City Sanitation Plan

ROURKELA

Research Study Series No. 122

June 2012

National Institute of Urban Affairs
New Delhi , India

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OP&HS In association with
OP&HS (infra)

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PREFACE

The overall goal of the National Urban Sanitation Policy (NSUP) is to transform Urban India into community–driven, totally sanitized, healthy and livable cities and towns. Each state needs to formulate its own sanitation strategy and their respective cities should prepare sanitation plan in conformity with the NUSP.

In this context, the Government of Odisha (GoO) selected eight cities/towns to prepare City Sanitation Plans (CSPs) viz. Bhubaneshwar, Cuttack, Berhampur, Sambalpur, Rourkela, Puri, Balasore, Baripada. These cities/towns were selected on the basis of (i) geographical representation; (ii) emerging demand and interest of ULB to take-up initiative; and (iii) poor sanitation conditions that require urgent attention. GoO has also prepared a State Urban Sanitation Strategy in 2011, which served as guidelines for the selected cities/towns to prepare CSP.

GoO has identified National Institute of Urban Affairs (NIUA), New Delhi, as a technical coordinator to carry out the work. Subsequently, NIUA has undertaken the work in association with All India Institute of Local Self Government – Planning and Resource for Urban Development Affairs (AIILSG-PRUDA) and OP& HS (infra).

Out of the eight CSPs, five have been prepared by AIILSG-PRUDA viz. Bhubaneshwar, Puri, Cuttack, Balasore and Baripada and three by OP&HS (infra) viz. Sambalpur, Raurkela and Berhampur. NIUA is thankful to the above agencies for carrying out the work. NIUA would like to thank officials of Department of Urban Development, GoO, selected cities/towns and Ministry of Urban Development, Government of India for their continued guidance and support. Special thanks are due to Dr. M.P.Mathur, Mr. Ajay Nigam and Mr. Naveen Mathur who have overseen the in-house work, visited the cities, attended meetings and provided their valuable comments.

Chetan Vaidya

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Director, NIUA

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Executive Summary

Provision of universal access to safe drinking water and sanitation facilities is a prime need to enhance quality of life in any community. The Government of Orissa (GoO) has formulated the *Odisha Urban Sanitation Strategy* (OUSS) on the lines of, *National Urban Sanitation Policy* (NUSP) that was announced by, the Ministry of Urban Development, in December 2008. As a first step in implementing the OUSS, the GoO has undertaken to assist some 8 cities/towns in developing City Sanitation Plans (CSP) with funding support from Government of India with National Institute of Urban Affairs as the central coordinating agency.

OP&HS is appointed as the consultant for assisting the three cities of Rourkela, Sambalpur and Berhampur in the preparation of CSPs for the respective towns and had earlier submitted the Inception Reports. In line with the methodology of NUSP, the consultant has carried a structured survey and focused group discussions for undertaking the Situation Analysis of the sanitation status in the city covering the three key areas of wastewater, solid waste and the storm water drainage.

This Draft Report on City Sanitation Plan provides an insight on the present sanitation practices/situation in the city, sanitation deficiencies and further provides a detailed planning for city wide sanitation for attaining the goal of open defecation free city. A structured sample survey was conducted throughout the city on various attributes that concern the sanitation facilities in its vicinity and analysis of the same is carried out to assess its present sanitation situation.

The following methodology was adapted to selection of samples for the field survey:

- The city was divided as per its administrative wards. The sample size in each ward is fixed in proportion to the ward population and the sample households were selected duly taking in to account the geographical spread and ensures good representation of the characteristic of the ward.
- Separate survey questionnaires for sample survey and the focused group discussions were developed and the drafts discussed with the city administration and amended based on feedback and used in collecting the data.
- The survey team was trained and sensitized on the fundamental aspects of sanitation and were provided with sufficient background knowledge on the theme and objectives of CSP.
- The community and public toilets existing in the city were physically inspected by the survey team on walk in and walk around method and also by interaction with the users present during the walk around.

Demography

The population of the town for the census year 2001 was 2,24,987 , and the current population as of 2011 is estimated to be 2,69,602 (provisional) with the slum population of 1,14,980(43%). The total number of households as of 2011 is 59,239 out of which 25,994 are slum households. The town divided into 33 administrative wards is spread over 31.6 Sqkm sloping west to east and has a total road network of 630 km. Due to its importance of the location with a major steel plant, fertilizer plant and many small steel plants, there are good number of floating population in the town.

Situation Analysis

Access to Water Supply

It is observed from the primary survey that 17% of non slum and 31% of slum population depend on public stand post where as 41% of non slum properties and only 8% of slum properties have piped water connection. There is a high level of dependence on open well and tube well (41%) in the slum area. However due to low water table the open wells and 60% of the tube wells go dry during the summer season.

Water Supply Service Indicators

The water supply coverage is about 35% where in there are 14,437 direct piped water supply connections. The physical coverage is also quite low. As against 630 km road length the water network is available in about 220 km only. Majority population depends upon some 431 public taps, 1132 hand pumps, open wells & tanker supply. The town has adequate water with treatment capacity of 79 MLD. NRW is 33%. The citizens get water supply at an average of 2.8 hours a day.

Access to Toilets

According to the survey about 99% of the non slum households and 67% of slum households in the town have individual toilets About 25% of slum population and 1% of non slum population resort to open defecation in the open field, river bank, alongside ponds, drains or road side

.Wastewater Management

The town has limited implementation of wastewater management only in one colony (Koel Nagar) with collection and septic tank treatment which accounts for the 5% of non slum households. The rest of the 95% of the area are without facility of sewerage system though a large number of households have access to toilets and water abundance in the city as a whole is observed. About 86% of non slum households and 61% of slum households have onsite sanitation facilities and the remaining population either discharges the sewage into water bodies or resort to open defecation. The sewage generation presently is 38 MLD and as per estimates about 15% of this waste water finds its way into the storm water drains every day. This waste water ultimately flows into the Koel and Brahmini River, thereby polluting the river and posing a potential environmental hazard. There are nine such outfall points wherein the natural drains flow into the river. The ULB does not have a septage management policy nor a scientific treatment facility for septage.

Solid Waste Management

The ULB introduced door to door collection of garbage by private contractors and 15 wards are covered by the facility. The total solid waste generated per month amounts to 4,980 tons of which only 4,410 tons are collected and disposed at low lying area within and outside the city. The average collection efficiency of the garbage is about 89%. No land has yet been identified for disposal and treatment facility.

Storm Water Management

There are four major natural drains namely Bandha Munda Nallah, PF nallaha, main drain nallaha and Kalinga Vihar nallaha flowin into the Koel river. The city has a natural slope towards north which helps in quick drainage of storm water. In total 488 Km drains within the city and nine outfall points into the river. However due to encroachment and deposition of solid waste the Nallah is Choked causing flood in the city.

Basic Services to Urban Poor

Rourkela has total 114 numbers of slums. The slum population total to 1,14,980 with 26,994 households. Nearly 43% of the total population of the town comprises of the slums. The slums in the city are scattered all around the city and increasing over time. The slums are facing difficulties due to deficiency in various infrastructure facilities like roads, water supply, drainage, street lighting, solid waste management etc. Municipality is taking up a number of slum improvement and poverty alleviation programs with assistance from state gov. and central Govt. Few to mention are SJSRY, NSDP, RAY, IHSDP, ILCS etc. The data collected through primary survey and secondary source suggest that the situation in Rourkela town is much better than many cities of Odisha and are the situation can be much improved with small interventions.

Financial Status of Rourkela Municipality

It can be seen above that the own source revenues are very low and the town depends almost on grant devolutions from the state government. Also the expenditure on salaries is very high. The tax collection efficiency varies in a range of 40% - 50% leading to increased arrears.

Key Issues

Water supply

- Low coverage; inequality of distribution;
- wastage and theft of water; illegal connection and high system loss
- Lack of proper maintenance of infrastructure

Sewerage

- Only 5% sewage network, transmission and primary treatment facility
- Lack of proper septage management
- No community toilets leading to open defecation
- Raw sewage being disposed to water bodies leading to health hazards

Solid waste

- Lack of proper a scientific land fill site or even a proper dump yard

- River and ponds are widely used for dumping solid waste
- ULB lacks a waste management plan

Drainage

- Inadequate carrying capacity of drains leading to flooding
- Encroachment into drain; choking of drains due to garbage dumping
- Lack of comprehensive drainage master plan

Others

- Low level of awareness more so in the slum area
- Unhygienic condition in slum area
- Lack of coordination between various institutions responsible for urban services and development
- Inadequate staff strength
- Inadequate initiative on reforms
- Ring fencing of expenditure not practiced
- E-governance has not yet been implemented leading to manual method which results requirement of large man power and delay in working.

City Sanitation Plan

Population Projection

The population projection was arrived using graphical progression with 2012 as the base year and 2027 as the intermediate year and 2042 as the design year. The population projected are 274064, 340986 and 407909 respectively.

Waste Water Management

Option analysis has been done for various components of the waste water management such as household level sanitation, collection, treatment and disposal of waste water. The options of recycle and reuse have also been explored.

The strategy adopted in the planning process focuses on augmentation of water supply system with additional capacity of production, increased coverage and improved management resulting in low NRW.

The waste water management has been formulated with the concept of providing 100% access to toilets to all residents and floating population. As far as possible individual toilets are to be promoted with subsidy support, shared toilets being the next best option followed by community & public toilets. The institutional sanitation in schools, colleges & offices also needs to be addressed simultaneously. The sewer zoning has been adopted based on the topography of the area. The collection have been considered with prioritization of sewer network system considering the fact that most of the septic tanks are under designed leading to poor effluent

quality. Also the service level benchmark suggests for 100% collection efficiency as one of the indicators. Small bore system have been adopted were ever applicable. Considering the constraints and land availability and local resistance for treatment facility in the neighborhood, decentralized system with bigger zoning has been proposed.

The base year is taken as 2012 and the design year has been considered as 2042 with implementation period being six years i.e. 2012 to 2017. The sewage generation is computed at 45 MLD for the design year considering 110 LPCD sewage generation at 80% of water supply. A comparative statement of different construction of pipes shows that RCC pipes are the most suitable for the collection system. The additional infrastructure required includes

- 3746 individual toilets for both slum and non slum area
- 86 shared toilets being shared by two households
- 80 community toilet seats in 8 toilets suitably located within accessible distance of the targeted slum
- 40 public toilet seats in 8 toilets suitably located in the public places
- 30 public urinals with provision of two urinals in each facility
- 50540 new household connection
- 556 Km sewer collection network in two zones (Zone 1 & 2)
- 2 treatment facilities totaling to 38 MLD. One of 3.5 MLD capacity and second of 34.5 & is proposed.

The total subsidized capita cost is proposed as 241.00 crores to be implemented in time frame of five years.

Solid Waste Management

The solid waste management proposal has been developed with the objective of proper and effective collection, segregation, transportation, processing and disposal of municipal solid waste. Protection of public health, minimize environmental and occupational hazards are the other primary goal.

The approach taken to conclude the planning process is ensure 100% collection with segregation at source. Easy access of service to every citizen is priority. There has to be a eco friendly transfer and transportation system. A feasible processing facility has to be adopted to ensure optimal utilization of waste for productive output. A scientific land fill is also proposed.

The base year is taken as 2012 and the design year has been considered as 2015 for collection & transportation and 2030 for treatment & landfill. The collection and transportation infrastructure designed for 2015 itself has a over loading capacity of 10% which can take care of next 7- 10 years upto 2022 and also the addition of infrastructure required for this component are in small modules which can be added at intervals of 5 years. The treatment and landfill are designed for 15 years since the construction of these infrastructures are a long term process and are economical with size. The ULB already has good number of equipments for collection and transportation of solid waste with a available land fill site.

The waste generation in base year is 85 MT per day. It is projected that the generation will increase to 91 MT per day during 2015 and 118 MT per day during 2030. The water generation projection is based on the study conducted for similar cities in Odisha and confirmed by sample

verifications. The characteristics waste suggests that it contains 63% organic component, 13% recyclable components and 24% inert components.

The additional infrastructure consists of primary collection system, street sweeping, transportation vehicle, secondary transfer station, recovery centers, composting unit, mechanical & electrical equipments, bio-methanation plant, land fill site, bio medical waste handling and cost of land acquisition.

The total project cost is arrived at Rs. 28.71 crores to be implemented in a time horizon of three years i.e. 2012 to 2015.

Storm water Drainage

Proper drainage & disposal of storm water and prevention water logging are very vital component of a good sanitation system and improved public health. A properly networked drainage system of proper design standards is required to achieve the required goal.

All the roads need to have a drain well networked with the primary drains and finally disposal to the natural drains or water bodies. The drains have to be covered type. It is assumed that 50% of the roads would be required to have drains on both side. Total road length of the is city is 629 Km. A total of 629 Km of drains are proposed out of which 192 Km of pucca drains are in existence. The additional infrastructure required is 437 Km out of which 66 Km main drain, 153 Km secondary drain and 219 Km tertiary drain are proposed.

The total cost of additional infrastructure is calculated at Rs. 139.20 crores to be implemented over a period of 4 years i.e. 2012 to 2016

IEC and Institutional Strengthening

Awareness generation, promotion of cultural & social shifts are the major component for success of planning process. The required objective can only be achieved when the citizens are educated, conscious, responsive and adaptive. These should be supported by a strong institutional reform including capacity building and a equally strong enforcement mechanism.

It is proposed to adopt various medium for awareness generation with delivery in next four years. However this process should continue on a annual basis to continue the momentum. The process can be categorized as design phase, implementation phase and review phase. Midterm correction should be adopted for effectiveness of the programs. Simultaneously the capacity as well as the structure of the institution needs to be strengthened.

The total IEC cost is arrived at Rs. 3.50 crores to be implemented over a period of 4 years i.e. 2012 to 2016.

Cost Abstract

The abstract of the capital outlay for achieving city wide sanitation is as follows

Description	Amount in Lakh Rs.
Waste Water Management	24,100.00
Solid Waste Management	2,871.00
Storm Water Drainage	13,920.00
IEC & Capacity Building	350.00
Total	**41,241.00**

The total investment plan for the city sanitation plan is computed at **Rs. 412.41 crores**

Acronyms

CSP	-	City Sanitation Plan
DTDC	-	Door to door collection
GoI	-	Government of India
GoO	-	Government of Orissa
HH	-	Household
LPCD	-	Liters per Capita per Day
MoUD	-	Ministry of Urban Development
MSW	-	Municipal Solid Waste
MSWM	-	Municipal Solid Waste Management
NUSP	-	National Urban Sanitation Policy
SWD	-	Storm Water Drainage
SWM	-	Solid Waste Management
ULB	-	Urban Local Body
SUSP	-	State Urban Sanitation Policy
CSP	-	City Sanitation Plan
SAR	-	Sanitation Analysis Report
PPP	-	Public Private Partnership
RM	-	Rourkela Municipality
EMD	-	Earnest Money Deposit
SD	-	Security Deposit

1. Introduction

Provision of universal access to safe drinking water and sanitation facilities is a prime need to enhance quality of life in any community. The State of Orissa is taking several steps to improve the quality of life of its urban population. This vision of providing basic facilities for all is driven by Orissa's remarkable progress in several areas in the recent past. The Government of Orissa (GoO) has formulated the *Odisha Urban Sanitation Strategy* (OUSS) on the lines of, *National Urban Sanitation Policy* (NUSP) that was announced by, the Ministry of Urban Development, in December 2008. By implementing the strategy, the state is planning to drive itself towards total sanitation, thereby, enhancing the standard of living across the cities and towns.

As a first step in implementing the SUSP, the GoO has undertaken to assist some 8 cities/towns in developing City Sanitation Plans (CSP) with funding support from Government of India with National Institute of Urban Affairs as the central coordinating agency. For ensuring inclusive development approach, the CSP, as envisaged in NUSP, will be prepared by taking into consideration ground realities, local conditions, and an up-to-date assessment of the situation. It shall be prepared through consultations with all relevant stakeholders in each of the sectors covered.

OPHS is appointed as the consultant for assisting the three cities of Berhampur, Sambalpur, and Rourkela in the preparation of CSPs for the respective towns and had earlier submitted the Inception Reports. In line with the methodology of NUSP, the consultant has carried a structured survey and focused group discussions for undertaking the Situation Analysis of the sanitation status in the city covering the three key areas of wastewater, solid waste and the storm water drainage.

This City Sanitation Plan comprises of two parts. First the situation Analysis and second the planning for city wide planning. The Situation Analysis Report provides an insight on the present sanitation practices/situation in the city. Proper analysis of the situation provides inputs for preparing a effective and implementable strategy which finally translated into a detailed city sanitation plan.

2. Background

2.1. Objective

To determine the gravity of the current sanitation facilities in the Rourkela and to prepare a plan to achieve goal of zero open defecation & a sanitized city, the City Sanitation Plan report is prepared so as to address all the issues like: coverage of individual toilets, availability of public toilets, transport and disposal of liquid and solid wastes, and other key issues pertaining to sanitation.

2.2. National Urban Sanitation Policy

NUSP which forms basis for the situation assessment and further development planning for improving the sanitation in the city. The vision of National Urban Sanitation Policy is " 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 woman". The key objectives of NSUP are:

- Cities must be free of open defecation
- They must eliminate the practice of manual scavenging and provide adequate protective equipment that ensures the safety of sanitary workers.
- Proper disposal of municipal wastewater and storm water drainage should be arranged
- Recycle and reuse of treated wastewater for non-portable applications should be implemented wherever, possible
- Solid waste should be fully collected and safely disposed off
- Basic services to the poor should be provided adequately and maintained properly
- Measures for improved public health and environmental standards should be taken
- Awareness generation and behavior change

2.3. Odisha Urban Sanitation Strategy

The main objective of the State Urban Sanitation Strategy is to develop citywide sanitation plans and implement them by integrating all aspects of sanitation in an effective way. The program implementation strategy is based on the following principles:

- Develop sanitation facilities in the urban areas with special emphasis on the slums, through active participation of the communities, especially women.
- Eradicate the practice of open defecation in the city by providing household toilets, community toilets and public toilets.
- Safe disposal of human excreta, solid and liquid waste, including institutionalizing and provisioning the implementation of policy guidelines of Government of India on Management of Municipal Solid Waste and Management of Biomedical Waste.
- Improve the 'quality of life' of the sanitation workers.
- Engage civil societies and communities (women in particular) in awareness generation, hygiene education, creation of sanitation infrastructure and its maintenance.
- Strengthen institutional set up and build the capacity of the municipal staff for effective program implementation and meeting the challenges of technology and management.
- Encourage Public Private Partnerships (PPPs) to ensure generation of funds and sustainable program implementation.
- Ensure inter-departmental coordination and integration of various relevant projects/schemes/program for their optimum use and outcome

2.4. National Rating Scheme for Sanitation

In order to rapidly promote sanitation in Urban areas of the country (as provided for in the National Urban Sanitation policy and Goals, 2008), and to recognize excellent performance in this area, the Government of India has instituted an annual rating and award scheme for cities. The award (Nirmal Shahar 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 citywide sanitation plans, thereby putting in place processes that help achieve outputs pertaining to safe collection, confinement and disposal (including conveyance, treatment , and/ or reuse without 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 outcomes, was carried out in 2010 to set the baseline ranking. Cities are expected to undertake an objective self-assessment from time to time. The NUSP document on ratings states that those in the red category are "Cities on the brink of Public health and environmental 'emergency' and needing immediate remedial action". The city sanitation rating methodology is provided at **Annexure 18**

2.5. Overview of the Scope of Work

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

- 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. Refer **Annexure 1**

- Task 2 – Conduct 1st Consultation

A first consultation has been conducted to orient the city stakeholders on the objectives of the NUSP and OUSS, and on the process and methodology of preparing the City Sanitation Plan. Refer **Annexure 2**

- 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 Public Latrines in Wards and Slums
- 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

Refer **Annexure 3**

- 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.

- 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. Refer **Annexure 14**
- 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.

- Task 8 – 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. Refer **Annexure 17**
- Task 9 – 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 consultation meeting.

2.6. Sanitation Components

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

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

Improvement and Management of Sanitation facility

3. Situation Analysis

"I am willing to pay....but where is the matching service" – says a common man

The city ranks at 134 in City Sanitation Ranking conducted during the year 2010.

3.1. Approach

- Study of past development history, growth, economy, values & culture, demographic, socio-economic status etc.
- Secondary data collection on spatial spread, basic services, institutional setup, key stakeholders and financial reports
- Reconnaissance survey on sample basis scientifically distributed across the municipal area
- Interact with key stake holder with special inputs from councilors on the status and issued related to the ward
- Walk through survey of the wards and observation on the physical situation of infrastructure, service quality and condition assessment
- Conduct focused group discussion on basic services
- Assessment of current service status in water, sewerage, solid waste and drainage sector
- Assessment of current institutional arrangement and financial strength
- Identification of key issues and challenges with special reference to urban poor

3.1.1. The base line data collection covered the following aspects.

- Base maps, and available secondary data on the city's demographics, service levels of water and sanitation
- Information on water supply, wastewater generation, collection and disposal, including initiatives which are being implemented or planned.
- Information on solid waste (collection, transportation and disposal)
- Data on institutional setup
- Data on municipal finances especially demand and collection of water and sewerage/sanitation charges, including connection fees and user charges; and capital costs and operation and maintenance costs for water and sewerage/sanitation services, and solid waste.

3.1.2. Field Survey

The assessment of sanitation situation is further determined through a structured field survey covering three groups; (i) reasonable sample of households covering non-slum and slum areas; (ii) focused group discussion with the councilors and (iii) focused group discussion with the municipal managers and operational staff.

The following methodology was adapted to selection of samples for the field survey:

- The city was divided as per its administrative wards. The sample size in each ward is fixed in proportion to the ward population and the sample households were selected duly taking into account the geographical spread and ensures good representation of the characteristic of the ward. 5% of non slum and 10% non slum House hold were selected for survey
- Separate survey questionnaires for sample survey(**Annexure 4**) and the focused group discussions (**Annexure 7 & 8)** were developed and the drafts discussed with the city administration and amended based on feedback and used in collecting the data.
- The survey team was trained and sensitized on the fundamental aspects of sanitation and were provided with sufficient background knowledge on the theme and objectives of CSP.
- The community and public toilets existing in the city were physically inspected by the survey team on walk in and walk around method and also by interaction with the users present during the walk around **(Annexure 11)**

The data analysis is undertaken to determine the status by application of appropriate statistical analytical tools and the resultant trend was further confirmed through a feedback discussion with the operational staff through a test of reasonableness of the findings. The findings of the primary survey is annexed to this report. Refer **Annexure 6, 7, 8 & 11**

3.1.3. Councilor Interaction

A questionnaire was prepared for taking inputs from the councilors on the current status of the ward, perception on the quality of service and issues related to the ward.

