - Livelihood Mechanism ◘ Cross-subsidy mechanisms to finalize the connection fees and tariff structures/user charges; ◘ Establish capacity building initiatives to train the communities in the construction and O&M of the facilities ◘ Citizen Report Cards and feedback mechanism to be institutionalized and formalized;
Long-Term 2015 - 2031	◘ Finalize the Microfinance Model; ◘ Finalize the Microenterprise Model; ◘ Institutionalize the mechanisms of participatory planning and budgets; ◘ Establish the City Community Vocational Training Unit(s) engaging the skilled professionals from within community; ◘ Finalize GIS based information management systems to create central repository of community ideas, needs and prioritization of projects information ◘ Establish the Revolving Fund Mechanism ◘ Update and upgrade the mechanisms; ◘ Improve the participatory planning process & participatory budget mechanisms based on monitoring and evaluation; ◘ Review and reengineer the City Vocational Training Units and Curriculum; ◘ Update and upgrade the mechanisms; ◘ Improve the participatory planning process & participatory budget mechanisms based on monitoring and evaluation; ◘ Review and reengineer the City Vocational Training Units and Curriculum; Achievement of Municipal Model Law objectives in totality ◘ Successful implementation of City Financial Viability Mechanism ◘ Establishment of Participatory Planning Process ◘ Establishment of accountable governance framework

9.10 Conclusion:

The City Sanitation Plan for Rohtak MC is a useful starting point to escalate attention to the 'important yet often neglected area' of sanitation and presents a comprehensive snapshot of the issues and imperatives for sanitation with in MC. It also outlines a possible prioritization of the above actions needed along short, medium and long term towards achieving the NUSP goal of universal equitable access to sanitation. Rohtak

MC should work with the Government of Haryana and MoUD to initiate the steps needed to implement the actions recommended in the CSP. A Committee comprising representatives from Rohtak MC, GoH and the CTF could be formed to steer implementation. As envisaged in the NUSP, a CTF has been formed as part of the preparation of the CSP and it provides a useful platform to engage with public stakeholders and mobilize public support and participation during the implementation phase of the CSP.

Annexure-I

Assessment of Solid Waste Management Services in ULB – Template for fact Sheet

A. General

1. Name of ULB:
2. Name of District:
3. Name of *State/UT:*
4. Population (as per 2011 Census):
5. MSW total generation (TPD):_____Per Capita generation (Kg):_____
6. a. Total number of electoral Wards:____

   b. No. of wards covered with door to door garbage collection: _____

   c. No. of wards not covered with door to door garbage collection:_____

B. Gap analysis of infrastructure- Door to Door Garbage Collection

S. No.	Functional Equipment vehicles (two for each household)	Requirement as per Norms	Usable Existing equipment/ vehicles	Gap	Indica-tive Cost (Rs.)	Fund requirement
i.	Segregation Bins- 10-12 Liters capacity				80-100 per bin	
ii.	Push Carts (One for 150- 200 HH)				7,000	
iii.	Tricycle (One for 200- 300 HH)				18,000	
iv.	Auto Tipper having 300 to 500 kg capacity (One for 1000-1500 HH)				5,50,000	

C. **Gap analysis of infrastructure - Storage and Transportation**

The number of bins suggested below for placing along main road need to be assessed based on population density in the area and availability of space. This is not applicable to those ULBs who have achieved high level of collection efficiency by putting more vehicles and have streamlined waste collection mechanism and have removed bins from streets.

Sr. No.	Functional Equipments/ No. vehicles	Requirement as per Norms	Usable Existing equipment/ vehicles	Gap	Indicative Cost (Rs.)	Fund requirement
I	Bins-1.1 M3 (One or more bin at every 1000 mt on main road depending on assessed waste collection varying from locality to locality)				9,000	
II	Bins-2.5/3.0 m3 (One bin for operational areas of 1000 HH)				36,000	
III	Bins-4.5 M3 (One bin at the midpoint of 2 operational areas of 1000 HH each)				58,000	
IV	Light Commercial Vehicles > 700 kg capacity (One for 1500-2000 HH)				16,00,000	
V	Refuse Compactors				24,00,000	
VI	Backhoe Loader (JCB)				28,00,000	
VII	GPS (One per vehicle)				8,000	

7. Timeline for procurement of machines and equipment:

8. Estimated cost (Rs. In Cr.):

9. Funds available (including mission allocation under SBM):

10. Gap in funds available (9-8):

D. Gap analysis of infrastructure- Processing and Disposal

11. Quantity of Municipal Solid Waste treated currently (Tonnes per day):

12. Type of waste treatment technology used/available except crude dumping & proposed as per DPR / Swachh City Plan/ any other assessment (Please "):

Sr. No.	Technology	Used/Available	Proposed
I	Composting		
II	Biomethanation		
III	C&D Waste Processing		
IV	Mass burning based WTE processing		
V	RDF *andl* or WTE processing		
VI	Only RDF		
VII	Inert landfilled in SLF		
VIII	CRUDE Dumping		

13. Gap in treatment capacity (MTD) (5-11):

14. Availability of Sanitary Landfill: YIN

15. Fund requirement for treatment & disposal (Rs. In Cr):

16. Funds available (Rs. In Cr):

17. Gap in fund availability (Rs. In Cr) (16-15):

E. Gap analysis of Manpower

S. No.	Category/Norms	Existing Manpower	Requirement As per Norms	Gap	Timeline to fill-up
I	Waste Collector (One for every 1250 persons)				
II	Sweeper (One for every 10,000 persons)				
III	Driver (One per vehicle)				
IV	Helpder (One per vehicle)				
V	Sanitary Inspector (1 for every 50,000 persons)				

F. rsc Strategy

18. No. of NGOs/SHGs active in the ULB:

19. No. of NGOs/SHGs involved in IEC related activities:

20. Funds available for involving NGOs/SHGs in IEC (Rs. In Cr):

21. Expenditure estimated (Rs. In Cr):

22. Gap in fund availability (Rs. In Cr) (21-20):

G. Financial Sustainability for operation and maintenance:

23. Current expenditure on the SWM per annum (Rs. In Cr):

Capital	O&M	Salary

24. Source of Funding (Rs. In Cr):

Source	Property tax	GoI	State/others
Capital			
O&M			
Salary			

25. Whether user charges notified: *YIN*

26. User chargesl SWM related revenue collected per annum (Rs. In Cr):

27. Provision of byelaws to prevent littering: *YIN*

28. If No, timeline to enact the same:

Annexure-II

Service Level Benchmark indicators for Solid Waste Management

Sr. No.	Indicator	Benchmark
1.	Household level coverage of solid waste management services	100%
2.	Efficiency of collection of municipal solid waste	
3.	Extent of segregation of municipal solid waste	100%
4.	Extent of municipal solid waste recovered	80%
5.	Extent of scientific disposal of municipal solid waste	100%
6.	Efficiency in redressal of customer complaints within service level parameters	80%
7.	Extent of cost recovery in SWM services	100% for O&M + 20% of Capital Cost
8.	Efficiency in collection of SWM charges	90%