3.1.4. Focused Group Discussion

Focused group discussion was conducted in two separate groups

- Elected representatives (councilors)
- Officials and managers of service providers

The findings of the focused group discussion is encloses as **Annexure 7 & 8**

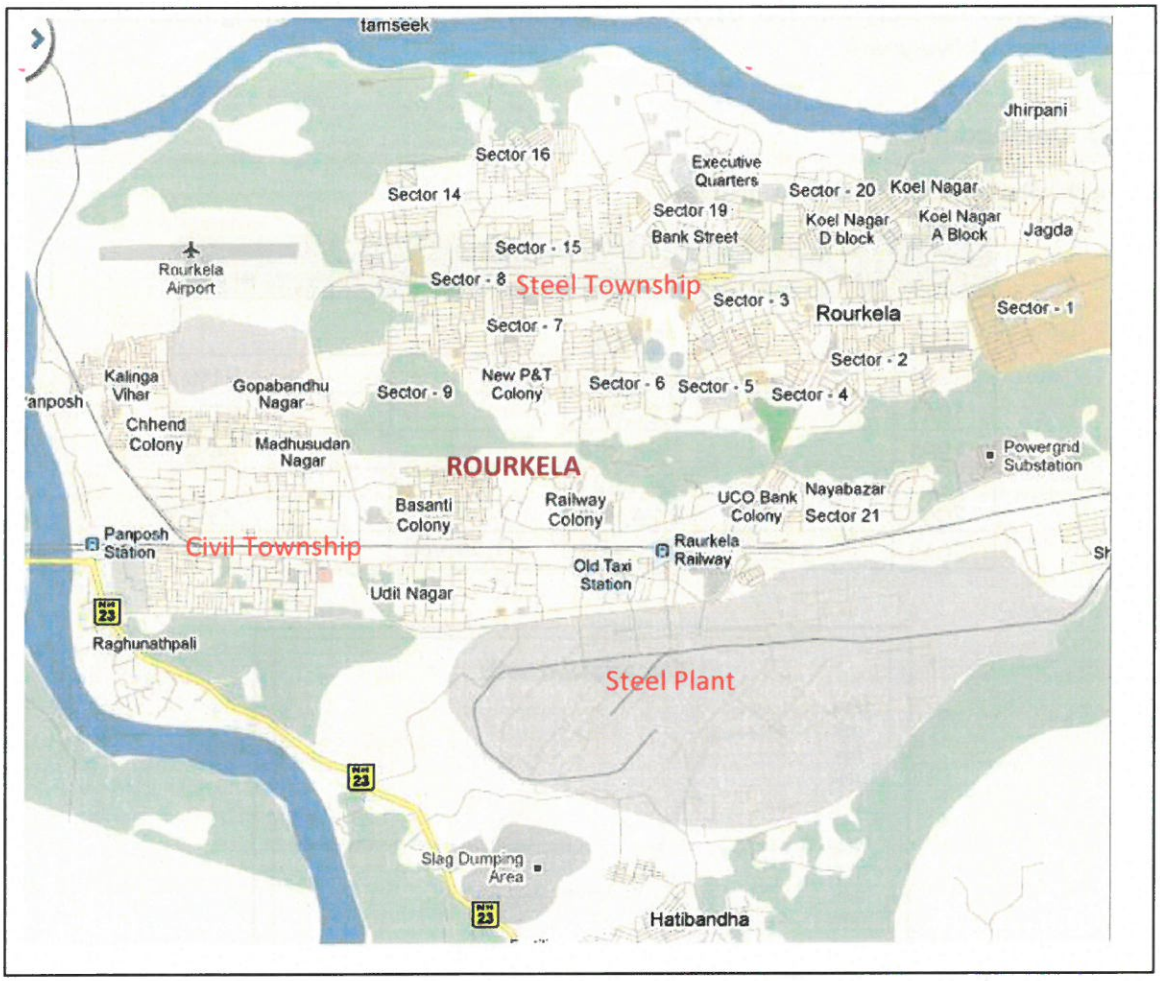
3.1.5. Condition Assessment Survey

Condition assessment survey for the existing community toilets was conducted to assess the capacity, physical condition and the usage. Also some information on the operational issues were collected. Refer **Annexure 11**

3.2. Rourkela City

3.2.1. Location

Rourkela the North western town of Orissa located at about 350 Km from the state capital. The town is surrounded by river Brahmini, Koel and Sankh. The town located at the heart of mineral rich belt and spread over an as well as by east cost railway and strategically located on the Kolkata-Mumbai rail route. The town forms a part of the north-west upland of Orissa at MSL 219m with the ground sloping towards West. The town is famous for the major steel plant, and National Institute of Technology.



3.2.2. Climate

The climate of the town is extreme with summer temperature rising as high as 47°C and the winter temperature falling as low as 7°C. The average annual rainfall in the town is 1800 mm. The major of the area has tropical dry deciduous forest.

3.2.3. Culture

Rourkela has been traditionally a tribal belt with more of forest area. It has a touch of tribal culture in the outskirt villages. Subsequently it developed into a industrial township with a cosmopolitan culture.

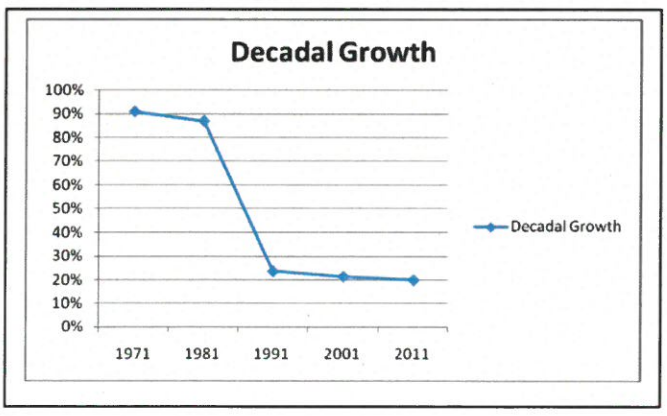
3.2.4. Economy

Rourkela is the industrial capital of Odisha. The main economy of the area revolves around the mega steel plant. The steel plant supports a number of ancillary units. Rourkela also has a fertilizer plant which is a subsidiary of the steel plant. Some of the other major industries in and around Rourkela are L&T at Kansbhal, OCL India Ltd. At Rajgangpur and IDL at Jagda. The city is in the growth trajectory with real estate, housing development and shopping malls remarkably visible since last five years..

3.3. Demography

Table 1 : Rourkela Population growth

Year	Area of the City	Total Population	Slum Population	Decadal Growth Rate
1961		90,287		
1971		1,72,502		91%
1981		3,22,610		87%
1991		3,98,864		24%
2001	31.6	4,84,292 / 2,24,987		23%
2011	31.6	2,69,602	1,14,980	20%



Rourkela NAC was established in the year 1855 and upgraded to Municipality in 1989. It is the third largest town of Orissa and has been declared as a Class-I Town as per 2001 census. The town is divided into 33 wards with a total area of 31.6SqKm.

The Municipality of Rourkela also included the steel township till late nineties. Subsequently the steel township has been separated out of Rourkela Municipal limits. The population of the town for the census year 2001 was 2,24,987, and the current population as of 2011 is said to be 2,69,602 (provisional) with the slum population of 1,14,980(43%). The total number of households as of 2011 is 59,239 out of which 25,994 are slum households. The town divided into 33 administrative wards is spread over 31.6 Sqkm sloping towards north and has a total road network of 629 km. Due to its importance of industrial and trading activity, there are good number of floating population in the town.

Table 2 : Ward-wise estimated population in Rourkela as on 2011

Ward	Population 2001	Population 2011	Total House Holds	Number of Slums	Slum Population	Slum House Holds	% of slum Population	Geographical area
1	5622	7576	1652	10	6681	1519	88%	1.95
2	6174	5956	1249	3	3579	842	60%	1
3	7529	14043	3129	3	8810	1814	63%	3.29
4	10790	11475	2407	5	1511	339	13%	1.25
5	6835	9033	2100	5	4245	1009	47%	0.54
6	9720	10612	2500	9	6007	1555	57%	1.44
7	11535	7590	1707	6	6035	1536	80%	0.6
8	8493	11500	2600	1	517	160	4%	0.44
9	7114	10329	2309	6	7651	1729	74%	0.52
10	7846	10410	2580	3	4606	1169	44%	0.2
11	5842	5807	1351	5	5572	1988	95%	0.47
12	9745	9643	2241	4	2209	516	23%	1
13	9611	13456	3006	4	8715	1041	65%	0.46
14	4841	7500	1680	3	3473	784	46%	0.31
15	5391	5102	1020	3	2951	557	58%	0.26
16	5911	8320	1960	3	3921	942	47%	0.24
17	3849	4950	1091	1	1523	369	31%	0.31
18	5905	4260	960	1	1727	423	41%	0.2
19	6667	6120	1280	1	1756	338	29%	0.22
20	6888	9312	1615	3	4130	826	44%	0.12
21	4911	5157	983	2	3524	676	68%	0.11
22	4827	4427	857	3	2397	463	54%	0.95
23	4906	4697	1103	3	2254	576	48%	2.72
24	5572	7236	1559	4	5688	1164	79%	0.34
25	5123	4903	1153	3	1109	267	23%	0.3

Ward	Population 2001	Population 2011	Total House Holds	Number of Slums	Slum Population	Slum House Holds	% of slum Population	Geographical area
26	3439	3510	795	2	1653	409	47%	1.29
27	7064	6054	1361	2	697	154	12%	1.23
28	5754	7341	1600	1	555	125	8%	1.84
29	6278	7170	1463	1	297	63	4%	1.86
30	7636	9404	1504	2	2929	736	31%	3.13
31	7828	10374	2453	5	4083	982	39%	1.41
32	8495	11894	2606	7	4175	923	35%	0.46
33	6846	14441	3365	0	0	0	0%	1.14
Total	**224987**	**269602**	**59239**	**114**	**114980**	**25994**		**31.6**

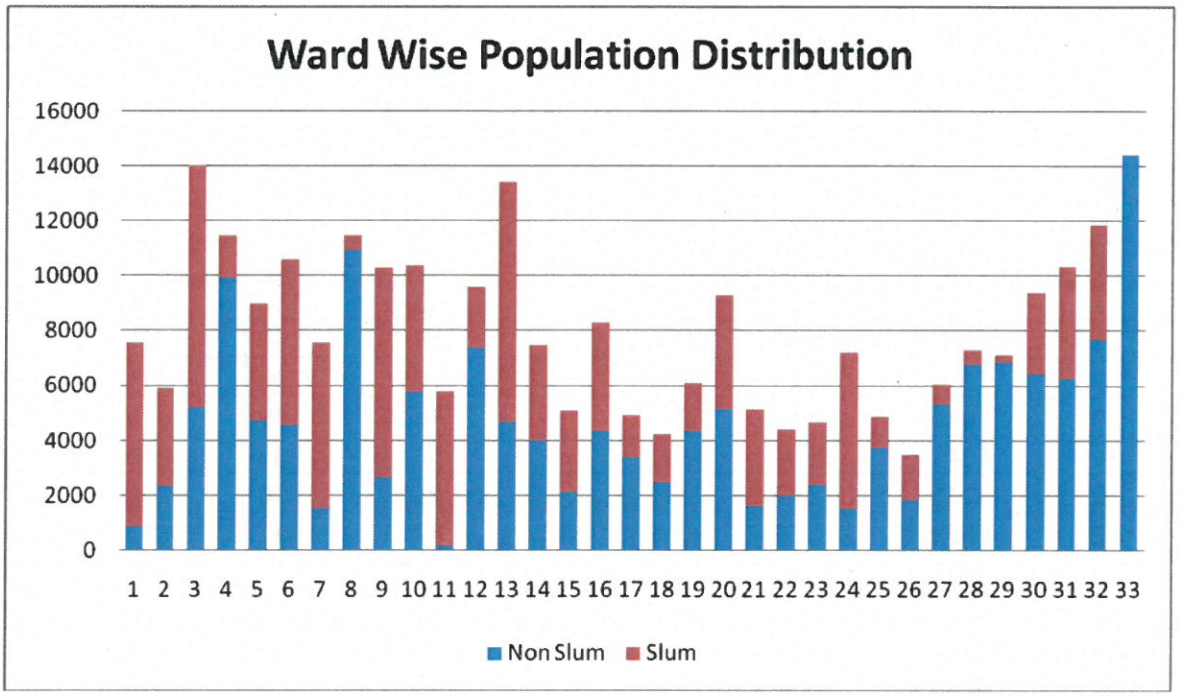


Figure 1 : Ward wise distribution of total and slum population

The ward wise status of sanitation and services as inferred from the walk through survey, field survey and focused group discussions is summarized at **Annexure 5**. The slum status is detailed at **Annexure 9**

3.4. Water Supply service

Water supply and wastewater services are provided by the Public Health Engineering Organisation and the town receives two hours forty five minutes water supply per day. The water service indicators and the targets proposed are shown in the following table

3.4.1. Water Supply Performance

Table 3 : Water Supply Service Indicators

Performance Indicator	Benchmark	2009-10	20010-11	Target for 2011-12
Coverage (%)	100%	34.1	35.0	40
Per Capita Supply of Water(lpcd)	135	293.0	275.0	250
Extent of Metering (%)	100%	0	0	2
Extent of Non-Revenue Water (%)	15%	74.2	33.2	30
Continuity of water supply	24x7	2.9	2.8	2.8
Eff. in redressal of customer complaints (%)	80%	76.4	78.3	80
Quality of Water Supplied (%)	100%	81.5	89.5	100
Cost Recovery (%)	100%	23	21.5	30
Eff. In Collection of Water Charges (%)	90%	65.5	66.5	80

55 MLD WTP at Rourkela

The water supply coverage is about 35% where in there are 14,437 direct piped water supply connections. The physical coverage is also quite low. As against 630 km road length the water network is available in about 220 km only. Majority population depends upon some 431 public taps, 1132 hand pumps, open wells & tanker supply. The town has adequate water with treatment capacity of 79 MLD.

The average daily water supply to the town from these sources is 48 MLD. The Per capita water supply of 275 is high as compared to the national benchmark. No meters have been installed and the users are charged at flat rate which is a major cause of wastage leading to high Non Revenue Water (33%). The town has interim water supply with average 2.8 Hrs of supply daily

3.4.2. Access to Water Supply

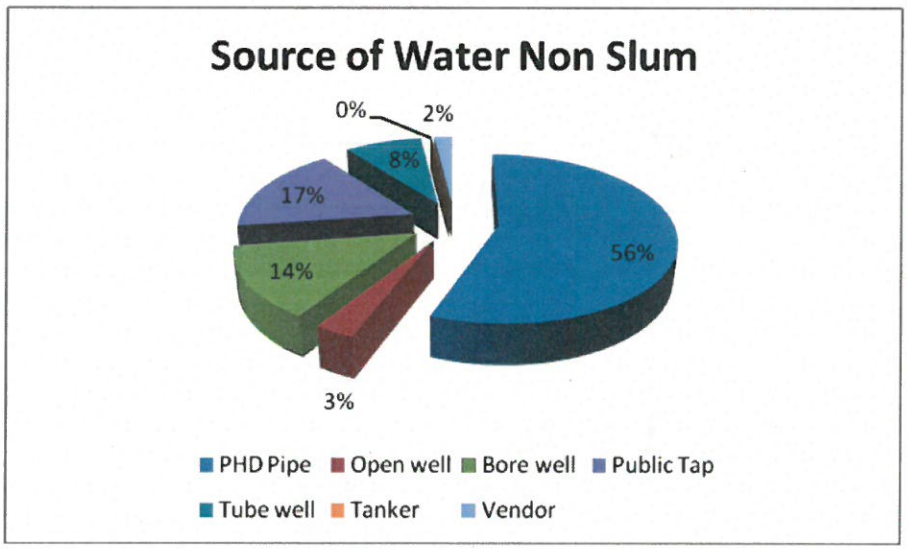


Figure 2 : Water source in non slum area

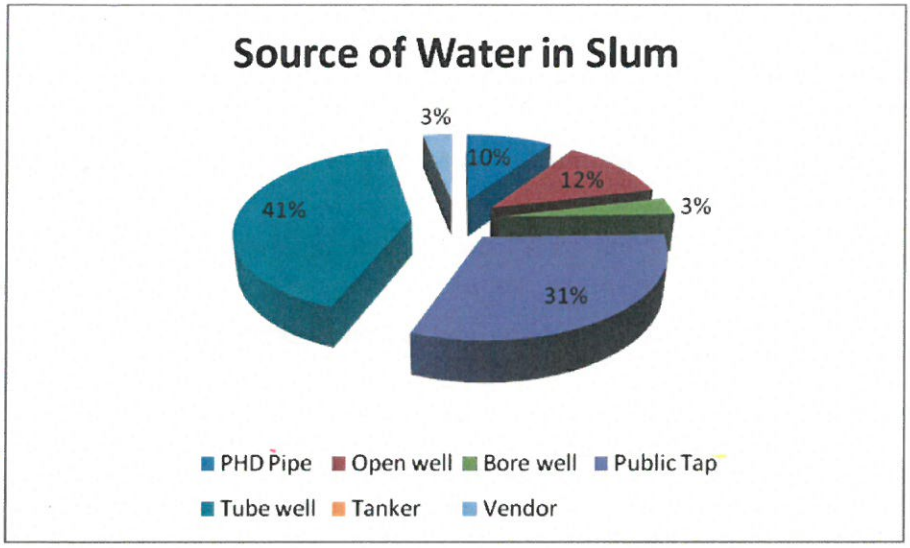


Figure 3 : Water source in slum area

It is observed from the primary survey that 17% of non slum and 31% of slum population depend on public stand post where as 41% of non slum properties and only 10% of slum properties have piped water connection. There is a high level of dependence on open well and tube well (41%) in the slum area. However due to low water table the open wells and 60% of the tube wells go dry during the summer season resulting in scarcity of water. The slum areas are most affected during summer due to high dependence on hand pump tube well.

3.4.3. Ground Water

The city being situated amidst a hilly mining region, the water table is very low and the yield is very poor. The water table normally is 6-7m below GL and fall as low as 20m during summer. The open wells and majority of hand pump tube wells dry up during monsoon. The yield of deep bore well is also quite low.

3.4.4. Water Bodies

River water bodies and other still water bodies are useful domestic sources for people residing in water scarcity areas. It is no different in Rourkela town where residents depend upon such water bodies due to either inadequate or irregular access to potable water. There are very few ponds in the town. The rivers are widely used for variety of purposes including bathing and drinking. The ponds have deteriorated in water quality due to several causes such as quick siltation, natural damage and rapid & concentrated population growth in concerned area. There is a constant increase in BOD due to presence of organic waste primarily due to open defecation and sewage inflow into the water bodies.

3.4.5. Key issues

- The city has adequate water but there is inequality in distribution and urban poor are the victim of the system.
- Coverage is low due to scattered location of wards leading to o inadequate distribution network
- There is large wastage and theft of water due to lack of metering and proper surveillance.
- Illegal connections, suction from distribution line and system leakages are a matter of concern
- Inadequate maintenance of the existing infrastructure
- Open defecation is in practice though comparatively low in the river side leading to unhealthy and unhygienic conditions. Quality of water bodies in the city is degrading rapidly and the ponds are heavily silted.

3.5. Sanitation

3.5.1. Access to Toilets

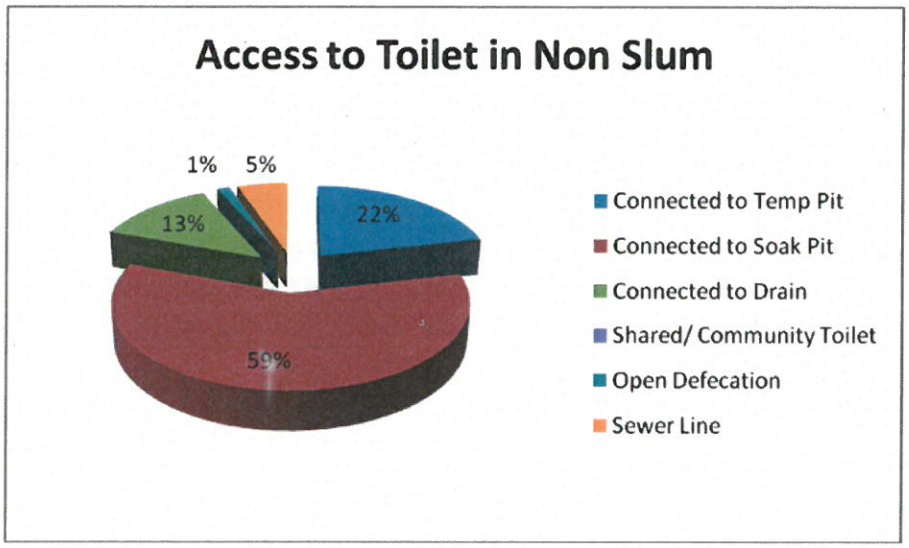


Figure 4 – Access to Toilets in non slum

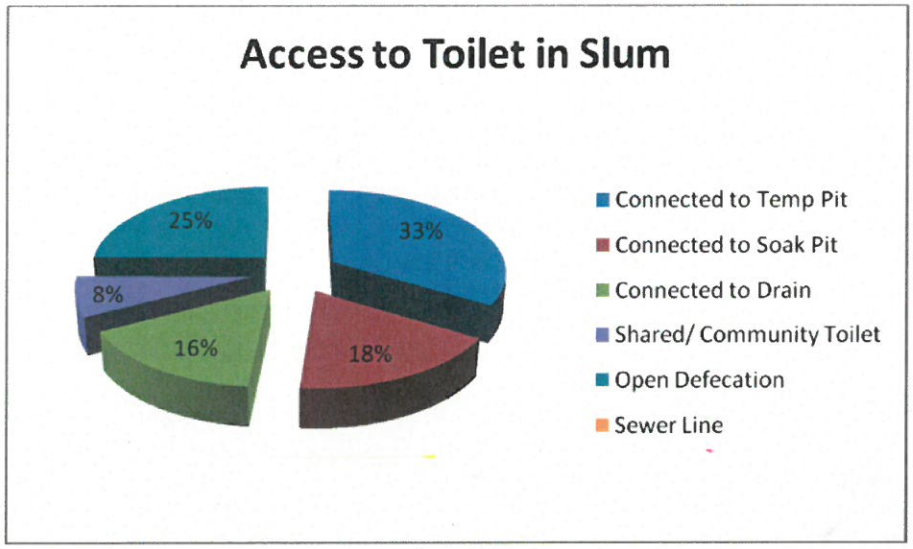


Figure 5 – Access to Toilets in slum area

According to the survey about 99% of the non slum households and 67% of slum households in the town have individual toilets and the remaining population, either use the public toilets or share with other households or resort to open defecation. The figure above shows the availability / access to toilets for the current population in non slum and slum areas of Rourkela. Out of the remaining household 8% of households use either community toilets or share the toilets with neighbors / owners. About 25% of slum population and 1% of non slum population resort to open defecation in the open field, river bank, alongside ponds, drains or road side. The detail slum sanitation status is provided at **Annexure 9**.The town has 5% of non slum houses with sewerage collection network. This is observed mainly in the Koel Nagar area. The sewerage system has a decentralized septic tank and the effluent from the septic tank is discharged to river Koel.

3.5.2. Condition Assessment of Community/Public Toilets

There are no community toilets in the ULB. The town has 5 public toilets with 54 seats which are also extensively used by the slum dwellers. Three are maintained by Municipality and two are maintained by Sulabh International. One of the Municipality toilets has been outsourced to a private agency for operation and maintenance. All the toilets are being operated with user charges and have been observed to be in condition. The source of water to the community toilet is either from PHD or bore well. The disposal of sewage into individual soak pits. The public toilets charge fees in the range of Rs.2.00 – Rs.4.00 for usage and hence the

maintenance of the same is relatively better than the community toilets. On an average some 200 – 250 people use the facilities. Refer **Annexure 11**

There are very few water bodies in the town. The water bodies are not maintained and are silted over a period of time. These are primarily used by the local residents for their day to day water requirement. However these locations are used for open defecation and disposal for solid waste there by creating hygiene problems.

The slum dwellers basically from the labour class resort to open defecation along the river side and water bodies. These places are widely used for dumping of solid waste.

3.5.3. Wastewater Management

The town has limited implementation of wastewater management only in one colony (Koel Nagar) with collection and septic tank treatment which accounts for the 5% of non slum households. The rest of the 95% of the area are without facility of sewerage system though a large number of households have access to toilets and water abundance in the city as a whole is observed. About 86% of non slum households and 61% of slum households have onsite sanitation facilities and the remaining population either discharges the sewage into water bodies or resort to open defecation. The critical factors for such a status are pressure on urban space in highly dense old residential

areas, high cost of living and migration of rural mass to the urban area in search of work. Such a scenario has resulted in unhygienic conditions; with the highly polluted river poses a great threat to the public health and welfare of the community. Non-existent of full-fledged treatment and disposal system for the town is posing a great threat to the public health. At present the supply of water to the city is around 48 million liters per day. The sewage generation presently is 38 MLD and as per estimates about 15% of this waste water finds its way into the storm water drains every day. This waste water ultimately flows into the Koel and Brahmini River, thereby polluting the river and posing a potential environmental hazard. Even the households with onsite sanitation, there is no scientific disposal of sludge and the residents hire local suction machines and the septage is disposed off into open pits/nalas located outside the town limits. The ULB owns two cesspool equipments which is provided to the residents on hire but does not have a septage management policy nor a scientific treatment facility for septage. At many of the slum area the residents resort to manual scavenging which leads to health hazards. The ward wise existing sanitation status is provided at **Annexure 10**

Thereby, the entire town's wastewater disposal needs a complete changeover in order to achieve a safe sanitized environment. OWSSB is preparing a DPR for sewerage system for Rourkela town.

3.5.4. Key Issues

- There is no proper sewerage collection system in the ULB except one colony
- There is no sewerage treatment plant. Septage management is not practiced by the ULB
- There is practice of open defecation though less as compared to other cities of Odisha. This is creating unhygienic conditions and health problems.
- The sewage is drained out into the open drains which ultimately find its way into the river leading to contamination.
- There are no awareness campaigns run by the municipality for the slum dwellers.
- Populations residing in slums are facing unbearable unhygienic conditions.
- There are no community toilets in the ULB. Only Public toilets are present which is also used by the slum dwellers.

3.6. Solid Waste Management

The Health Department of Municipality is responsible for collection and transportation of solid waste generated in Rourkela municipal area. For operational purposes the entire area is divided into 33 solid waste wards. Sanitary inspectors are in charge of the operation of SWM headed by a health officer. The primary collection in the Rourkela municipal is carried out through door to door collection, open collection points, secondary collection & transportation through tractors/trucks.

The current service levels in the town in regard to solid waste management as notified in the Orissa gazette are shown in the following table.

Table 1 :Solid Waste Management Indicators

Sl.	Indicator	Benchmark	2010-11	Target 2011-12
1	Household Level Coverage of SWM Services(%)	100	80	90
2	Efficiency of Collection of MSW (%)	100	90	100
3	Extent of Segregation of Solid Waste (%)	100	00	00
4	Extent of Municipal Solid Waste Recovered (%)	80	70	80
5	Extent of Scientific Disposal of Solid Waste (%)	100	00	30
6	Efficiency in Redressal of Complaints (%)	80	70	75
7	Extent of Cost Recovery in SWM Services (%)	100	00	10
8	Efficiency in Collection of SWM Charges (%)	90	00	50

Orissa state introduced commendable initiatives managing the urban solid waste and the ULBs with the lessons learnt are trying to extend the services to cover entire cities/towns.

The ULB introduced door to door collection of garbage in 15 wards out of which 11 are outsourced to private agency, 3 are managed by Municipality and one is managed by a NGO. In the remaining 18 wards the solid waste is currently collected from a common collection point mostly an open site, from where it is hauled to the disposal site. The household level coverage is reflected as 80% which needs to be verified since other related information and enquiry reveals that the household level coverage level is only 35%. The total solid waste generated per month amounts to 4,980 tons of which 4,410 tons are collected and disposed at different low lying area within the town and outside the town. The Municipality also uses the dumping yard used by the steel township. The average collection efficiency of the garbage is about 89%.

Some of the wards covered by street sweeping are taken up for about 6 days a week. The waste collected by street sweeping is about 1710 tons per month, which is about 35% of the total waste generated. This reveals the fact that lat of domestic garbage is thrown on the road and also there is a big presence of road side vendors. Rourkela Municipality is planning to extend the private management to all the wards.

There are new growth area which are being added to the municipal area also there is a long standing demand to add other outskirt areas like Jalda into the municipal limits and to convert it into a corporation. The cattle wastes from these areas also require a safe and scientific disposal.

Reforms in Solid Waste Management in Rourkela

Rourkela Municipality has added new equipments for improving the SWM system with funding from 12th FC grant. The municipality has put in service 5 tippers/trucks, 7 tractor trolleys, 2 excavators and 9 auto tippers. Also they have 88 dustbins and 66 garbage bins placed within the town. Over and above this the private agency deploys its own equipments for SWM in the 15 wards outsourced to it.

The following figure shows the percentage-wise breakup of solid waste generation sources. The waste generated from street sweeping suggests the lack of proper infrastructure in collection and disposal of solid waste in the town.

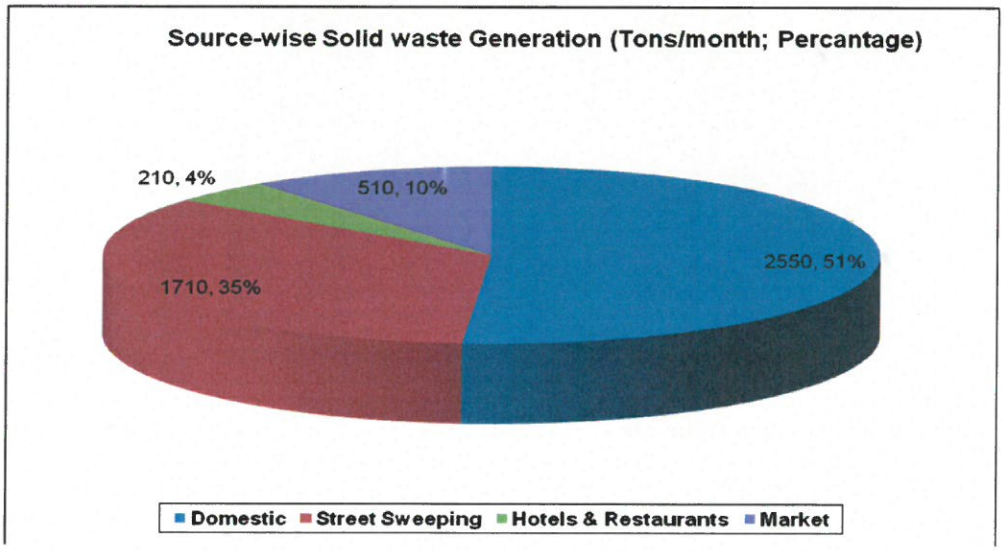


Figure 6 - Source- wise Solid Waste Generated

It is observed that the quantity of waste generated from street sweeping is almost 35% which suggests that there is big presence of road side vendors which caters to the transit passengers. Due to the presence of large number of floating population and lack of adequate disposal bins in the busy area, the waste are thrown on the road.

It is observed that the waste from the areas located on the banks of River is indiscriminately dumped in the River posing a serious public health hazard to the number of bathing ghats along the river bank.

Rourkela Municipality is proposing to set up a treatment and disposal unit in association with steel township.

Key Issues

- The ULB lacks a solid waste management plan
- There is no scientific landfill site. Also there is lack of identified disposal site resulting indiscriminate spreading of solid waste
- River bank is widely used to dump garbage leading to water contamination and hygiene issues
- Low level of awareness amongst the citizens on solid waste handling

3.7. Storm Water Management

Storm water drains in Rourkela

There are four major natural drains namely Bandha Munda Nallah, PF nallaha, main drain nallaha and Kalinga Vihar nallaha flowin into the Koel river. The city has a natural slope towards north which helps in quick drainage of storm water. In total there are nine outfall points into the river

Table 5 :Drainage Indicators

Sl.No.	Indicator	Benchmark	March 2011	Target 2011-12
1	Coverage of Storm Water Drainage Network (%)	100	21	25
2	Incidence of Water Logging/Flooding (Number)	0	05	03

The drains are in a state of disrepair and the situation is further aggravated by clogging by plastic. The municipal conservancy staff are said to be de-silting the drains on a daily basis. Most of the drains are Kucha. The total length of drain are reported to be 488 Km and are isolated without proper connectivity. It is observed that though there is presence of 488 Km of drain as compared to 629 Km road but the coverage is reported as low as 21%. This data needs further verification.

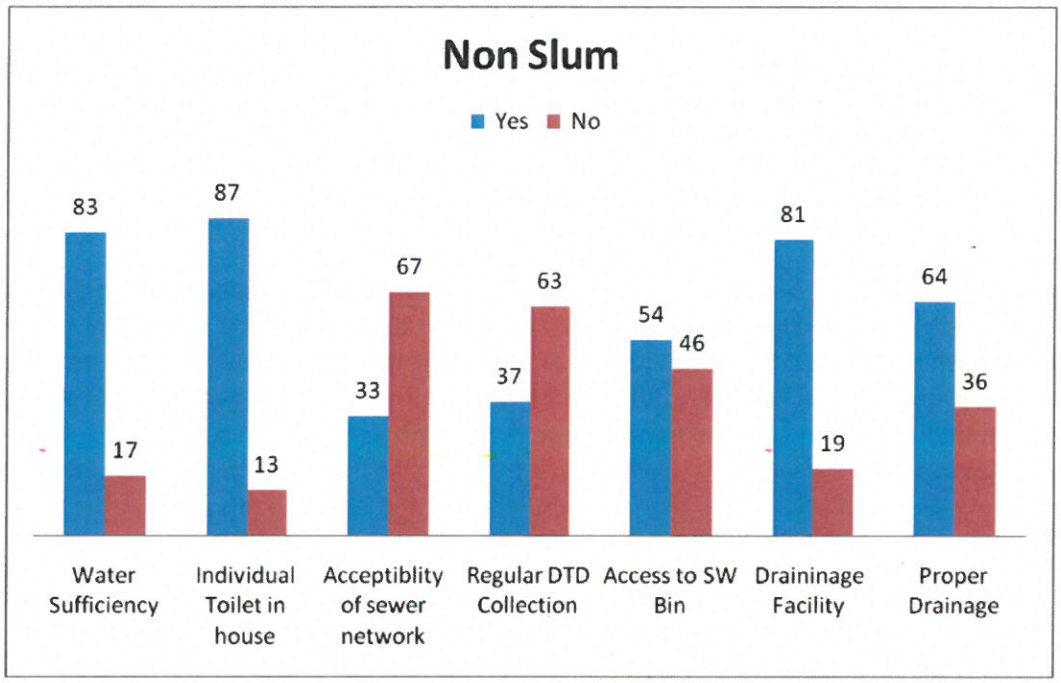
Key Issues

- Comprehensive storm water system is not present in the city. Natural storm water drains are presently acting as the conveyance channels for the untreated sewage into river
- The condition of the drains presently is not up to the mark. Majority of the drains are chocked due to the dumping of the solid waste
- It is also important to conduct awareness programs at the city level to cover all classes of the residents to highlight the function of storm water drains, prevention of encroachment of the storm water drain areas, prevention of dumping of solid waste and discharge of sewage/sullage from households and other related issues

3.8. Overall Citizen satisfaction on Basic services

The citizen perception on urban basic services as analysed from the primary survey is depicted below. It is observed that the slum areas are more deprived of the basic services. There is a huge scope for improvement in the service levels.

- 83% of non slum and 51 % of slum residents complain about the sufficiency of water.
- 63% of non slum and 84% of slum residents feel that door to door collection is not regular
- Almost 50 -60% of the residents complaint about easy access to municipal bins which calls for more deployment of bins
- More than 60% of citizens feel that the drainage facility is inadequate and disposal of storm water is not proper



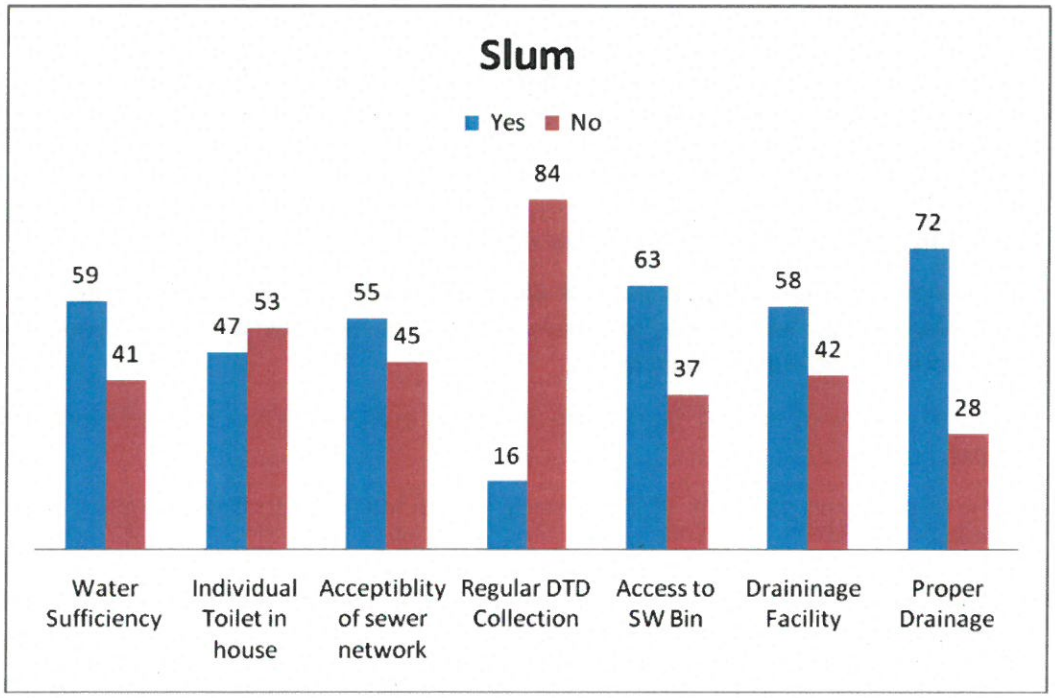


Figure 7 – Citizen Satisfaction on basic services in non slum and slum area

Basic Services to Urban Poor

Rourkela has total 114 numbers of slums. The slum population total to 1,14,980 with 26,994 households. Nearly 43% of the total population of the town comprises of the slums. The slums in the city are scattered all around the city and increasing over time. The slums are facing difficulties due to deficiency in various infrastructure facilities like roads, water supply, drainage, street lighting, solid waste management etc. The slum sanitation status is provided at **Annexure 9**

Table 6 : Literacy rate of Rourkela

Category	2001	
	City	Slum
Average Literacy Rate	75%	50%
Male Literacy Rate	81%	62%
Female Literacy Rate	69%	37%

The slum areas are deprived of the basic services due to land tenure problem and accessibility issues. The population density has been the major bottleneck in providing of basic service. The result of primary survey reveals the following

Table 7 :Service status in slum

Service	Status
Housing	25% are with Kuchha houses and 68% are with Pucca house which reveals a better status of the slums
water supply	Only 9% have PHD direct piped connection; 31% depend on public taps and 41% depend on hand pump tube well
Access to toilet	31% of the houses do not have individual toilets resulting in open defecation; there are no community toilets in the town
Solid waste Collection	DTD collection is operational in limited areas of the slum; also the frequency of garbage lifting is very less;
Drainage	42% of slum area do not have proper drainage facility

Municipality is taking up a number of slum improvement and poverty alleviation programs with assistance from state govt. and central Govt. Few to mention are SJSRY, NSDP, RAY, IHSDP, ILCS etc. The data collected through primary survey and secondary source suggest that the situation in Rourkela town is much better than many cities of Odisha and are the situation can be much improved with small interventions.

Institutional Framework

Table 8 :Legislatives governing Institutions

Names of Institution	Governing Institutions
Rourkela Municipality	Orissa Municipal Act –1950
Rourkela Development Authority RDA	Orissa Development Authorities Act, 1982
Orissa Water Supply and Sewerage Board	Section 67 of OWSSB 1991
Public Health and Engineering Organisation	Formed by Government of Orissa
Orissa Pollution Control Board	Section 4 of the (water prevention and control of pollution) amendment act 1975

Table 9 :Institutional framework and roles

Sl. No	Name of the Institution	Responsibilities and Functions	Remarks
1	Rourkela Municipality	• Responsible for basic services within the town such as SWM, road, drainage, street lighting, • Responsible for city sanitation, preventive health care • Responsible for implementation of slum development and poverty alleviation programs • Birth and death registration • Parking, plantation, markets	• As per 74th CAA ULB is responsible for 18 basic functions
2	Rourkela Development Authority	• Preparation and implementation of Area Development plans and projects for ensuring scientific land use pattern • Working as coordinating agency between various Government and other agencies for development activities. • Determining and phasing	• All functions pertaining to Master plan and development plan Preparation. Preparation of development schemes and its implementation

		development.	
3	Public Health Engineering Organisation	• Responsible for planning, design and engineering of water supply schemes • Responsible for construction, operation and maintenance of city water supply system and sewerage system • Responsible for internal water supply, plumbing and sewerage system of Govt. buildings	• This function needs to be transferred to ULB as per 74th CAA • Currently the power devolution has been done through a tripartite MoA
4	Orissa Water Supply and Sewerage Board (OWSSB)	• Responsible for planning, design and construction of city sewerage system	
5	State Pollution Control Board, Orissa	• Responsible for pollution control and environmental protection. Deal with environmental monitoring and pollution control in the state • Also undertakes environmental planning studies for the entire State	• This institution should continue to act as a monitoring agency for environmental aspects of the city
6	Directorate of Town Planning, GoO	Advises the GoO on matters pertaining to urban planning	This Department should provide advisory services on matters pertaining to urban planning.

Presently the Public Health Engineering Organisation is the service provider and plans, executes, operates and maintains the Urban Water Supply and Sewerage System of the State. The Orissa Water Supply and Sewerage Board execute major / mega water supply and sewerage projects and after completion, hands over the projects to Public Health Engineering Organisation for operation and maintenance.

The Public Health Engineering Organization has a committed work force of 7742 persons consisting of 323 Engineering Personnel, 807 Ministerial Staffs assisting day to day office administration, 3304 wages staff and 3308 Temporary Field Staff.

The PHEO for Rourkela water supply operation and maintenance consists of 6 technical and 147 non technical staff.

As per the provisions of the OM Act, 1950 the apex body is the 'General Body' of **Rourkela** Municipality headed by the honorable Chair Person. The Act provides for **four** authorities in a Municipality as indicated **below**

- Municipality
- Chair **Person;**
- Council Committees
- Executive **Officer.**

Various functional departments under the Municipality are

Department	Role
Accounts & Cash	Looks after the Budget, revenue and expenditure of the ULB, Maintains accounts for the ULB
Scavenging Establishment	Looks after the matters of Sewerage, drainage cleaning and Road sweeping through manually operated persons under the various areas of Municipality by Sweepers. The direct authority for the same is Executive Officer.
Vehicle, Transport, Cesspool & Kalyan Mandap	Looks after the Sanitation and sewerage cleaning around the Municipality through mechanized method. The department also takes care of Kalyan Mandap & Water Tank.
Works Department	Looks after various developmental work like building and repairing of roads and others along with works under BRGF scheme etc.
Stores & Consumables	Deals with all kind of stores, tools, tackles and consumables for other departments
Tax Department	Looks after various tax collections activities under Municipality areas like Holding Tax, Water Tax etc.
Shop & License	Looks after various Commercial Establishments allocation, issuing of License for various commercial establishments etc.
Electrical Engineering	Looks after various Electrical works under Municipal area with street lighting
Health Department	Looks after various health issue including public health and sanitation along with birth & death registration
Urban Poverty Alleviation Section	Looks after various poverty alleviation program of State and Central government , BPL , APL etc program, SGSRY etc

The Municipality is facing shortage of manpower which is affecting effective delivery of services. Currently the ULB has 44 vacant posts against the sanctioned posts. The detail of staff position is annexed to this report as **Annexure 12**

Key Issues

- There is a Lack of coordination between the Rourkela Development Authority and Municipality.
- The Rourkela Development Authority and Municipality have less number of employees leading to capacity problem
- Most of the Reforms like e-governance, E-Sewa, Water harvesting, asset Management, double entry accounting have not yet being started

3.9. Financial Status of Rourkela Municipality

The financial status of ULB is summarized in the following tables.

Table 10 : Financial Receipts and Expenditure in Rourkela Municipality

Sl. No.	Description	2007-08	2008-09	2009-10
	RECEIPT			
1	Rates and Taxes	9,16,30,017.35	11,22,56,588.75	13,27,38,532.00
2	Other sources like grants from State & Central, etc.	4,10,33,364.65	8,23,83,171.25	9,51,19,285.00
	Grant Total	**13,26,63,382.00**	**19,46,39,760.00**	**22,78,57,817.00**
	EXPENDITURE			
1	Current Expenditure like lighting, drainage, water supply, sanitation, etc	8,49,10,878.00	15,34,03,067.00	21,58,68,107.00
2	Capital Expenditure like roads, buildings, vehicles & others	2,97,50,368.00	2,40,38,066.00	2,00,87,297.00
	Grant Total	**11,46,61,246.00**	**17,74,41,133.00**	**23,59,55,404.00**

It informed that the own source revenues are very low and the municipality has to depend on grant devolutions from the state government. Also the expenditure on salaries is very high and some portion of the expenditure on development works also relates to salaries of the field work charged staff. The key component of own source revenue is the municipal tax on properties the details of which are shown below. The budget statement for FY 2011-12 is annexed as Annexure 6.

Table 11 : Details of Taxes

Components	Category 1	Category2
Holding Tax	5%	5%
Drain Tax	1%	3%
Light Tax	5%	5%
Water		2%
Total	**11%**	**15%**

The demand and collection of the taxes is shown in the following table.

Table 12 : Tax Demand and Collection in Rourkela

Sl. No.	Subject	2007-08	2008-09	2009-10	2010-11
1	Demand				
	Arrear	1,51,57,583.00	1,34,35,752.00	1,41,08,453.00	1,40,93,498.00
	Current	42,02,619.00	42,02,619.00	42,02,619.00	1,20,77,022.00
	Total	1,93,60,202.00	1,76,38,371.00	1,83,11,072.00	2,61,70,520.00
2	Collection				
	Arrear	39,31,310.00	15,83,220.00	20,03,108.00	33,52,415.00
	Current	19,93,140.00	19,46,698.00	22,14,466.00	56,78,850.00
	Total	59,24,450.00	35,29,918.00	42,17,574.00	90,31,265.00
3	Balance				
	Arrear	1,12,26,273.00	1,18,52,532.00	1,21,05,345.00	1,07,41,083.00
	Current	22,09,479.00	22,55,921.00	19,88,153.00	63,98,172.00
	Total	1,34,35,752.00	1,41,08,453.00	1,40,93,498.00	1,71,39,255.00

The collection efficiency varies in a range of 40% - 50% leading to increased arrears. The detail revenue and expenditure as per the Municipality budget is enclosed at **Annexure 13**

Key Issues

- Cash based single entry accounting system is followed
- Accounting system has not been computerized
- Ring fencing of expenditure not practiced
- Collection efficiency is low
- Revenue from own source is very low raising serious questions on self sustainability approach

4. Population Projection

Year	Population (new boundary)	Population (Old boundary)	Increase per Decade	% increase in population per decade	Incremental increase in population
	(PO)		(X)	(IG)	(Y)
1971	80139	172502			
1981	149875	322610	69736	87.02	
1991	185300	398864	35425	23.64	-34310
2001	224987	484292	39687	21.42	4262
2011	269602	269602	44615	19.83	4928
		Avg.	47366	30.57	-8374

4.1) Arithmetic Progression Method (Pn=Po + nX)

Year		Population
2012	=	2,74,339
2021	=	3,16,968
2027	**=**	**3,45,387**
2031	=	3,64,333
2041	=	4,11,699
2042	**=**	**4,16,436**
2051	=	4,59,065

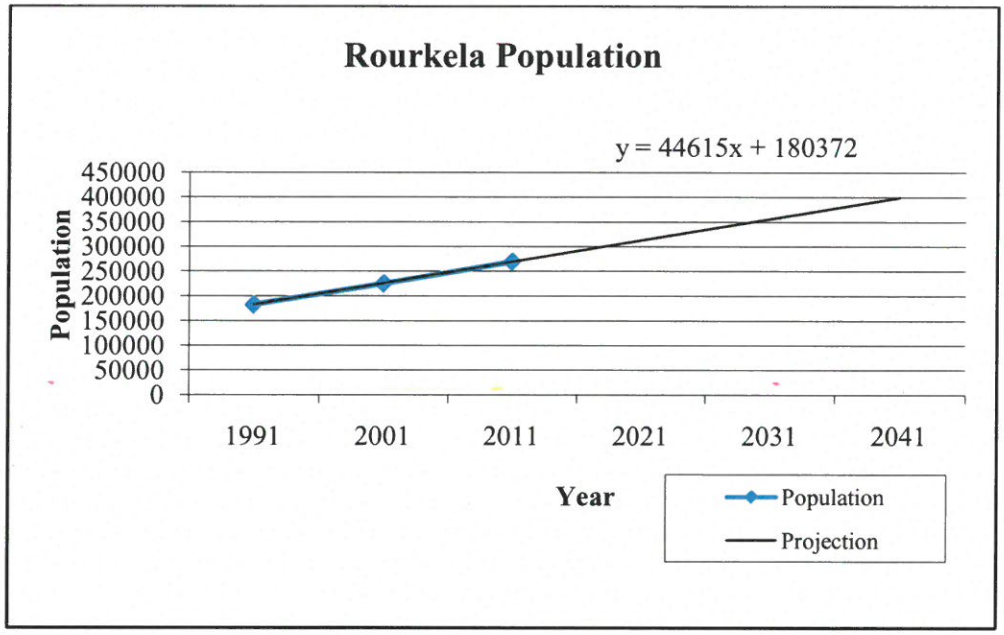
4.2) Geometrical Progression Method {Pn=Po (1+IG/100)^n}

Year		Population
2012	=	2,76,891
2021	=	3,52,025
2027	**=**	**4,13,126**
2031	=	4,59,645
2041	=	6,00,168
2042	**=**	**6,16,393**
2051	=	7,83,651

4.3) Incremental Increase Method { Pn = Po + nX + (n(n+1)/2) x Y }

Year		Population
2012	=	2,73,878
2021	=	3,08,594
2027	**=**	**3,27,970**
2031	=	3,39,213
2041	=	3,61,458
2042	**=**	**3,63,222**
2051	=	3,75,330

4.4) Graphical method



Year		Population
1991	=	182916
2001	=	224987
2011	=	269602
2012	=	274064
2021	=	314217
2027	**=**	**340986**
2031	=	358832
2041	=	403447
2042	**=**	**407909**
2051	=	448062

5. Waste Water Management

5.1 Waste water effluent standard

Sl	Parameter	Unit	Standard	
			Inland Surface	Land for Irrigation
1	Biological Oxygen Demand	mg/l	30	100
2	Chemical Oxygen Demand	mg/l	250	250
3	Suspended Solids	mg/l	100	600

5.2 Sanitation Options

5.2.1 Household Sanitation

Toilet Access Options

A toilet facility can be provided in one of four possible ways:

- Individual household toilets,
- Shared toilets for more than one households (say 2 to 5 households),
- Public toilets, or
- Community toilets.

Relative advantages of each are analyzed below

Sl. No.	Parameters	Options of Toilets		
		Individual	Shared	Public or Community
1	Feasibility of construction	Depends on availability of land	Possibility of land with one of the beneficiaries is better	Depends on availability of public plot
2	Cost	Depends on the design	Less than individual toilet	Least per seat, but may increase with a dedicated water supply
3	Cost Sharing	By Individual	Shared by Beneficiaries	Individual household not burdened
4	Acceptability	Maximum if affordable	Acceptable if individual toilet not affordable	May be preferred, as no burden of cost
5	Sense of ownership	Maximum	Less	Does not exist
6	O&M	Individual household	Depends on will capacity and cooperation of beneficiaries	Needs separate organization
7	Sustainability	Maximum	Depends on will capacity and cooperation of beneficiaries	Depends on capacity of organization (better, if pay and use type)
8	Desirability	Most desirable, if affordable	Next choice, if affordability is an issue	Least desirable
9	Suitability	Most suitable	Suitable in low-income households (like slums)	Should be adopted only when no other option available

Choice

It is desirable to choose an alternative, which is affordable, sustainable and likely to be most used and well maintained. It is recommended to provide individual toilets to most of the households. Where individual households cannot afford, have no suitable land for construction, and are willing to share a facility, shared toilets should be promoted. Surveys also reveal that, in a few cases, households with individual toilets may be defecating in the open. A considerable effort of creating awareness and change in attitude is called for.

5.2.2 Options for collection, treatment & Disposal of Waste Water

Domestic waste water generated at the household level, including the waste from toilets, can be disposed of either on-site of off-site or a combination of both. Possible options are:

- Fully on-site disposal (septic tanks or soak pits)
- Local sewer network (small-bore sewerage or decentralized waste water treatment system),
- Centralized or decentralized full-scale sewerage system
- Combined system

a. Fully on Site sanitation system

Fully on site sanitation arrangements will be involve on-plot treatment and disposal of all domestic waste water. This is achieved by using on-plot sanitation technologies---septic tanks and soak pits--- to receive and treat the entire waste water flow from the household. However, it is recommended that the septage (sludge from septic tank) is removed and transferred to another location for further treatment and final disposal.

Septic tank with soak pits

In this option, all discharge of domestic waste water resulting from bathing, washing, cooking, cleaning and usage of toilets is treated in the septic tank. The septic tank effluent is disposal in dispersion trenches or soak pits. Septage is periodically cleared and taken away to a common treatment facility.

Twin soak pits (Leach pits)

Wastewater from the latrine is discharged into soak pit in this option. Waste water from domestic use, such as domestic waste water from bathing, washing, cooking, cleaning, etc. is also disposed into another soak pit. For an uninterrupted and proper functioning, it is recommended to use a set of two pits.

Septage Management

It will be necessary to set up an effluent septage collection system, operated by either the Municipality Corporation or a private agency. Appropriate regulation and monitoring mechanisms, in respect of septic tanks and septage handling and disposal, need to introduced. Suggested septage treatment consists of septage drying beds consisting of sand filters for dewatering the sludge. This requires low capital and has low O&M and technical requirements; thus, it can be operated easily. The dried sludge cakes can be used as fertilisers.

Fully On-site Sanitation: Benefits and Challenges	
Benefits	**Challenges**
✓ Low public investment (less demanding on public resources) ✓ Can be easily set-up ✓ Will not lead to wastage of the private investment already made in septic tank construction ✓ Citywide sanitation can be achieved faster	✓ Risk of groundwater pollution will have to be evaluated as the HNPP draws groundwater for municipal water supply ✓ Finding place for constructing soak pits in all households will be a challenge ✓ HNPP will need to institute septage management system ✓ New rules and regulations relating to septage management will have to be introduced

b. Small-bore sewerage system

In a small-bore sewerage system, all internal waste water, including the toilet usage water, is diverted to an on-plot septic tank. Households constructing new individual sanitation facilities should be encouraged to construct septic tank/ interception chambers. Some households could continue to use pit latrines. Only their other household waste water (gray water) may be connected to sewers. The septage (sludge from septic tanks) is removed for treatment and final disposal.

A small diameter sewer pipe (<200 mm) is laid at a flatter gradient to carry the effluent from the septic tanks. Since the sewer pipes do not carry solids, the flatter gradient and smaller diameter are sufficient. The flatter gradient also allows laying of sewer lines at shallower depths, resulting in same cost reduction.

Disposal of septage

It will be necessary to set up an efficient septage collection system, operated by either the Municipal Corporation or a private agency. Appropriate regulation and monitoring mechanisms, in respect of septic tanks and septage handling and disposal, need to be introduced.

Conveyance of septic tank effluent

The septic tank effluent is disposed into a network of small-bore sewer pipes for centralized or decentralized treatment and final disposal.

Treatment of waste water

Effluent from the septic tanks is partially treated, but still is not safe for discharge into public water bodies. Prior to final disposal, the collected waste water should be adequately treated to meet effluent discharge standards.

Settled (small bore) Sewerage: Benefits and Challenges	
Benefits	**Challenges**
✓ Add on to the existing system rather than creating a complete new system ✓ Demand on public resources is high compared to fully-on-site system ✓ No risk of groundwater contamination ✓ Can easily achieve NRCP objectives	✓ Households end up paying for wastewater conveyance and treatment as well as septage clearance ✓ New rules and regulations relating to septage management will have to be introduced ✓ Convincing households to modify/ upgrade existing toilets and plumbing system

c. Sewerage system

This alternative includes a proposal for a regular sewerage network (either a local simplified network or an elaborate citywide network) to collect the waste water from the households. The network is normally laid through most of the town. Waste water is collected at different locations in the decentralized systems and is treated before final disposal or reuse. In a centralized system(s), the waste water is collected at a central location(s) for treatment and final disposal or reuse (like land irrigation).

Whether a series of decentralized system is feasible depends on land availability. Otherwise, a centralized treatment plant for the whole (or major) part of the city may be proposed. A detailed topographical and land availability survey will be necessary to determine the feasibility and required number of decentralized waste water treatment plants. In the area covered with a sewerage network, efforts should be made to connect all households to the sewerage network. Even in this alternative, there is a possibility that a few households will still be served by on-site sanitation systems – mainly pit latrines. Under this option, the following household/ public sanitation and waste treatment and disposal arrangements will be possible.

The choice of between decentralized vs. centralized mainly depends on feasibility in terms of availability of land for decentralized systems, their acceptability to the people and cost (both capital and O&M).

d. Decentralized systems

Decentralized systems are feasible and desirable in areas that are isolated and have space to accommodate small multiple waste water treatment plants and disposal systems. Since these systems are localized small systems, they will be simpler for operation and maintenance. It may be also possible to form local committees or co-operative societies, which may take up the O&M of these plants. A substantial community effort, of course, will be necessary. If this is not feasible and achievable, the alternative is to outsource the O&M to a private party. A third alternative is for the Municipal Corporation to take over this responsibility. However the O&M cost and manpower requirement is high. The biggest constraint is the availability of land.

Decentralized waste water treatment systems (DEWATS) technology has been developed and promoted by BORDA (Bremen Overseas Research and Development Association). The system provides treatment for waste water from both domestic and industrial sources, especially from small and isolated areas. The capacity ranges from 1 to 500 cum per day. It works without electrical energy, guarantees permanent and continuous operation, with occasional fluctuation in effluent quality, and is best suited where skilled and responsible operation and maintenance cannot be guaranteed.

DEWATS is based on four treatment systems:

- Sedimentation and primary treatment in sedimentation ponds, septic tanks or imhoff tanks (septic tanks being more familiar in cities like Rourkela)
- Secondary anaerobic treatment in fixed bed filters or baffled septic tanks (baffled reactors).
- Secondary and tertiary aerobic/ anaerobic treatment in constructed wetlands (subsurface flow filters).
- Secondary and tertiary aerobic/ anaerobic treatment in ponds.

Combination of primary treatment (a) with any of the other systems mentioned above is done in accordance with the quality of the waste water influent and desired effluent quality

Decentralised Wastewater Treatment: Benefits and Challenges	
Benefits	**Challenges**
✓ Most of the wastewater is treated off-site ✓ No need to augment a water supply ✓ Low maintenance ✓ No risk of groundwater contamination ✓ No dependence on power supply for operation ✓ Simple operation and maintenance	✓ Both capital intensive system ✓ High O&M cost ✓ Management is difficult ✓ Households will have to invest substantial amount in upgrading ✓ Convincing households to modify/ upgrade existing toilets and plumbing system

e. Centralized systems

In areas, like the core city wards, density of population is high, open plots are not likely to be available, and people may not accept multiple treatment and disposal systems within the vicinity. Hence, localized dispersed systems may not be feasible. A centralized system, which collects the waste water from a large city area through a sewer network and conveys it to a central, large-size treatment plant and disposal system, may become imperative. Such a system will be more expensive than the decentralized systems for the same area, but may be better for unitary control over its O&M. The responsibility will be taken over by Municipality Corporation and participation of the beneficiary population will be limited.

Sewerage treatment plants have, basically, three stages of treatment:

- Pre-treatment for removal of large floating, suspended and settlement inorganic solids in screens and grit removal chambers.
- Primary treatment for removal of organic and inorganic settleable solids.
- Secondary biological treatment for conversion of organic matter into settleable boi-floc and stable inorganic matter (like in aerobic processes) or into methane gas, carbon dioxide and stable organic residue (as in anaerobic processes)

Centralised Sewerage: Benefits and Challenges	
Benefits	**Challenges**
✓ All of the wastewater is treated off-site ✓ Initial investment of individual resident is very low ✓ Low user fee ✓ Demand on public resources is high compared to fully-on-site system ✓ Less risk of groundwater contamination	✓ Both capital and O&M intensive option ✓ Convincing households to modify/ upgrade existing toilets and plumbing system ✓ High on operation and maintenance Power outages may interrupt wastewater treatment

f. Combined system description

Under this option, a combination of all options is promoted, assuming that all households have access to improved sanitation facilities and human excreta and community liquid wastes are treated and safely disposed. The combination includes both on-site sanitation arrangements (septic tanks with soak pits and twin pit latrines in section 8.5.1) and off-site sanitation systems (small-bore sewerage system or regular sewerage with centralized or decentralized wastewater treatment systems, as described in sections 8.5.2 and 8.5.3 above).

Disposal of Septage

For households served by an on-site sanitation system, i.e., septic tanks, it is necessary to set up an efficient septage collection system that can be operated by the Municipal Corporation or a private agency. Appropriate regulation and monitoring mechanism need to be set up to ensure that septic tanks are properly built, that septage is cleared regularly, and safely treated and disposed. The septage can be treated at a separate septage treatment facility, in the form of sludge drying beds of sand filters for dewatering/ sun drying.

Waste water conveyance and treatment

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

Mixed Sanitation Arrangements: Benefits and Challenges	
Benefits	**Challenges**
✓ No need to augment a water supply ✓ Low maintenance ✓ Improvements can be implemented incrementally- allows better financial planning based on availability ✓ No dependence on power supply for operation ✓ Very low operation and maintenance cost- hence low burden on users. ✓ Simple operation and maintenance	✓ Capital intensive system, especially for wastewater treatment facilities. However, an overall balance is struck with a mixed approach ✓ Households will have to invest substantial amount in upgrading

5.2.3 Evaluation of options of waste water disposal

Four options for disposal of domestic waste water, discussed above, are evaluated on various parameters for the purpose of recommending options for different areas of the city.

Sl. No.	Parameters	Waste water Disposal Systems			
		On-site Disposal (A)	Local Small-bore System (B)	Sewerage (C)	Combined System (D)
1	Public investment	Least	Low	Highest	High
2	Ease of implementation	Can be achieved faster; depends on user response	Easy and fast	Most difficult	Easier than (C)
3	Ease of O&M	Easy, as user responsible	Easy, as less complex, but multiple schemes	Most difficult and expensive	Easier than (C)
4	Use of existing household facility	Maximum	Maximum	Septic tanks will be	More use than in (C)
5	Septage management	Separate system required	Separate system required	Not for household septage	Require to some extent
6	Land availability	Problem in core city and developed area	Problem in core city and developed area	Land for pumping stations and treatment plant	Choice as per land availability feasible
7	Impact on ground water	maximum	Less than (A)	Least	Much Less
8	Willingness to connect and pay	Not applicable, as it is own initiative	Less	More, as household does not need a septic tank	Depends on type of disposal
9	Suitability	Suitable in small isolated areas; not suitable in large urban places	Suitable in isolated and peripheral areas; but not suitable for integration in central sewerage	Suitable in core and developed areas	Suitable depending on land use

5.2.4 Waste Water from Industries

The major industries have their own water sources and waste water collection and treatment plants. Only small, scattered industries, which may be generating small quantities of waste water, will discharge to a municipal sewer. Good control and monitoring by the State Pollution Control Board is necessary to ensure that the waste water being discharged to the municipal drains in safe as per the standards.

5.2.5 Waste Water from Other Public Institutions

Other public institutions include educational institutions, hospitals and other institutions like offices, police quarters, agriculture produce markets, etc. The liquid waste generated in these institutions is currently being treated in septic tanks and the effluent disposed to nearby drains. When a new sewerage network is created, the waste water from these institutions will be discharged into these networks, as the quality of the waste water is acceptable for discharge into a municipal sewer.

5.2.6 Treatment Technology Options

	Application Suited For		
Sewage Treatment Technology Option	large, urban locations	medium, urban locations	smaller, more rural zones
ASP (single stage)	(✓)	✓	✓
ASP (two-stage)	✓	(✓)	X
SBR	(✓)	✓	✓
TF (single stage)	(✓)	✓	✓
TF (two-stage)	✓	(✓)	X
UASB + ASP	(✓)	✓	✓
UASB + TF	(✓)	✓	✓
UASB + WSP	X	X	(✓)
WSP	X	X	(✓)
FAL	X	X	(✓)
KT	X	X	(✓)
Biofilm reactors	(✓)	(✓)	(✓)
CW	X	X	✓
Covered Anaerobic Ponds	X	X	(✓)
FSTP	(✓)	(✓)	(✓)
Low cost sewerage	X	(✓)	✓

✓ Highly Recommended
(✓) Recommended only under specific condition
X Not Recommended

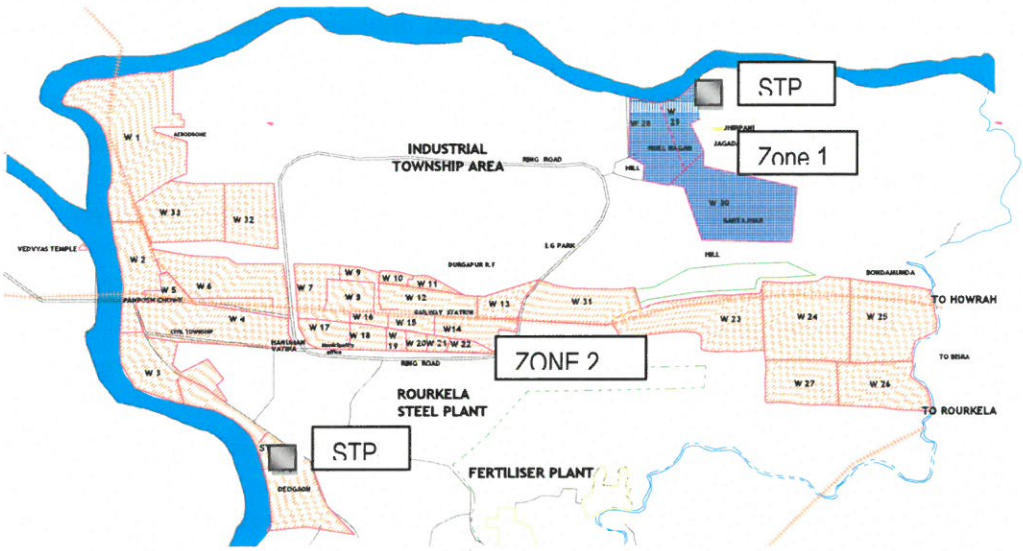
The above table provides suitability of various treatment options for different categories of cities/towns. A small scale town is considered with population less than one lakh, a medium scale town is considered with population between one lakh to one million and a large scale city is considered with population more than one million.

5.3 Strategy

5.3.1 Water Supply

Water supply coverage has to be increased along with equitable distribution. There is adequacy of production capacity with two water treatment plant with total capacity of 79 MLD which can cater to the future demand of next 30 years. However all the wards are not properly covered by distribution system and also there are growth centers within and outside the Municipal limits. Hence it has become important for implementation of a planned distribution system to best utilise the available capacity.

5.3.2 Sewerage Zoning



The municipal area have been divided into two sewerage zones based on the topography and area contour. Zone 1 consists of ward no 28, 29 and 30 with present population of 23915 and zone 2 consists of rest of the 33 wards with present population of 245687.

5.3.3 Household sanitation

- Objective is to achieve 100% access to sanitary toilets to all residents
- Provide incentives for encouraging individual toilets to people who can afford and available space
- Support subsidies for individual toilets for low income households
- Provide shared or community toilets for slum clusters where individual toilets are not feasible
- Ensure adequate toilet facility in institutions like schools, colleges, offices, shopping complex etc.
- Public toilets at all public places (markets, bus stand, etc.)
- Structured communication for regular usage and maintenance of toilets
- Encourage community management of community/public toilets and encourage cost recovery

5.3.4 Collection and Treatment system

The treatment option to be adopted in the context of Odisha has been considered with the following issues in the background

- There is no regulatory framework, policy or guideline for on site sanitation system. On the contrary the Water Works Rule proposed amendment proposes for compulsorily phasing out all the septic tanks once the sewerage network are provided
- Most of the cities in Odisha have more than 30% slum population which are highly unorganised settlements
- Due to lack of strong building by law and monitoring mechanism, most of the houses being constructed in cities across Odisha cover 90% of the plot area without much space. This leads to construction of under designed septic tank or discharge to drain. The possible exception could be Bhubaneswar after 2008
- The Govt. lands available within the municipal limits are few in numbers and small. More over the land ownership lies with revenue department and not with the municipality.
- All the apartments are being directed to install their own treatment and drainage facility
- The National bench mark for 'coverage of sewerage network' is 100% which means the entire city should be connected with a sewer collection system
- The primary survey reveals that residents prefer connectivity to sewerage network even if they have individual septic tank
- Going by the logic of economy of scale, community facility is always cheaper for operation and maintenance
- **Odisha water rules provides for compulsory connection to available sewerage network and phasing out of septic tank**

In view of the above situation the sanitation strategy adopted for developing CSP is as follows

- Utmost priority is given for network collection system based on the feasibility. The factors influencing the feasibility in a area are number of individual toilets, feasibility of laying sewer pipe line, growth potential etc.
- Areas where collection network is not feasible or the utility corridor is very narrow, small bore system should be adopted
- On site sanitation should be promoted where new colonies are developing or community toilets are not within close proximity of the proposed/available network, provided adequate space is available within the property
- Adequate measures are taken in terms of regulatory frame work for implementation of properly designed system and a proper septage management policy is in place.
- Increase coverage of sewerage network and connections to achieve national benchmark
- In view of the constraint of land availability, resident's objection and increased cost of O&M, a centralized system is more preferable to decentralized system within a gravity zone.
- Decentralized system shall be preferred in areas of uneven terrain which might call for a number of pumping stations or the gravity flow demands higher depths

- Off site treatment and disposal coupled with onsite septage management for existing community/individual septic tanks to manage the sanitation system as a intermediate arrangement before transiting to full fledged collection network. This would also support phasing of investment and improve financial feasibility position.
- Adopt natural bio-degradation technologies economically feasible and locally suitable and minimise energy requirement in transport and treatment of sewage
- Citizen's aspiration is provided the maximum importance
- Importance has to be attached to critical issues of sludge management, odour control and mosquito menace
- Encourage recycled and reuse of treated effluent water for non portable purpose

5.4 Option Analysis

Various treatment options are analysed based on the topography of the area, existing infrastructure, socio-economic status and implementation feasibility. The situation analysis reveals that the old Rourkela area is a more of a planned city. The colonies are well planned with accessible internal roads. The socio economic profile of the city reveals that the average income of the residents are quite reasonable or high. Even the slums are resided by workers with average monthly income of 8000-10000. The field survey and discussion with the officials suggests that most of the septic tanks and soak pits are under designed due to space constraint. At many places the overflow effluent is discharged to the open drain. This leads to ground water contamination. The factor affecting choice of treatment options for the various zones are as follows

Zone 1 & 2

- Most of the colonies are well planned
- Roads are wider
- Adjacent area of these zones are potential growth centres and the land prices are quite high
- Availability of land is a issue
- Strong public opinion not to have sewerage treatment within the residential area
- Shortage of operational manpower with the ULB
- Proper topography of the area
- Existing sewerage system in part of zone 1
- Slum areas are well accessible and have been provided with some of the basic amenities like road & water
- High degree of individual toilets in slum households as well
- Better paying capacity of the slum as well as non slum residents

Orissa Water supply & Sewerage Board is a organisation under H&UD department, Government of Odisha, responsible for implementation of sewerage schemes in cities of Odisha. They are preparing a DPR for implementation of sewerage system in Sambalpur. The DPR preparation is in process and the data could not be shared by the Board.

It is proposed to have sewerage collection network with centralised Sewerage Treatment Plant in all the zones. ASP or SBR treatment process is proposed for these zones.

5.5 Policy Framework

- City sanitation should be fore seen in the light of NUSP and OUSS
- The ULB needs to take care to prevent any kind of increase or growth of slums
- The vision for slum free city needs to be drawn up and implemented
- Building by laws should be strictly implemented for proper sanitation facility
- Strict regulatory frame work should be embedded into the existing system in respect of sanitation issues
- Adequate steps needs to be taken for addressing the housing need of EWS/LIG and migrating population
- Ensure a systematic long term awareness drive attaching social stigma to sanitation offence

5.6 Planning

5.6.1 Assumptions & Data

The City Sanitation Planning is based on a set of data and certain assumptions which very much city specific and are based on the following factors

- Available data
- Citizen need and aspirations
- Field survey findings
- Need assessment
- Stakeholder consultations
- Existing situation and limitations
- Service providers priority

Base year	: 2012
Design Year	: 2042
Sewerage network Design	: 2042
STP design	: 2027
Target Year	: 2017
Implementation period	: 2012 – 2017
Average Per capita water demand	: 135 LPCD
Sewage Generation	: 110 LPCD (80% of water supply)

Data

Zone 1				
Data Description	**Unit**	**Non slum**	**Slum**	**Sub total**
Population	Nos.	20134	3781	23915
Number of households	Households	3643	924	4567
Number of community toilets	Number			0
Number of seats in community toilets	Number			0
Households with individual toilets	Households	3502	745	4247
Households with sharing toilets	Households	141	127	268
Households practicing open defecation	Households	0	52	52
Slum households using community toilets	Households			0

Zone 1				
Data Description	**Unit**	**Non slum**	**Slum**	**Sub total**
Total Road length	Km			50
Available sewer length	Km			35
Persons per house	persons			5.2
Individual toilets under construction	Toilets			0
Number of Public toilets	Toilets			0
Number of community toilets under construction	Toilets			0
Bituminous road length	Km			24.09
Cement concrete	Km			23.53
Mettal road length	Km			0.95
Kacha road length	Km			1.51
Pucca road length	Km			48.49

Zone 2				
Data Description	**Unit**	**Non slum**	**Slum**	**Sub total**
Population	Nos	134695	110992	245687
Number of households	Household	30252	24420	54672
Number of community toilets	Number			0
Households with individual toilets	Household	28488	17757	46245
Households with sharing toilets	Household	1764	1943	3707
Households practicing open defecation	Household	0	4720	4720
Slum households using community toilets	Household			0
Total Road length	Km			579
Available sewer length	Km			0
Persons per house	persons			4.5
Individual toilets under construction	Toilets			262
Number of Public toilets	Toilets			5
Number of Public toilet seats	Seats			50
Number of community toilets under construction	Toilets			0
Bituminous road length	Km			278.91
Cement concrete	Km			272.47
Metal road length	Km			11.05
Kacha road length	Km			17.49
Pucca road length	Km			561.51

Total		
Data	**Unit**	**Total**
Population	Nos.	269602
Number of households	Households	59239
Number of community toilets	Number	0

Total		
Data	**Unit**	**Total**
Households with individual toilets	Households	50492
Households with sharing toilets	Households	3975
Households practicing open defecation	Households	4772
Slum households using community toilets	Households	0
Total Road length	Km	629
Available sewer length	Km	35
Persons per house	persons	4.6
Individual toilets under construction	Toilets	262
Number of Public toilets	Toilets	5
Number of Public toilet seats	Seats	50
Number of community toilets under construction	Toilets	0
Bituminous road length	Km	303
Cement concrete	Km	296
Metal road length	Km	12
Kacha road length	Km	19
Pucca road length	Km	610

Assumption

Assumptions	**Unit**	**Value**	
Possible road length for laying sewers in Pucca roads	%	95%	
Possible road length for laying sewers in Kucha roads	%	60%	
Toilets connected to sewers	%	94%	Computed
Toilets connected to soak pits	%	6%	Computed
No. of households sharing one toilet in a shared toilet	Number	2	
Number of seats per public toilet	Number	5	
Number of seats per community toilet	Number	5	
Number of users for community toilet per seat	Number	35	
Number of users for public toilet per seat	Number	60	
		Zone 1	Zone 2
Non Slum road length based on HH density	%	84%	55%
Slum road length based on HH density	%	16%	45%
Road cutting and restoration required	%	97%	97%
Cost			
Cost of individual toilet connected to sewer	Rs.	8,000.00	Per no.
Cost of individual toilet connected to soak pit	Rs.	10,000.00	Per no.
Cost of community toilet into septic tank (5 Seater)	Rs.	3,30,000.00	Per no.
Cost of community toilet into sewer(5 Seater)	Rs.	1,20,000.00	Per no.
Cost of pumping station	Rs.	25,00000.00	Per no.
Cost of STP	Rs.	75,00,000.00	Per MLD
Repair cost of existing public toilet	Rs.	2,50,000.00	Per no.

5.6.2 Sewage Generation

Zone	1	2
Population 2011	23915	245687
%	9%	91%

Year	Population	Water supply (MLD)	Total Sewage generation (MLD)	Zone 1 (MLD)	Zone 2 (MLD)
2012	274064	37.0	30.1	2.6	27.5
2027	340986	46.0	37.5	3.3	34.2
2042	407909	55.0	44.9	4.0	40.9

5.6.3 Pipe Cost Comparative statement

Sl. No.	Dia mm	Cost of GSW with CM joints and Labour/m	Cost of RCC with Rubber joints and Labour/m	Difference
1	100	142	264	122
2	150	217	272	55
3	200	450	286	164
4	225		313	313
5	250	627	338	289
6	300	1035	479	556

5.7 Infrastructure Need

Zone 1 & Zone 2				
Sanitation development	**Unit**	**Base**	**Target**	**BoQ**
Open Defecation	%	25	0	
Individual toilet coverage	%	85%	92%	
HH covered under Community toilet coverage	%	0%	1%	
HH Shared toilet coverage	%	7%	7%	
Coverage of sewer connection	%	0%	95%	
Number of individual toilets	Number	50754	54500	3746
Total Number of shared toilets	Number	1988	2073	86
Number of community toilet seats	Number	0	80	80
Number of community toilets	Number	0	16	16
Public Toilets	Number	5	13	8
Number of Public Toilets seats	Number	50	90	40
Number of Public Urinals	Number	0	30	30
Number of sewer connection	Number	2200	50548	48348
Construction of sewerage networks	Km	35	591	556
STP	MLD	0	38	38

The detail sanitation infrastructure need is provided in **Annexure 16A & 16C**

5.8 Implementation & Investment Phasing

5.8.1 Implementation

(Zone 1 & Zone 2)								
Sanitation Provosions	**Unit**	**Base**	**Y-1**	**Y-2**	**Y-3**	**Y-4**	**Y-5**	**BoQ**
Individual toilet coverage	%	85%	87%	88%	89%	91%	92%	
HH covered under Community toilet coverage	%	0%	0%	0%	1%	1%	1%	
HH Shared toilet coverage	%	7%	7%	7%	7%	7%	7%	
Coverage of sewer connection	%	0%	19%	38%	57%	76%	95%	
Number of individual toilets	Number	50754	51503	52252	53002	53751	54500	3746
Total Number of shared toilets	Number	1988	2005	2022	2039	2056	2073	86
Number of community toilet seats	Number	0	16	32	48	64	80	80
Number of community toilets	Number	0	3	6	10	13	16	16
Public Toilets	Number	5	7	8	10	11	13	8
Number of Public Toilets seats	Number	50	58	66	74	82	90	40
Number of Public Urinals	Number	0	6	12	18	24	30	30
Number of sewer connection	Number	2200	9564	19396	29506	39888	50548	48348
Construction of sewerage networks	Km	35	146	257	369	480	591	556

5.8.2 Investment

	Zone 1 & Zone 2		Non Slum				Slum			
Rate in Rs.	Component	Unit	Scope	Cost Rs. Cr	Subsidy %	Net Cost Rs. Cr	Scope	Cost Rs. Cr	Subsidy %	Net Cost Rs. Cr
8000	Individual toilets with sewer connection	Each	2021	1.62	0%	0	1498	1.20	90%	1.08
10000	Individual toilets with soak pits	Each	130	0.13	20%	0.03	97	0.10	90%	0.09
8000	Shared toilets with sewer connection	Each	46	0.04	20%	0.01	34	0.03	90%	0.03
10000	Shared toilets with soak pits	Each	3	0.003	20%	0.001	2	0.002	90%	0.002
660000	Community toilet connected to septic tank	Each	0	0.0	100%	0.00	10	0.33	100%	0.33
240000	Community toilets connected to sewer	Each	0	0.00	100%	0.00	6	0.07	100%	0.07
120000	Public toilets connected to sewer	Each	8.0	0.10	100%	0.10	0	0.00	100%	0.00
250000	Repair of existing Public toilet	Each	5.0	0.13	100%	0.13	0	0.00	100%	0.00
30000	Public urinals of 2 units	Each	30.0	0.09	100%	0.09	0	0.00	100%	0.00
Estimate	Cost of Sewerage Networks	Km	319	73.74	100%	73.74	237	54.78	100%	54.78
2500000	Rehabilitation of existing network	Km	10.05	2.51	100%	2.51	7.45	1.86	100%	1.86
Estimate	House Sewer Connections	Number	27766	23.66	50%	11.83	20582	17.45	100%	17.54
2500000	Trenchless crossing	Number	10	2.50	100%	2.5	5	1.25	100%	1.25
2500000	Pumping stations	Number	11	2.87	100%	2.87	9	2.25	100%	2.25
7500000	STP	Number	38.0	28.50	100%	28.5	0	0	100%	0.00
	Sub-total			135.88		122.31		79.42		79.28

Management Improvements

Item No.	Assumptions	Unit	Quantity	Rate (Rs)	Amount (Rs)
1	Engineering and Customer Survey	Nos.	59239	50	29,61,950.00
2	Communications	Nos.	10	10000	1,00,000.00
3	Training for Staffs	Nos.	40	10000	4,00,000.00
4	Sewer cleaning machine	LS			30,00,000.00
5	Safety equipments	LS			30,00,000.00
6	Misc and Unforseen Items	LS			8,050.00
	Total Cost				**94,70,000.00**

5.8.3 Investment Abstract

Rate in Rs.	Component	Unit	Total (Cr. Rs.)	Subsidised cost (Cr. Rs.)	Contingency	Grand Total (Cr. Rs.)	Grand Net subsidised Cost (Cr. Rs.)
8000	Individual toilets with sewer connection	Each	2.8	1.08	5%	2.96	1.13
10000	Individual toilets with soak pits	Each	0.2	0.12	5%	0.24	0.13
8000	Shared toilets with sewer connection	Each	0.1	0.04	5%	0.07	0.04
10000	Shared toilets with soak pits	Each	0.01	0.00	5%	0.01	0.01
660000	Community toilets(10 Seat) connected to septic tank	Each	0.3	0.33	10%	0.36	0.36
240000	Community toilets(10 seater) connected to sewer	Each	0.1	0.07	10%	0.08	0.08
120000	Public toilets (10 seater) connected to sewer	Each	0.1	0.10	5%	0.10	0.11
250000	Repair of existing Public toilet	Each	0.1	0.13	5%	0.13	0.14
30000	Public urinals of 2 units	Each	0.1	0.09	5%	0.09	0.09
Estimate	Cost of Sewerage Networks	Km	128.5	128.52	5%	134.95	134.95
2500000	Rehabilitation of existing network	Km	4.4	4.37	5%	4.59	4.59
Estimate	House Sewer Connections	Number	41.2	29.37	5%	43.27	30.84
2500000	Trenchless crossing	Number	3.8	3.75	5%	3.94	3.94
2500000	Pumping stations	Number	5.1	5.12	5%	5.38	5.38
7500000	STP	Number	28.5	28.50	0%	28.50	28.50
	Sub-total		215.30	201.59		224.66	210.28
Estimate	Management Improvements						0.95
1.50%	Project management fee						3.15
5.00%	Cost escalation						26.40
LS	Miscellaneous Items						0.22
	Grand total						**241.00**

Total Sewerage project cost is Rs. 241.00 Crores

6.0 Solid Waste Management

6.1 Objective:

- Scientific management of MSW of the Rourkela City.
- Ensure proper segregation, collection, transportation, processing and disposal of MSW generated in the townships.
- Upgrade the existing facilities to minimize contamination of soil and water from the MSW
- Protection of public health and environment from hazardous effect of MSW
- Development of environmentally sustainable and economically feasible solid waste management system
- Minimize occupational (adverse) exposure to the waste handlers.

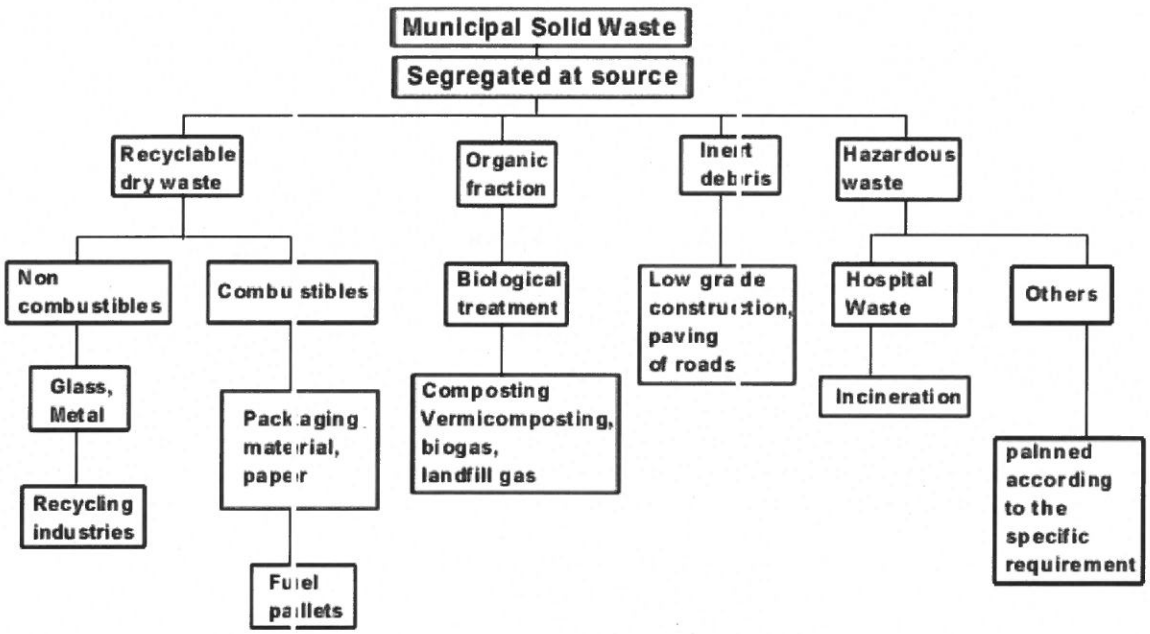
6.2 Strategy:

The basic approaches of the proposed SWM system would be:

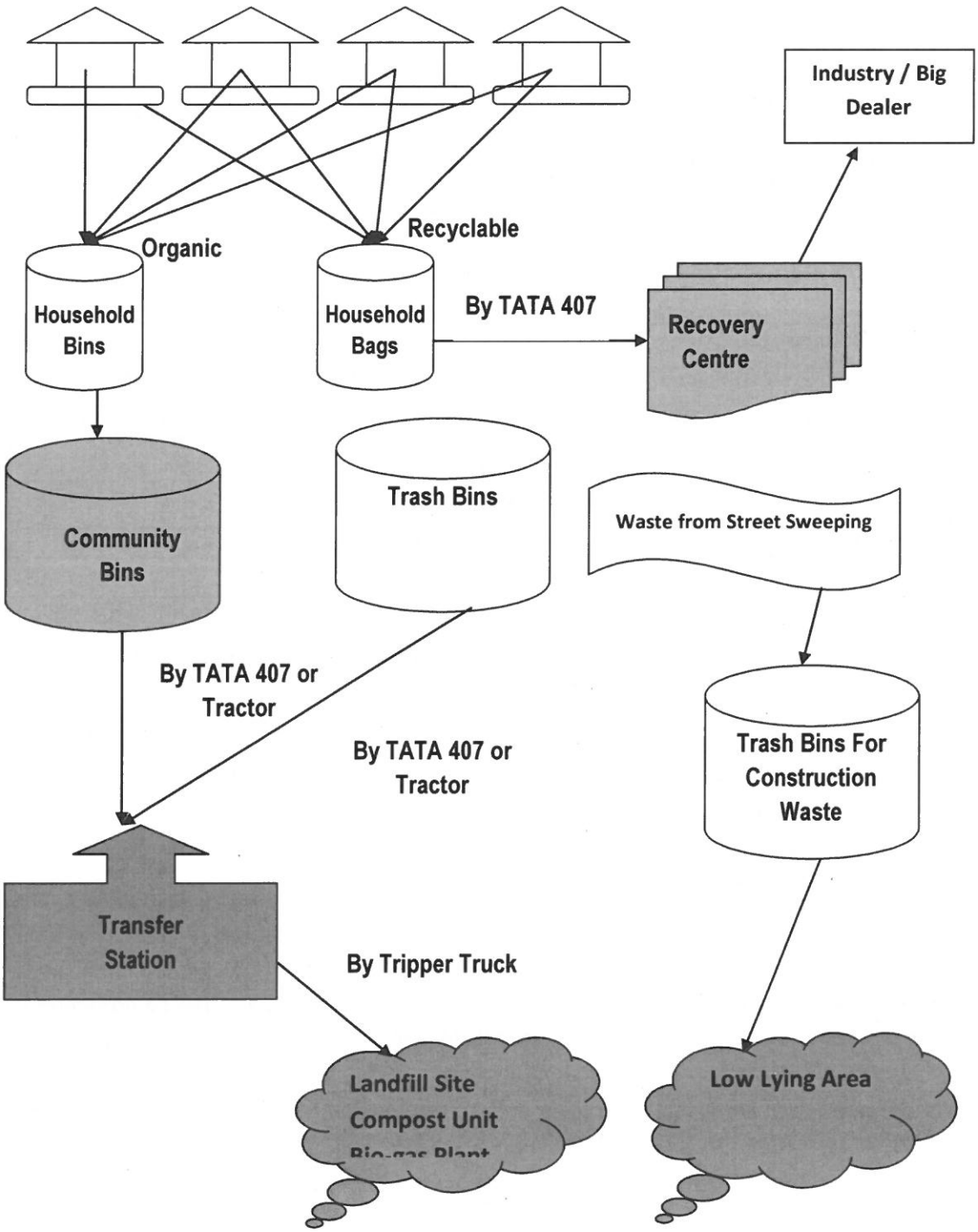
- 100% waste collection
- Segregation of waste at source
- No accumulation of waste in the streets and lanes
- Accessibility of service to every citizen
- Elimination of road side open dumps
- Setting of optimum number of transfer station
- Economic and eco-friendly transport system
- Elimination of multiple handling of waste
- Institutionalization of recycling system
- Category wise treatment and disposal
- Sound personnel management
- Immediate introduction of Containerization of solid waste from storage to disposal.
- Engagement of NGOs/Private Firms for door to door collection.
- Popularization of 'Segregation at source' practice through proper awareness campaign with effective IEC materials and group discussions.
- All organic waste including market waste may be used for composting (Preferable semi-mechanical). Compost plant should be located near by the land fill site.
- Market mechanism for segregated recyclable wastes must be developed for proper management of the said waste and for revenue generation to be used for welfare purposes.
- Training of all level of staff associated with SWM to be imparted by recognized institute/personnel.
- Awareness and motivation campaigns must be given adequate emphasis to get support from the community for effective operation of the system

- Preparation of Action Plan for Solid Waste Management under City Sanitation Programme for the City
- SWM practices for Present Level Generation of SW and up to the end of the design period i.e. up to the Year 2030
- Implementation year 2012-2015
- The action plans for the City are being formulated within the legal framework of rules of Ministry of Environment and Forests, Govt. of India.

MUNICIPAL SOLID WASTE PROCESSING PRINCIPLES



Principles of solid waste management



6.3 Generation and characteristics of waste

6.3.1 Type of Waste

Sl. No.	Establishment	Type of Wastes
1	Residence	Food Wastes (animal, vegetable and fruit residues) ; Garden trimmings; Combustible rubbish- Paper; cardboard; plastics; polythenes; Leather; Rubber; Rags and Cloths; Noncombustible rubbish- Metal foils; Tin cans; glass and glass bottles; crockery;
2	Commercial establishments	Combustible and noncombustible rubbishes are main constituents but a small amount of food wastes are also generated
3	Market	Vegetables, Fruits and animal residues (Garbage) are mainly generated but a small amount of rubbish is also generated.
4	Restaurant/ Food Establishment	Food Wastes are mainly generated
5	Health care establishment (Hospital, Nursing Homes etc;)	Infectious and hazardous waste are the main concerned. A significant amount of food waste and rubbish is also generated

6.3.2 Waste Generation Rate

In almost all growing urban cities of India having population more than 2 lakhs, the average generation of waste is 350 gms/cap/day and the generation of solid waste is estimated in the range of 300-600 gms/capita/day for residential house holds.

It is proposed that the individual houses will be covered with house to house collection and the slums will be covered by Community bins collection.

For the city of Rourkela the quantity of generation is calculated on the basis of preliminary data collected from Municipal authorities and on assumption of per capita generation rate of **350gm/c/day** in house holds & **200 gm/cap/day** in slum pockets.

6.3.3 Characteristics

The characteristics of municipal solid waste is more or less similar in the urban areas of the state of Odisha as per various survey conducted in the different parts of the state. The percentage of different components of waste generated are tabulated below

Component	Percentage by weight
A. Organic	
1. Food waste, vegetables waste, Garden trimmings and dry leaves.	63.00
B. Recyclables	
1.Paper	4.00
2. Plastics/polythenes	4.00
3. Rubber, leather	1.00
4. Glass & ceramics	1.50
5. Textile/cottons	0.50
6. Earthen wares	1.00
6. Metal	Negligible
7.Coconut shells	1.00
Total	**13.00**
C. Inert, dirt, sand, dust, soil etc.,	**24.00**
Total	**100.00**

The waste composition indicates amount of compostable waste is 63%, which may be of residential and animal waste matter. Paper and plastic comprises 8% of the waste generated & these form the re-usable items and are being picked up regularly by innumerable rag pickers. Apart from these waste, one of the growing concern is construction waste, which is about 24 percent. This construction waste generation will increase in coming days since construction activity is growing and will increase the pressure on solid waste management.

The density of mixed solid waste has been taken as 425 Kg/cubic metre and the calorific value as 900.00 (approx) Kcal/Kg. However, density of recyclables was taken as 200Kg/Cubic metre

The basic character of the waste reveals that it has a low combustible value but has a high compostable value.

6.3.4 Waste generation

Description	2011	2015	2030
Population			
Non Slum Population	154622	161019	191819
Slum Population	114980	119737	144706
Total Population	269602	280756	336525
Commercial & Inst. Establishments	4000	5000	10000
Generation per day			
Non Slum (MT)	54	56	67
Slum (MT)	23	24	29
Commercial Establishment (MT)	8	10	20
Others (MT)	1	1	2
Total Generation (MT)	**86**	**91**	**118**
Organic Waste (MT)		58	74
Inert Waste (MT)		22	28
Recyclable waste (MT)		12	15

The detail calculation of solid waste generation is provided in **Annexure 15**

6.4 Design Parameters for SWM

It is expected that the implementation of Solid Waste Management system would take three years time altogether for completion including development public awareness towards handling of solid waste. Therefore the different parameters for solid waste management system under this City Sanitation Plan have been designed taking into consideration of waste generated upto the year ending 2015. However the design of disposal site, i.e Landfill area have been designed taking the waste generation upto the year ending 2030.

6.4.1 Storage

As the basic mandate in the Rules is to segregate waste at the point of generation, it is proposed to segregate the waste at the household level broadly into two parts, Organic (decomposable) and Inorganic (recyclables). There will be two systems of collection for the above collection and the frequency of collection will differ. While for organic (biodegradable) waste the collection frequency will be Daily, the same for recyclables will be **once in a week**. Segregation of waste at source is proposed to be practiced by households and establishments. The following measures should be taken on to residential and commercial areas that

a) No one should throw solid waste in the open areas, streets, and neighbourhood.

b) They shall store both biodegradable waste & non-biodegradable waste in plastic containers with lid. Metal containers can also be used for storage of biodegradable waste but they become corroded within a short period therefore, is not recommended. A standard design and size of the containers will be prescribed by the department to facilitate the activities.

System	Description	Advantages	Disadvantages
Shared	Residents can bring waste at any time		
Shared container	Residents and other generators put their waste inside a container which is emptied or removed at definite time interval	Low operating cost and convenient for the pedestrians and market places.	There is every possibility that occasionally the waste will spill out from the containers. Placement of containers will be difficult in a busy and narrow streets and lanes. Adjacent residents and shopkeepers may complain about the smell and appearance.
Individual	In these systems the generators need a suitable container and must store the waste on their property/premises until it is collected.		
Block collection	Collector sounds horn or rings bell and waits at specified locations for residents to bring waste to the collection vehicle.	Economical. Less waste on streets. Staff requirement is less though the standard of service is satisfactory.	If family members are not present during time of collection, the accessibility of the service reduces.
Kerb side Collection	Waste is left outside property in a container and picked up by passing collection vehicle, or swept up and collected by conservancy worker	Convenient for the households. No permanent storage point is required in the streets or lanes	Waste that is left out may be scattered by animals, children and waste pickers. Vacant area outside the premises for keeping the container may not be available in many cases.
Door to door collection	Waste collector knocks on each door and waits for waste to be brought out by resident.	Convenient for resident. Little waste on street	Residents must be available to hand waste over. A large number of workers is required as much time will be needed by each worker to attend every house.

As mentioned earlier that each family will be provided with two separate storage facilities. They shall store biodegradable waste and non-biodegradable waste in plastic containers with lid. Shared container (community bins) system is proposed for collection of organic waste as well as inorganic waste for slum area. It will be difficult for the vehicles to wait in some of the narrow but busy lanes. Community bins are proposed in those areas.

The number and size of household bins and community bins are estimated as follows

6.4.1.1 Household Bins

Door-to-door **daily** collection is proposed for collection of organic waste. Door-to-door collection is also proposed for collection of inorganic recyclable waste with frequency of collection, **once in a week.**

CATEGORY	MATERIAL	NUMBER REQUIRED	SIZE	FREQUENCY OF COLLECTION
HOUSEHOLD BINS(Organic Waste)	PLASTIC	60,000	8 LITRES	DAILY
HOUSEHOLD BINS(Recyclable Waste)	PLASTIC / METAL	60,000	10 LITRES	ONCE IN A WEEK

6.4.1.2 Community bins for slum area

It is assumed that a community bin will serve 25 families or 125 persons. Organic waste will be collected daily & recyclable waste will be collected once in a week.

CATEGORY	MATERIAL	NUMBER REQUIRED	SIZE	FREQUENCY OF COLLECTION
COMMUNITY BIN (ORGANIC)	FIBRE GLASS	1000	100 LITRES	DAILY
COMMUNITY BIN (RECYCLABLE)	FIBRE GLASS	1000	200 LITRES	ONCE IN A WEEK

6.4.1.3 Bins for Commercial Establishments/Shops

It is assumed that one bin will serve 25 shops. Organic waste will be collected daily & recyclable waste will be collected once in a week.

CATEGORY	MATERIAL	NUMBER REQUIRED	SIZE	FREQUENCY OF COLLECTION
BIN FOR ORGANIC MATTER	FIBRE GLASS	200	100 LITRES	DAILY
BIN FOR RECYCLABLE MATTER	FIBRE GLASS	200	300 LITRES	ONCE IN A WEEK

6.4.1.4 Bins for Institutions

It is assumed that two trash bin will be placed in each institution. Both Organic waste & recyclable waste will be collected daily.

CATEGORY	MATERIAL	NUMBER REQUIRED	SIZE	FREQUENCY OF COLLECTION
TRASH BIN	FIBRE GLASS	50	100 LITRES	DAILY

Locations of such bins shall be decided by the Administration based on the convenience of placement in consultation with the Institution Authority.

6.4.1.5 Bins for Marriage Hall & Kalyan Mandap

It is assumed that one trash bin will be placed in each marriage mandap. Both Organic waste & recyclable waste will be collected daily.

CATEGORY	MATERIAL	NUMBER REQUIRED	SIZE	FREQUENCY OF COLLECTION
TRASH BIN	FIBRE GLASS	20	5000 LITRES	DAILY

6.4.1.6 Bins for Hotel and Restaurant

In addition to the above bins for storing of commercial waste, **200 nos of trash bins each of 2000 litres capacity** will be placed at each hotels and restaurant for collection of bulk generation of organic waste.

CATEGORY	MATERIAL	NUMBER REQUIRED	SIZE	FREQUENCY OF COLLECTION
TRASH BIN	FIBRE GLASS	100	2000 LITRES	DAILY

6.4.2 Primary Collection Vehicles

Common types of primary collection vehicle are

- The handcart, which is pushed by the operator as he/she walks along,
- The pedal tricycle with containers/box in front of or behind the operator.

It is proposed that 40% 0f the waste will be collected through hand carts having 4 nos. of 30 lit. Capacity container and 60% of the waste will be collected by pedal tricycles having 8 nos. of 30 lit. Capacity container.

It is considered that one sweeper will make 3trips/day from the household/community to the primary transfer stations.

Carrying capacity of hand cart /day = 3x4x30lit.=360lit. or 0.360cum.

No. required= 69MTx .40= 27.6 MTx 1000/425= 64.94 cum/.360 = 180.38 **or say 180**

Carrying capacity of pedal tricycle/day = 3x8x30lit.=720 lit. or 0.720cum.

No. required= 69 MTx .60= 41.4MTx 1000/425= 97.41 cum/.0.720= 135.29 **or say 135**

ITEM	Capacity	Number
Hand Cart	4 container	180
Pedal Tri cycle	8 container	135
Container	30 Litres	1800

6.4.3 Transfer and transportation

Main objectives of the proposed solid waste transportation system are

- Optimum Utilization of the transport vehicles.
- Avoid Multiple Handling of Solid waste
- Environment friendly and hygienic system

1. Primary Transfer Station

The method of transferring waste from the primary transport cum collection vehicle to Primary transfer stations should be chosen with care, in order to avoid environmental pollution and occupational health risk of the workers.

Calculation of Dumper Placer Container

Total Road length of 33nos of ward of Rourkela City = 629 km.

Average road length per ward =629/33 = 19.06 km.

Total Area of Rourkela city = 31.60 Sq km.

Average area per ward = 31.60/33 = 0.96 Sq km.

Taking into consideration of average road length & area of a ward it is proposed to have 2 no of dumper placer containers of 1 Cum capacity in each ward at suitable locations for organic waste, 1 no of dumper placer container of 3 Cum capacity in each ward for recyclable waste.

a) In addition to this it is proposed to place one no of dumper placer container of 3 cum Capacity in each ward at suitable locations for waste from street sweeping.

b) 20 nos. of 4.5 cum capacity dumper placer containers at major commercial area

c) 4 nos. of 4.5 cum capacity at vegetable markets

Considering generation of 2015 total dumper placer container required

Total no of 1 cum capacity container= 33x2 = 66

Total no of 3 cum capacity container = 33x3 = 99

Total no of 4.5 cum capacity container = 24

2. Container Lifting Vehicles

These container lifting vehicles will engage to transport the waste from primary transfer stations to secondary transfer stations.

Considering 4 numbers of containers can be lifted & transported per vehicles per day, the number of Dumper Placer required = 189/5 = 37.8 or say 38 nos. Add 10% extra = 38+4 = **42 nos.**

Out of the above, **14 nos.** will be of Auto transported dumper placer and rest **28 nos.** will be Tractor/Mini truck carried dumper placer.

3. Secondary Transfer Stations

Split-level transfer is proposed for the town. Split level transfer can be of three types as mentioned below

Method Description	Advantages	Disadvantages
Ramp: The collection vehicle is moved up a slope until it is high enough for the waste to fall by gravity into the secondary transport vehicle	Rapid and hygienic transfer	It requires considerable space to provide a desirable slope for the motor vehicles. That much of free space may not be available in most areas.
Pit: The secondary transport vehicle is driven into a pit, so that the waste can be tipped from a primary transport vehicle into it.	No restriction imposed on the size of the Primary transport vehicle	If the pit is not well drained and regularly cleaned, it may become filled with water or waste, or both.
Using natural ground level allow split level transfer	Problems of Ramp and Pit do not arise	Some special construction arrangements have to be made sometimes, if the land where transfer will take place is uneven.

For the Rourkela City 1 numbers of two level transfer stations (Ramp type) is proposed at the following locations

i- Ward No-17

For the above purpose land area of 2000 Sq.mt. (approximately 70mt.x30mt) is required at the above locations. These transfer stations should be within 10-15 km distance from the prosed Landfill Site. The waste collected through dumper placer from the city will be transferred to prime movers (Truck attached with hydraulically operated tippers) and the waste will be transported to Landfill/Waste processing site from these transfer stations.

4. Prime Movers Required

Total solid waste to be transported to disposal site = 57 MT per day

Capacity of each Prime Mover = 5 MT

No. of Prime Mover required = 57/ (5 x 3 trips) = 3.8 say 4 nos.

Provide 10% extra as stand by unit.

Total No. of Prime Mover = 4+1= **5 nos.**

5. Transportation of Construction Material/Inert Waste

It is proposed that the construction waste will be kept by the waste generator in their premises or at road side and it will be lifted directly from the construction site by Rourkela Municipality. These materials will be disposed at low lying area of the city or in the river bank through Tractors or Mini truck. It should be ensured that such waste should be free from any type of organic waste & recyclable waste otherwise it will create environmental or river pollution.

Calculation of no. of vehicle required/day for disposal of Construction Waste

It is assumed that one vehicle will run 20 km/trip and 5 trips/day.

Capacity of one Tractor = 1cum x 5 trips/day = 5 cum.

Density of Inert waste is considered as 1000kg/cum.

Inert Material is **22 MT/day**

No. of vehicles to be engaged for lifting of 22 cum = 4.4 or say 5 nos.

Add 10% extra =5+1= **6 nos.**

6. Street sweeping

Total length of the road of Rourkela City = 629km.

The width of the roads are different. Considering 30% of road length having 10 Mt. width, 40% of the road length having 7 Mt. width & 30% of road length having 3 Mt. width, the length of the roads of different width are as follows-

10 Mt. width road = 189km; 7 Mt. width road = 251km; 3 Mt. width road = 189km

Considering one sweeper can sweep 2500 Sqmt. of road/day and also be allotted the duty for primary collection of waste from road side to dumper placer container.

The no of sweeper required

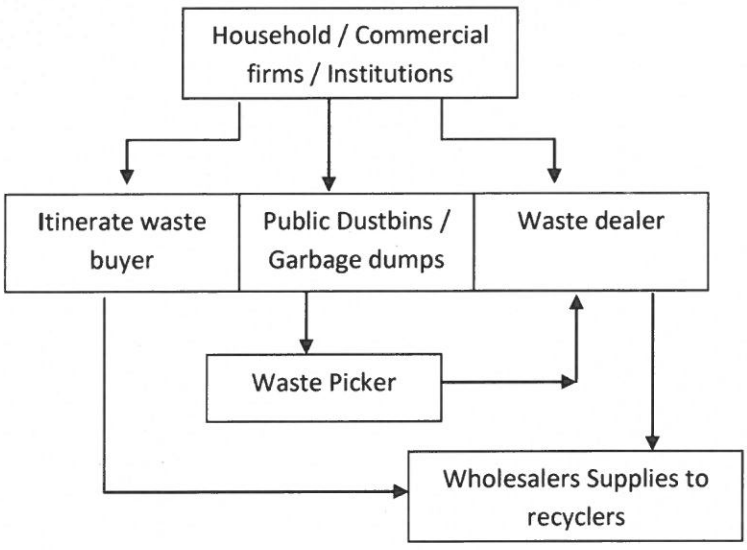
For 10Mt.width road	= (10x189000)/2500	= 756nos.
For 7Mt.width road	= (7x251000)/2500	= 703 nos.
For 3Mt.width road	= (3x189000)/2500	= 227 nos.
	Total	**= 1686 nos.**

6.4.4 Treatment & Disposal

1. Recycling or resource recovery

Each family of the City will be provided with metal/plastic bins for storing of recyclables generated in the house. As these wastes are not biodegradable, seven days storing inside the house will not pose problem. The waste will be handed over to the waste collectors who will collect the waste at doorsteps once in a week. These materials will be taken to Recovery Centres.

Recyclable waste that would be collected from residences, commercial establishments and markets, needs to sort. For that two recovery centres are proposed to be constructed just adjacent to the secondary transfer stations. It would be a simple enclosure with a boundary wall, where individual components of recyclables will be sorted and stored separately so that selling of the articles will be effective. There will be weighing machines in the centre for regular stock checking and quantification of items. Workers who will be engaged for material sorting must be protected from health hazards associated with waste handling by providing Personal Protective Equipments (PPE). A piece of land of **40Mt.x 30 Mt.** size will be adequate for one recovery centre.



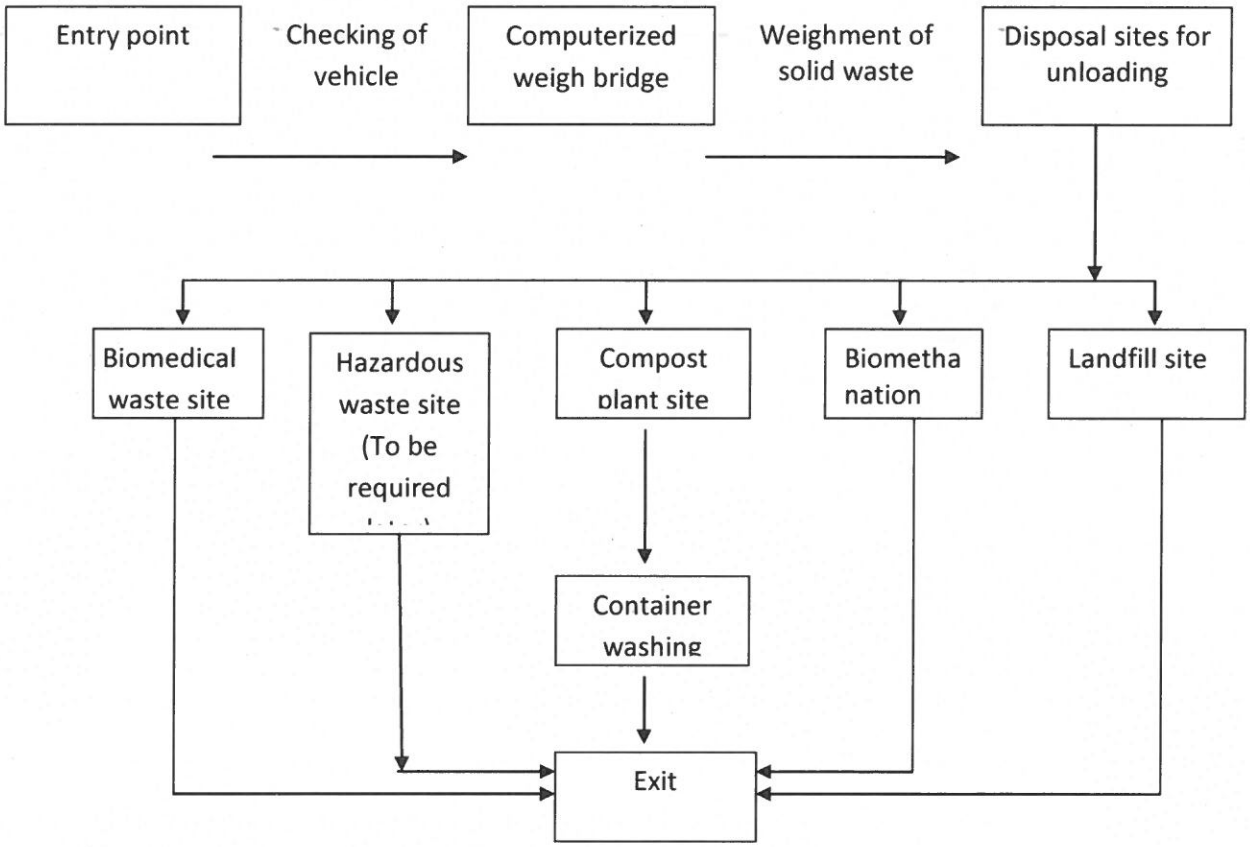
The schematic representation of recovery

2. Disposal

The disposal of solid waste is proposed to be carried out in a combination of three methods:

1. Composting
2. Biomethanation
3. Land filling

As it is already proposed that most inorganic waste will be taken care by recycling system, the organics and mixed waste will be disposed off. According to the Rules organic waste must be used for production of compost & for energy recovery. On that basis flow sheet of disposal operation to be practiced is depicted below



Flow Sheet of Disposal Operation by the Transport Vehicles

3. Compost unit

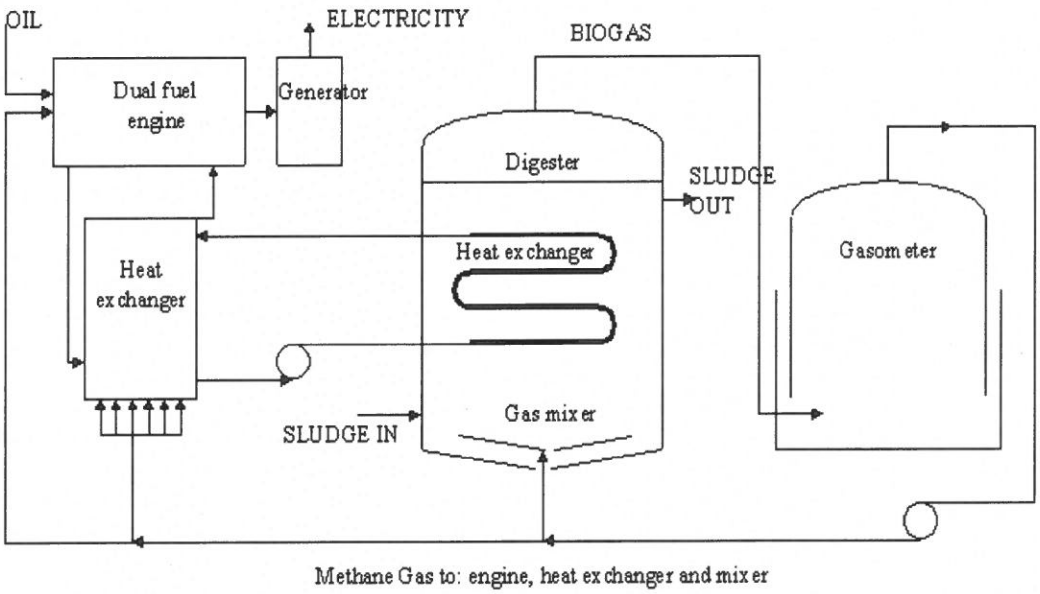
Composting cannot be effectively carried out without an integrated waste management policy, where recycling, composting, anaerobic digestion and land filling are given equal importance.

Quantity of Solid Waste to be utilized for compost plant

= 50% of the organic waste= 57x.50 = **28.50 MT.**

It is proposed to construct **1 nos.** of separate unit of compost yard of **30 MT** capacities each, near the land fill site. Land area required for each unit is around 2500 sq. mt.

4. Biomethanation/Anaerobic Digestion(AD)



The flow diagram of low solid AD

The following types of low-tech anaerobic digesters (AD) can be implemented

- TEAM digester (developed by Energy and Resource Institute (TERI))
- ASTRA digester (Centre for Sustainable Technologies): this type of biogas plants are built by TIDE (Technology Informatics Design Endeavour)
- ARTI digester (Appropriate Rural Technology Institute)
- SPRERI digester (Sardar Patel Renewable Energy Research Institute)
- BARC digester (Bhabha Atomic Research Institute)

Quantity of Solid Waste to be utilized for anaerobic digestion by installation of Digester Plant is 30% of the organic waste= 57x.30 = **17.1 MT.**

It is proposed to install **2 nos.** of separate unit of Digester Plant of **10 MT** capacities each, near to the land fill site. Land area required for each unit is around 1000 sq. mt.

5. Modified sanitary land fill (MSLF)

The basic criteria for site selection for land fill are

1. The landfill site shall be large enough to last for 20-25 years and preferably within 5 km from present city limits.
2. The site shall be at least 0.5 km away from habitation clusters, forest areas, monuments, National parks, wetlands and places of important cultural, historical or religious interest.
3. Landfill site shall be at least 20 km away from airport including airbase. Implementing authority shall obtain approval of airport/airbase authorities prior to the setting up of the landfill site.
4. 500 meters, wide buffer zone of no-development is to be maintained around landfill site and shall be incorporated in the City Planning Department's land-use plans.

The land fill site has to be designed for 2030 projection. The proposed site should fulfils all the criteria. Considering 20% of organic waste will be disposed off in the modified sanitary landfill (MSLF), 50%will be utilized in the compost plant and 30% will be utilized for anaerobic digestion for production of bio-gas.

The total land area should be approximately 15% more than the area required for land filling to accommodate all infrastructure and support facilities as well as to allow formation of a green belt around the landfill.

A landfill is operated in phase because it allows the progressive use of the landfill area, such that at any given time a part of the site may have a final cover, a part being actively filled, a part being prepared to receive waste, and a part undisturbed. Each phase is typically designed for a period of 365 days.

Waste generation by 2015(Organic Waste)	:	57 tonnes / day
Waste generation by 2030(Organic Waste)	:	67 tonnes / day
Design Life	:	Active period = 15 years
Average total rainfall	:	1200 mm per year

Land Fill Area

i) Waste to be disposed at landfill site by 2015
@ 20% of 57MT (organic waste) = 11.4 tonnes / day

ii) Waste to be disposed at landfill site by 2030
@ 20% of 67MT (organic waste) = 14.0 tonnes / day

iii) Total waste to be disposed in 15 years$(0.5*(11.4+14)x365x15)=0.7x10^5$ tons

iv) Total volume of the waste, (considering density of the waste 0.85 ton/cum
Volume of Waste Vw = $0.7 \times 10^5 / 0.85 = 0.85 \times 10^5$ Cum

v) Volume of daily cover Vde= $0.1 \times 0.85 \times 10^5$ Cum

vi) Volume of liner and cover system $Ve=0.125 \times 0.85x\ 10^5 = 0.106 \times 10^5$ Cum

vii) Volume likely become available within 30 days due to settlement of biodegradable waste and inert waste@ 7.5%

Vs = $0.075 \times 0.85 \times 10^5$ $= 0.064 \times 10^5$ cum

viii) Estimate of landfill volume

Ci $V_w + V_{de} + Ve - Vs$

= $(0.85+ 0.085+ 0.106- 0.064) \times 10^5$

= 0.977×10^5 Cum

ix) Proposed L:B ratio = 1:1

x) Proposed landfill height = 3.50mt

x) Land area required = $(0.977 \times 10^5 / 3.5)$Sqm

= 27914 Sqm

= 6.95 Acre or **say 7 Acre**

The land needs to be acquired for 9 acres. Out of which 1.0 acre of land is proposed to be utilized for compost unit and 1.00 acre to be utilized for setting up digester plant. No land has yet been allotted for treatment plat and land fill. This need to be taken up with topmost priority. ***The Municipality is also exploring the possibility of associating with RSP for common treatment and land fill unit or to provide the solid waste to the private operator appointed by RSP for their township. The Municipality should strongly pursuer the latter.***

Land fill Infrastructure

a) Site Entrance and Boundary Wall.
b) Administrative and Site Control Offices
c) Access Roads
d) Waste Inspection and Sampling Facility
e) Equipment Workshops and Garages
f) Signs and Direction
g) Water Supply
h) Lighting
i) Vehicle Cleaning Facility
j) Fire Fighting Equipment

Landfill equipment

The following equipment is required at a landfill site

a) Dozers – for spreading waste and daily cover -**1 Nos**

b) Landfill Compactors – for compaction waste - **1 Nos**

c) Loader– for loading of Waste (internal movement) – **1 Nos**

d) Tractor trailers –for internal movement of waste/daily cover soil – **2 Nos.**

e) Soil compactos – sheep foot rollers and smooth steel drum rollers – **2 Nos.**

f) Water tanker - **1 No.**

6.4.5 Bio-medical Waste

Bio–medical Waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological and including categories mentioned in Schedule-I of the Rules.

Bio-medical waste treatment facility

A facility wherein treatment, disposal of bio-medical waste or processes incidental to such treatment or disposal is carried out and includes common treatment facilities.

The Municipal Bodies can only pick-up and transport duly treated bio-medical wastes for disposal at the municipal dump site (Rule 6). The main responsibilities of collection and segregation bio-medical waste are with the hospital authority.

Categories of Health Care Waste

<table>
<tr><th rowspan="2">General Waste</th><th colspan="3">Biomedical Waste</th></tr>
<tr><th>Anatomical Waste</th><th>Infectious non-sharp Waste</th><th>Sharp Waste</th></tr>
<tr><td rowspan="2">Food Waste, Paper, Cardboard, Floor sweeping, earthen vessels, woods, rags, etc.</td><td rowspan="2">Placenta, human tissue, tumours, etc.</td><td><u>Soiled Waste</u> :
Waste contaminated with blood, body fluid (cotton, dressing, soiled plaster cut, linen, etc.)</td><td rowspan="2">Needles, syringes, scalpel, blade, broken glass, nails and any other items that may cause puncture and cuts.</td></tr>
<tr><td><u>Solid Waste</u> :
Disposable items other than waste sharps (rubber gloves, plastic tubing, catheters, IV sets, etc.</td></tr>
</table>

Colour Coding for different Categories of Waste

Waste Category	Colour of Bag	Colour Bin
General Waste (Non-hazardous)	Black	Black
Anatomical Waste	Yellow	Yellow
Infectious Non-sharp Waste	Red	Red
Sharp Waste	Blue	Blue

Need for the Segregation of BMW at Source

- If the proper segregation of the waste is not done at source then the bio-medical waste might get mixed up with the municipal waste of the hospital.
- This will jeopardize the entire process of the bio-medical waste treatment.
- Besides, this will endanger the human and the animal lives.
- Therefore, it is vital that all the health care units – both in the Government and in the Private Sector – strictly follow the segregation of bio-medical waste at source.

The bio-medical waste is segregated into Yellow, Red and Blue bags, containers and bins

Generation of Bio-Medical Waste

Total No of Bed- Rourkela Govt Hospital - 200

Other Primary Hospitals & Nursing Homes

(10 Nosx 30 bed average) -300

Total - 500 beds.

Considering the waste generated @1.5 Kg/cap/day

The total waste generated = 0.75 MT/Day

Out of which the municipal solid waste is considered as 75%, = 0.56MT

and the Bio- Medical Waste is considered as 25% i = 0.19 MT

6.4 Infrastructure, Investment & Implementation

Sl. No.	Details of items / Equipments / Tools	Capacity	Quantity required by 2015	Quantity Available 2011	Net Quantity Required	Cost per Unit (Rs.)	Total Estimated Cost (Rs.) by 2015
Cost Estimate For Primary Collection System							
1	House Hold Bins(For Organic Waste)	8 Lit.	60000	0	60000	100.00	60,00,000.00
2	House Hold Bins(For Recyclable Waste)	10Lit	60000	0	60000	150.00	90,00,000.00
3	Community bins (For Organic)	100Lit.	1000	0	1000	1,000.00	10,00,000.00
4	Community bins (For Recyclable)	200Lit.	1000	0	1000	2,000.00	20,00,000.00
5	Bins For Commercial Estt.(For Organic)	100Lit.	200	0	200	1,000.00	2,00,000.00
6	Bins For commercial Estt. (For Recyclable)	300Lit.	200	0	200	3,000.00	6,00,000.00
7	Bins For Institutions	100Lit.	50	25	25	1,000.00	25,000.00
10	Container For Marriage Mandap	4.5 Cum.	20	10	10	50,000.00	5,00,000.00
11	Container For Hotels & Restaurant	2 Cum	100	0	100	20,000.00	20,00,000.00
12	Containers For Hand Cart & Tri Cycle	30Lit.	1800	0	1800	500.00	9,00,000.00
13	Hand carts	4 container	180	0	180	6,000.00	10,80,000.00
14	Pedal tricycle	8 container	135	0	135	10,000.00	13,50,000.00
15	Dumper placer containers	1/3/4.5 Cum	190	97	93	2,00,000.00	1,86,00,000.00
						Sub Total	**4,32,55,000.00**

Sl. No.	Details of items / Equipments / Tools	Capacity	Quantity required by 2015	Quantity Available 2011	Net Quantity Required	Cost per Unit (Rs.)	Total Estimated Cost (Rs.) by 2015
			Street Sweeping				
17	Sweeping tools (Metal tray & metal plate, long handled brooms, shovels and protective gears)		Lump Sum				50,00,000.00
18	Street Vat	8 Ltr.	650	100	550	100.00	55,000.00
						Sub Total	**50,55,000.00**
			Transportation Vehicles				
19	Small vehicle for congested places / Auto Carried Dumper Placer	0.3Cum	14	9	5	2,50,000.00	12,50,000.00
20	Tractors fitted with hydraulic trolleys with equipments for dumper placer	1 Cum.	28	7	21	12,00,000.00	2,52,00,000.00
21	Prime Movers with hydraulic tripper	4.5 MT	5	5	0	30,00,000.00	-
22	Tractors fitted with hydraulic trolleys for construction waste	1 Cum.	6	0	6	10,00,000.00	60,00,000.00
						Sub Total	**3,24,50,000.00**
			Secondary transfer station				
23 I	Boundary Wall		1	0	1	10,00,000.00	10,00,000.00
II	Raised Platform		1	0	1	30,00,000.00	30,00,000.00
III	Administrative Office		1	0	1	10,00,000.00	10,00,000.00
IV	Approach Road		1	0	1	10,00,000.00	10,00,000.00
V	Electrification & W/S		1	0	1	5,00,000.00	5,00,000.00
						Sub Total	**65,00,000.00**

Sl. No.	Details of items / Equipments / Tools	Capacity	Quantity required by 2015	Quantity Available 2011	Net Quantity Required	Cost per Unit (Rs.)	Total Estimated Cost (Rs.) by 2015
			Recovery Centre				
24 I	Boundary Wall		1	0	1	5,00,000.00	5,00,000.00
II	Concrete Yard		1	0	1	10,00,000.00	10,00,000.00
III	Administrative Office		1	0	1	5,00,000.00	5,00,000.00
IV	Approach Road		1	0	1	5,00,000.00	5,00,000.00
V	Electrification & W/S		1	0	1	3,00,000.00	3,00,000.00
						Sub Total	**28,00,000.00**
			Compost Units				
25	**Civil Items**						
I	Construction of boundary wall all around the waste processing site.		1	0	1	15,00,000.00	15,00,000.00
II	Concrete Yard		1	0	1	20,00,000.00	20,00,000.00
III	G.I. Sheet Roof over the Yard		1	0	1	20,00,000.00	20,00,000.00
IV	Approach Road		1	0	1	5,00,000.00	5,00,000.00
V	Administrative Office		1	0	1	10,00,000.00	10,00,000.00
VI	Storage Yard		1	0	1	10,00,000.00	10,00,000.00
VIII	Surface Drains		1	0	1	2,00,000.00	2,00,000.00
VIII	Leachate Tanks		1	0	1	5,00,000.00	5,00,000.00
						Sub Total	**87,00,000.00**
26			**Other Mechanical & Elect. Items**				
I	Weigh Bridge	20MT	1	0	1	10,00,000.00	10,00,000.00
II	Screens	1,2,3,10 mm	40	0	40	10,000.00	4,00,000.00
III	Mechanical Tools For handling					L.S	10,00,000.00
	Electrification & W/S						10,00,000.00
						Sub Total	**34,00,000.00**

Sl. No.	Details of items / Equipments / Tools	Capacity	Quantity required by 2015	Quantity Available 2011	Net Quantity Required	Cost per Unit (Rs.)	Total Estimated Cost (Rs.) by 2015
	Bio-methanation Plant						
27	Package anaerobic digester plant					L.S	**2,00,00,000.00**
	Land Fill Sites						
28	**Civil Items**						
I	Construction of boundary wall all around the Land Fill site.					L.S.	20,00,000.00
II	Shed for equipments workshop					L.S.	20,00,000.00
III	Approach Road & Internal access road					L.S.	40,00,000.00
IV	Administrative Office					L.S.	15,00,000.00
V	Surface Drains					L.S.	20,00,000.00
VI	Leachate Tanks					L.S.	50,00,000.00
VII	Sedimentation Tank					L.S.	5,00,000.00
VIII	Treatment Unit for Leachate					L.S.	1,00,00,000.00
	Landfill gas recovery arrangements					L.S.	1,00,00,000.00
						Sub Total	**3,70,00,000.00**
29	**Other Mechanical & Elect. Items**						
I	Weigh Bridge	20MT		0	0	L.S.	8,00,000.00
II	Mechanical Tools & Equipments for Works					L.S.	20,00,000.00
III	Loader (2 nos)		2	2	0	30,00,000.00	-
IV	Compactors (3nos)		3	0	3	40,00,000.00	1,20,00,000.00
V	Dozer (1 nos)		1	0	1	25,00,000.00	25,00,000.00
VI	Water Tanker (1 no)		1	0	1	10,00,000.00	10,00,000.00

Sl. No.	Details of items / Equipments / Tools	Capacity	Quantity required by 2015	Quantity Available 2011	Net Quantity Required	Cost per Unit (Rs.)	Total Estimated Cost (Rs.) by 2015
VII	Tractor Trailer (2 nos)		2	0	2	8,00,000.00	16,00,000.00
VIII	Electrification & W/S						
30	Gas Flaring Arrangement					L.S	20,00,000.00
31	Environmental Monitoring Units					L.S	50,00,000.00
32	Leachate Collection Pipe					L.S	60,00,000.00
33	HDPE Geo Membrane Liner					L.S	1,50,00,000.00
34	Under Drainage Arrangements					L.S	1,00,00,000.00
35	Taking up plantation all around the disposal / processing site					L.S	50,00,000.00
36	Plantation over the completed phase of Landfill					L.S	1,00,00,000.00
						Sub Total	**7,29,00,000.00**
	Medical MSW Waste Management						
37	Cost towards collection, transportation, Waste from Municipal hospitals					**L.S**	**50,00,000.00**
	Land Acquisition						
38	Cost towards land acquisition for different sites					**L.S**	**5,00,00,000.00**
GRAND TOTAL						Rs.	**28,70,60,000.00**
SAY						Rs.	**28.71 Crores**

6.6 Private Sector Participation in SWM

Private sector participation or public private partnerships may be encouraged / attempted by the Rourkela Municipality.

Some of the areas where private sector participation can be considered are as under

- Door to door collection of domestic waste,
- Door to door collection of commercial waste
- Collection of hospital waste
- Collection of construction waste
- Collection of Market waste
- Setting up of waste disposal facility with its operation and maintenance.
- Setting up of waste treatment plants with its operation and maintenance.
- Supplying vehicles on rent
- Supplying vehicles on lease
- Repairs and maintenance of vehicles,
- Transportation of waste on contractual basis etc.
- Processing of MSW
- Awareness programs on community participation in solid waste management.

6.7 Recommended Measures

1. Household residents should be encouraged to segregate recyclables and non-recyclables organics and inert wastes at the source through public awareness campaigns
2. Door to Door collection systems in all residential area and Community bin collection systems in the slums
3. Collection of non-recyclables organics and inert wastes daily and recyclables once in a week by container carrier hand cart/ Pedal Tricycles
4. NGOs/Private Farms will be engaged for Primary collection systems by hand cart/pedal tricycles
5. Replacement of existing handcarts by containerized handcart to avoid double handling and less productivity
6. Involvement of market committees and participation of NGOs to be encouraged in managing the collection system within the market. Market mechanisms of the recyclables should be totally controlled by NGOs/Private Firm.
7. To fix sweeping Norms for different type of areas as well as different categories of roads according to population, commercial activities, length & width of the roads
8. Monitoring by routine visits to areas by the ULB representatives. Submission of daily report cards by NGOs engaged

9. Containers should be placed in locations (Transfer stations) where vehicles can access properly and loading and unloading operation can be comfortably made.
10. Recyclables should be totally managed by NGOs and the transportation of solid wastes may be given as contracts to private agencies under supervision of ULB.
11. Compost Units & Anaerobic digester plant should be outsourced to Private agencies
12. Consultancy support and specific recommendations of subject experts should be availed for effective management
13. Capacity building activities and training should be a taken up regularly
14. It is possible to make SWM a people's programme by launching comprehensive IEC activities for awareness generation

6.8 Estimation of manpower requirement

Sl.	Position	Sanitation workers	Drivers
1	Street sweepers for street sweeping and	1686	--
2	primary collection of waste through hand cart & pedal cycle	315	--
3	For Auto carried Dumper placers .	14	14
4	For tractor /mini truck carried Dumper placers with tipping arrangement	28	28
5	For tractor /mini truck for lifting of construction waste/debris	6	6
6	For Tipper with hydraulic arrangement	10	5
7	For bulldozer and excavators for landfill site	2	1
8	Labour at landfill site	20	--
9	Labour at Bio-Gas Plant site	20	--
10	Labour at Compost Plant site	15	--
11	Labour at Recycling Centre	10	
11	Tractor trailer at landfill site	4	2
12	Loader, Compactor & water tanker required for landfill site	8	4
13	Labour required for secondary transfer station	10	--
	Total	2148	55
14	Weekly off relievers /Leave Reserve @ 10%	215	6
	Grand Total	2363	61

Note : The above manpower requirement will be reduced based on private sector participation

7.0 Storm Water Drainage

Drainage system of a city is best judged by the coverage of the drainage network and the number and frequency of water logging in the city during heavy rains. Water logging is defined as the inundation of water within a area for a depth of more than six inches for a period greater than four hours. The city should have drainage network which should be well connected with proper slope and of adequate capacity to carry storm water. The drains should be connected to the main drains and then to the nearest water body. A improvised system can also explore the possibility of cost effective method of water harvesting.

7.1 Strategy

The city should have the drainage master plan which needs to be synchronous with the road network master plan of the city. The implementation of the drainage system could be taken up in a phased manner by following the master plan.

Storm water disposal can be taken care of through either a combined sewer system, which provides common collection and disposal of domestic waste water (sewerage) and storm water, or a separate system, in which storm water will be disposed through a separate collection, conveyance and disposal system. Looking to the rainfall pattern, with rainy days mainly in the period June to October and with other months largely dry, a combined system will prove to be expensive, besides being grossly under-utilized in dry months. The separate storm water disposal system is likely to be the preferred option. Also the combined system is not a preferred option for project proposals.
The tertiary and secondary drains, which will discharge into the primary drains, may be in the form of surface drains, with appropriate size and shape and constructed in locally available materials or pre-cast sections.

The design of the storm water drains should be done by using appropriate meteorological and hydraulic parameters. The Indian Meteorological Department (IMD) supplies data on rainfall pattern from which it is possible to develop the relationship between the return period, duration of rainfall and intensity of rainfall, and develop charts useful for design of tertiary, secondary and primary drains. IMD also publishes monograms, which provide charts of rainfall intensity and duration for different return periods for the entire country. Suitable design parameters can be generated by using these charts.

Natural drains, which are the primary drains in storm water drainage system, are likely to be adequate for accommodating the storm water generated in the city. But they will need some improvements like training, removal of blockages due to vegetation, lining in certain critical locations, etc. The resultant design needs to identify the improvements, based on field observations.

The existing drains need renovation and all the drains are necessary to be covered type with provisions for grit traps for cleaning.

Description	Rourkela
DATA	
Road Length	629
Length of available Pucca Drain	192
TARGET	
Target for coverage	100%
ASSUMPTIONS	
Drain Length per Km of Road	1.25
Cost per Km for Main drain	Rs. 60.00 Lakh /Km
Cost per Km for secondary drain	Rs. 27.00 Lakh /Km
Cost per Km for tertiary drain	Rs. 8.50 Lakh /Km
INFRASTRUCTURE	
Main Drain (Km) 15%	89
Secondary Drain (Km) 35%	208
Tertiary drains (Km) 50%	297
IMPLEMENTATION	
Period	2012 to 2016

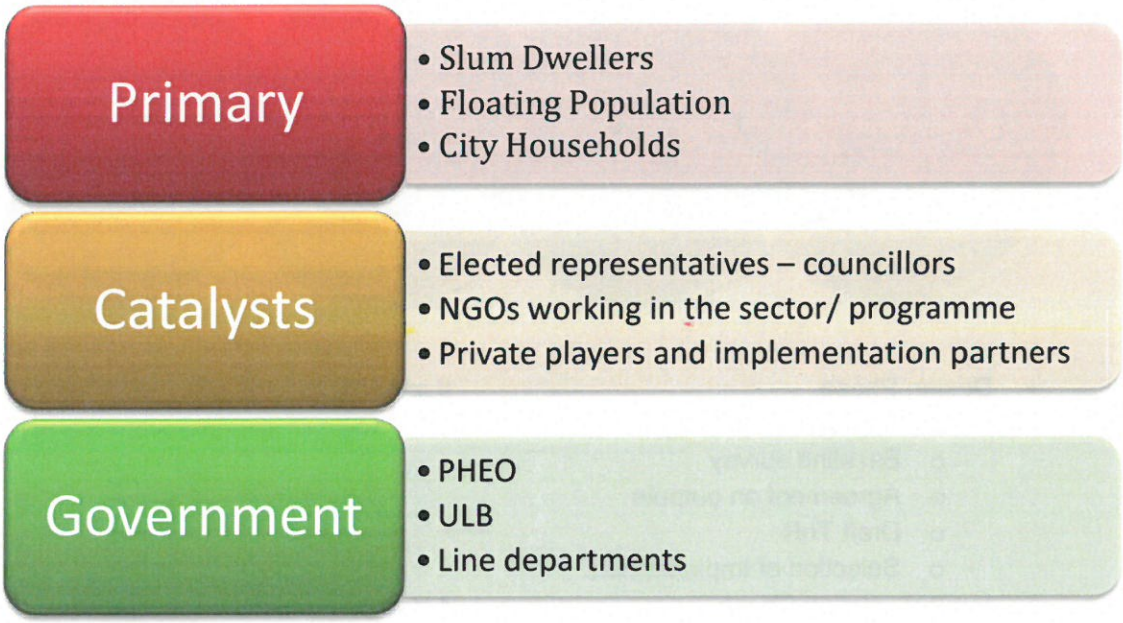
7.2 Investment

Description	Unit	Quantity	Rate (Lakh Rs.)	Cost (Lakhs Rs)
DATA				
Road Length	Km	629		
Length of available Pucca Drain	Km	192		
Drain Length per Km of Road		1.25		
Total Drain Length	Km	786		
Balance Drain to be executed	Km	594		
Target for coverage		100%		
INFRASTRUCTURE				
Main Drain (Km) 10%	Km	89	60.00	5,348.25
Secondary Drain (Km) 30%	Km	208	27.00	5,615.66
Tertiary drains (Km) 50%	Km	297	8.50	2,525.56
			Sub Total Rs.	**13,489.48**
Repair of existing drains	Km	142	3.00	426.00
			Total	13,915.48
			SAY	**13,920.00**

Rs. 139.20 Crores

8.0 IEC & Capacity Building

8.1 Stakeholders



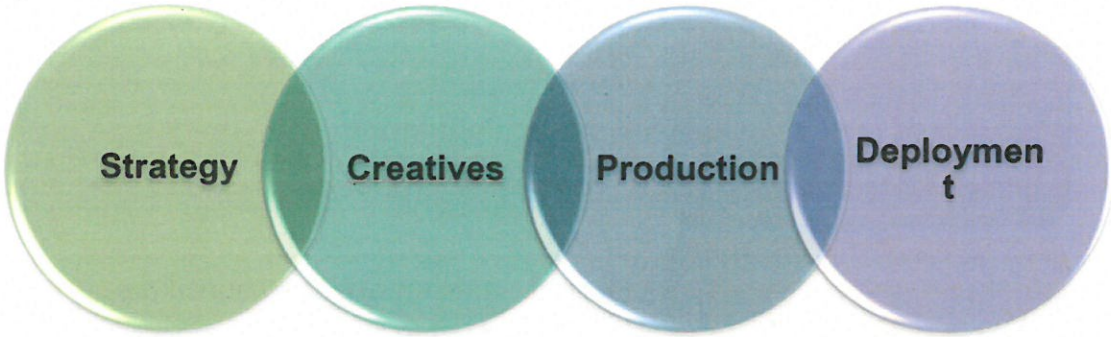
8.2 Approach

- Generating awareness about sanitation
- Promoting sanitation linking with personal health
- Use a range of media vehicles and messages
- Target external, internal and intermediary stakeholders
- Underpin high level commitment of government
- Backed by robust enforcement mechanism
- Periodic review for effective implementation of stratgey

8.3 Message

- Better city sanitation means better personal health
- Improved sanitation means healthier and happy family
- Access to facilities for better sanitation is easy i.e clear signage; there is a toilet around the corner
- It costs next to nothing to adopt better sanitation practices
- Benefits far outweigh user fees
- Cost of non compliance is high

8.4 Implementation components & Phasing



- Design Phase *6 months*
  - Approval of strategy
  - Baseline survey
  - Agreement on outputs
  - Draft ToR
  - Selection of Implementers
- Implementation Phase 4 Years
  - Roll out of campaign
  - Production of output
  - Deployment & dissemination
  - Monitoring & review
  - Mid course corrections
- Review Phase 4 months
  - Impact assessment survey
  - Next phase action plan
  - Case studies and documentation

8.5 Effective Mix & Media Planning

- Media relations
- Self sticking posters
- Print media advertisements
- Radio Spots
- Street play
- Direct Mailers
- Project meetings

8.6 Institutional Strengthening

- ULB shall be the obligated entity for ensuring clean sanitation
- Capacity building to ULB staff in the aspects of contract management needs to be enhanced
- The ULB needs to be trained on Service Level Benchmarking which supports measurement of the city sanitation health.
- Governance reforms shall have to be implemented in the city. All fixed assets and infrastructure needs to be owned by ULB
- Movable infrastructure/equipment shall be partially owned by ULB or provided by private sector
- Management and service provision shall have to be outsourced to private sector
- New infrastructure could be developed on Design, Build and Operate contracts
- Operational cost recovery to be ensured through direct and indirect user fee/tax regimes

8.7 Investment

Description	Cost in Lakhs Rs.
Strategy finalisation	5.00
Personal contact drive	30.00
Print advertisements	55.00
Radio spots	25.00
Posters and flyers	25.00
Events and workshops	47.00
Media relations	10.00
Street theatre	20.00
Audio visual for promotion in fairs	10.00
Flex boards and hoardings	40.00
Supervision	36.00
Documentation and surveys	15.00
Creatives	5.00
Training & Capacity Building	27.00
Total	**350.00**

Capital Cost Summary

Description	Amount in Lakh Rs.
Waste Water Management	24,100.00
Solid Waste Management	2,870.60
Storm Water Drainage	13,920.00
IEC & Capacity Building	350.00
Total	**41,240.60**

Rupees 412.41 Crores

Annexure 1 - City Level Committee

Phone : 2500240
2500388
Fax : 0661- 2500240

ROURKELA MUNICIPALITY
ROURKELA - 769012

No. 611 Date 28.01.11

OFFICE ORDER

Pursuant to Government of Orissa in Housing & Urban Development Department letter No. 23443 dated 28.10.2010 Rourkela Municipal Council has resolved in its meeting held on 12.1.2011 to constitute the **CITY LEVEL CITY SANITATION PLAN (CSP) IMPLEMENTATION COMMITTEE** headed by Chairperson, Rourkela Municipality comprising of the following members.

1.	Chairperson, Rourkela Municipality	...	Chairman
2.	Vice Chairman,Rourkela Municipality & Chairman Sanitation Committee	...	Member
3.	Health Officer, Rourkela Municipality	...	Member
4.	Municipal Engineer/Asst.Engineer, Rourkela Municipality	...	Member
5.	Project Officer, Rourkela Municipality	...	Member
6.	Executive Engineer, PHED, Panposh,Rourkela.		Member
7.	Planning Member, RDA, Rourkela	..	Member
8.	Regional Officer,Orissa State Pollution Control Board, Rourkela	...	Member
9.	CMO, Rourkela Govt. Hospital, Rourkela	...	Member
10.	Area Manager, SE Railway, Rourkela	...	Member
11.	G.M., Town Services, SAIL, Rourkela Steel Plant.		Member
12.	Executive Officer, Rourkela Municipality	...	Member Convenor

By Order of Chairperson

Executive Officer 27.01.11
Rourkela Municipality &
Member Convenor,City Level CSP
Implementation Committee

Annexure 2 - 1st Consultation

1st Consultation held on 6th May 2011

Rourkela Municipality.

Members Present in the 1st C.S.P Implementation Committee meeting 05.2.2011 Council Hall of Rourkela Municipality.

Sl.no.	Name	Designation	Signature	Cell no Email ID no
1		Chairperson		9437304748
2		Vice-Chairman		9437047957
3		Health Officer.		
4		Municipal Engineer	5.2.2011	9437358973.
5		Asst. Engineer.	05.02.11	9437047822
6		Depot. Officer.	5.2.11	9861047621
7		S.E, PHED RKL		(AE PH) 9437301258
8		PM, RDA, RKL		9437 60475
9	Dr. Arup Kumar Mallick AMS	RO, SPCB, RKL.		9437066727
9		CMO, RGH.		9437196805
10		A.M, SE, Rly. RKL	Manager Des.	9777582945
11		G.M, Town Service CSR RSP, (SAIL)		8895580606
12		Executive officer & Member Convener (CSP)	05.02.2011.	9437146811
13		Councillor		9439441594
14		Councillor		9861164402.
15.		D.M & D.C. RKL		8895493350

Sno.	Name	Designation	Signature	Cell no. / Email ID no.
15		Councillor		9437294411
16		Councillor	R K Dash - WN-4	9437038240
17		Councillor		9437309940
18		Councillor		9437196858
19		Councillor		9777402223
20		Councillor	5.2.2011	9938850287
21		Councillor	5/2/2011	9178137609
22		Councillor	5.2.11	9437874131
23		Councillor		9437965579
24		Councillor		9937424001
25		Councillor		9640356168
26		Councillor		Councillor 9861158760

Sl.no.	Name	Designation	Signature	Cell no. Email ID's.
27		Councillor Ward No: 33		9337404196
28		Councillor, W-26		
29		Councillor, W-01		
30		Councillor, W-25		
31		Councillor, W-24		Maya Tiwari 9777222263
32		Councillor, W-27		9735646265
33		Junior Engineer		9473722181
34		Councillor, Ward No. 09		9937585122
35				
36		Prajapati Das		

Annexure 3 - Data Collection & Consultation

Household survey for Data collection

Focused Group Discussion

Annexure 4 - Survey Question Questionnaire

INFORMATION SHEET

Date of Survey		Name of Surveyor	

1 **GENERAL**

Ward No		Plot No.		Type	Govt. / Pvt.	Area	
Holding No.		Name				Street	
No of floors		Structure	1)Kucha / 2)Pucca / 3)RCC			No. of families in the plot	

2 **PERSONAL**

Family size		Employment	1) Govt	2) Private	3) Self	4) Retired	5) Labour
Years of stay		Income/month			Economic Status		BPL/MIG/HIG
Ownership (own / Rent)		Expenditure			Education Status		
Monthly Expenditure	Electricity		Cable TV		Mobile Phone		

3 **WATER SUPPLY**

a	Source of water	1) PHD-Pipe	2)Open Well	3)Bore well	4)Public Tap	5)Hand Pump	6)Tanker
b	Storage Type	1) Sump	2) OH tank	3) Bucket	4) No storage		
c	Water sufficiency	Yes / No		If PHD supply, Avg. monthly Bill			
				Do you have latrine in your House		Yes / No	

4 **SEWERAGE**

a If you have latrines in your house

i	Total no of Latrines		a) Flushing Type		b) Non Flushing type	
ii	Where is the waste water disposed		1)Septic Tank	2)Soak pit	3)Drain	4)Open field	5)Sewer line
	Willingness to get connected to sewerage line		Yes / No	Willingness to pay user fee			Yes / No
b	If you do not have latrines in your house						
i	Where do you defecate		1)Open Field	2)Road side	3)Drain	4)Public toilet	
ii	Why individual latrine not constructed		1)Space	2)Funds	3)Others		
iii	Is there public toilet nearby		Yes / No	Are These maintained properly			Yes / No
c	Where is the Kitchen water disposed		1)Drain	2)Open Field	3)Road side	4)Soak pit	5)Sewer line

i	How much are you willing to pay for use of community toilet		Rs./month	
ii	Are you willing to contribute for new latrine	Yes / No		

5 **Solid Waste**

a	Do you have Door to Door collection	Yes / No	If Yes, frequency of collection per week			
	If No, Where do you dispose your waste	1)Road side	2) SW Bin	3)Open field	4)Drain	
b	Is the municipal bin within access	Yes / No				
c	Frequency of garbage collection(per week)		Frequency of street sweeping			
d	Is there frequent foul smell due to garbage	Yes / No	Is the complaint attended within a day			Yes / No
	Is there a user fee	Yes / No	If yes, how much (Rs./ month)			

6 **Drainage**

Is there a drain available in front of House	Yes / No	Type of drain	1)Pucca	2)Kucha
Does the water drain properly during rain	Yes / No	If No, how many hrs of water-logging		
Frequency of drain cleaning (per week)				

Annexure 5 - Ward-wise Observations

Ward No	Major Observations
1	• Ward 1 constitute of two old revenue villages, named as Pradhanpalli and Chend • In this ward maximum number of slums (mostly unauthorized) • Land belongs to Railway Deptt, railway line passes through the ward. • Well spaced between the houses • No drainage and sewerage system in the ward • Solid waste collection is more organized • Maximum BPL households • In few areas water supply through pipeline but most of the areas people are using well water for drinking purpose • All the main roads are Pacca and lane and bi-lanes are Murom • Most of the drains are broken and maximum area water logging • Most of the slum HH do not have toilet • More dustbin required for waste collection
2	• 90% HHs have toilet provision • In this ward maximum business community people leaving • All the main roads, lanes and bi-lanes are Pacca • Land used for commercial purpose • Very rich people are leaving • Only one slum in the ward • No sewerage and drainage system • Well spaced between the houses • Solid waste collection is more organized • Drinking water is a problem in this ward • More dustbin required for waste collection
3	• Houses are well spaced in non slum area • In this ward maximum number of slums (mostly unauthorized) • No drainage and sewerage system in the ward • No door to door Solid Waste collection practice • No pipe water supply in the ward but most of the areas people are using tube well water for drinking purpose • All the main roads are Pacca and lane and bi-lanes are Murom • Most of the drains are broken and maximum area water logging • Most of the slum HH do not have toilet • Economically people of this ward are very poor • Only Deogaon village is good in water supply and sanitation • More dustbin required for waste collection
4	• Houses are well spaced • In this ward maximum number of slums (mostly unauthorized)

Ward No	Major Observations
	• No drainage and sewerage system in the ward • No door to door Solid Waste collection • Pipe water supply to each nock and corners of the ward • All the roads are Pacca • Most of the drains are broken and maximum area water logging • Economically people of this ward are very rich • More dustbin required for waste collection
5	• No drainage and sewerage system in the ward • No door to door Solid Waste collection • Pipe water supply to each nock and corners of the ward • All the roads are Pacca • 50% HHs have toilet facility • Most of the drains are broken and maximum area water logging • Economically people of this ward are very poor • More dustbin required for waste collection
6	• This is basically industrial belt area • Houses are well spaced • No drainage and sewerage system in the ward • Door to door Solid Waste collection is practiced by Municipality • No one is defecating outside • Pipe water supply to each nock and corners of the ward • All the roads are Pacca • Economically people of this ward are very rich • Community Latrine is required in slum area • Drinking water crisis in the ward • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly • Educational institutions like ITI, UGI, BPUT University, and NCC campus are located
7	• People are economically rich • Houses are well spaced in non slum area • No drainage and sewerage system in the ward • Very less number of slums in the ward • Regular water supply is practiced in the ward • No door to door Solid Waste collection practice • All the main roads are Pacca • One private pond in the ward –it is managed by DAV public School management • Railway land occupied by Slum people • Only one slum in the ward –Ambedkar Slum (water supply and drainage facility in this slum)

Ward No	Major Observations
	• In slum , open defecating in railway line; HH do not have toilet • Dustbin is available in the ward but no one is using- need awareness camp for using the garbage bin
8	• People are economically not much well up • Houses are well spaced in non slum area • No drainage and sewerage system in the ward • Maximum area is water logging • Regular water supply is practiced in the ward • No door to door Solid Waste collection practice • All the main roads are Pacca • Drinking water crisis in the ward • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly
9	• People are economically not much well up • Houses are well spaced in non slum area • No drainage and sewerage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the main roads are Pacca • Drinking water crisis in the ward • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly • Community Latrine required • More Dustbin required and also awareness to use dustbin
10	• People are economically not much well up • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the main roads are Pacca • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly • Community Latrine required • More Dustbin required and also awareness to use dustbin
11	• People are economically not much well up • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice

Ward No	Major Observations
	• Basically residentially area • All the main roads are Pacca • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly • Community Latrine required • More Dustbin required and also awareness to use dustbin
12	• People are economically not much well up • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the main roads are Pacca • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly • Community Latrine required • More Dustbin required and also awareness to use dustbin • Maximum slums are located near the slum
13	• People are economically not much well up • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the main roads are Pacca • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly • Community Latrine required • More Dustbin required and also awareness to use dustbin
14	• People are economically rich • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the main roads are Pacca • This ward is basically residentially cum commercially area • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly • Community Latrine required • More Dustbin required and also awareness to use dustbin

Ward No	Major Observations
	• Bus stand and rail station is located in this area
15	• People are economically rich • Houses are closely spaced in non slum area • No sewerage system in the ward • Maximum area covered by slum dwellers • All the main roads are Pacca • This ward is basically residentially cum commercially area • All the drains are not connected properly • Community Latrine required • More Dustbin required and also awareness to use dustbin
16	• Maximum area covered by slum dwellers • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage system in the ward • No door to door Solid Waste collection practice • All the main roads are Pacca • This ward is basically residentially cum commercially area
17	• People are economically rich • No sewerage and drainage system in the ward • Maximum area covered by govt officials • Door to door Solid Waste collection is practiced • All the roads are Pacca • It well planned, neat and clean ward
18	• People are economically rich • Houses are closely spaced in non slum area • No sewerage and drainage system in the ward • Maximum area covered by govt officials • Door to door Solid Waste collection is practiced • All the roads are Pacca • It well planned, neat and clean ward
19	• Maximum area covered by slum dwellers • People are economically poor • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage system in the ward • No door to door Solid Waste collection practice • All the main roads are Pacca
20	• Maximum area covered by slum dwellers • People are economically rich • Houses are closely spaced in non slum area • Most of the drains are narrow

Ward No	Major Observations
	• No sewerage system in the ward • Drinking water is a problem in this ward • No door to door Solid Waste collection practice • All the main roads are Pacca • This ward is basically residentially cum commercially area • All the drains are not connected properly • Community Latrine required • More Dustbin required and also awareness to use dustbin • Bus stand and rail station is located in this area
21	• People are economically rich • Houses are closely spaced in non slum area • No sewerage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the main roads are Pacca • This ward is basically residentially cum commercially area • Maximum business community people stay
22	• People are economically rich • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the main roads are Pacca • This ward is basically residentially cum commercially area • Drain cleaning is required and awareness not to jam the drain
23	• People are economically rich • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage and drainage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the roads are Pacca • This ward is basically residentially cum commercially area • All the drains are not connected properly • 70% slum people open defecate
24	• Maximum area covered by slum dwellers • People are economically rich • Houses are closely spaced in non slum area • Most of the drains are narrow • No sewerage system in the ward

Ward No	Major Observations
	• No door to door Solid Waste collection practice • All the main roads are Pacca • This ward is basically residentially cum commercially area • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly • More Dustbin required and also awareness to use dustbin
25	• People are not economically well up • Houses are closely spaced in non slum area • No sewerage and drainage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the main roads are morum
26	• People are economically rich • Maximum area covered by official quarters • All the slums are unauthorized • No sewerage system in the ward • No door to door Solid Waste collection practice • All the main roads are Pacca • Maximum area covered by railway department • This ward is basically residentially cum commercially area • Drain cleaning is required and awareness not to jam the drain • All the drains are not connected properly • Community Latrine required • More Dustbin required and also awareness to use dustbin • Bus stand and rail station is located in this area
27	• People are economically rich • Houses are well spaced in non slum area • Most of the drains are pacca and open • No sewerage system in the ward • Maximum area covered by official quarters • No door to door Solid Waste collection practice • All the main roads are Pacca
28	• People are economically rich • Houses are well spaced in non slum area • sewerage and drainage system in the ward • Door to door Solid Waste collection is practiced • All the roads are Pacca • This ward is basically residentially area and well planned • Drain cleaning is required and awareness not to jam the drain • All the drains are connected properly • Municipality market and hospital is located in the ward

Ward No	Major Observations
29	• People are economically rich • Houses are well spaced in non slum area • sewerage and drainage system in the ward • Door to door Solid Waste collection is practiced • All the roads are Pacca • This ward is basically residentially area and well planned • Drain cleaning is required and awareness not to jam the drain • All the drains are connected properly • Municipality market and hospital is located in the ward
30	• Houses are closely spaced in non slum area • No sewerage and drainage system in the ward • Maximum area covered by slum dwellers • No door to door Solid Waste collection practice • All the main roads are Pacca • In slums all the HH have toilets • This ward is basically residentially area
31	• People are economically rich • Drainage system is available • No sewerage system in the ward • No door to door Solid Waste collection practice • All the main roads are Pacca • This ward is basically residentially area • All the drains are not connected properly • Wide and neat clean road is available
32	• People are economically rich • Most of the drains are narrow • No sewerage system in the ward • No door to door Solid Waste collection practice • All the main roads are Pacca • This ward is basically residentially area
33	• Newly developed ward • Maximum open space • People are economically rich • Wide road and drainage facility • No sewerage system in the ward • No door to door Solid Waste collection practice • All the main roads are Pacca

Annexure 6 - Abstract of Survey Result

Primary Survey Result for Rourkela City			
Sl. No.	**Description**	**Slum %**	**Non-slum %**
	Total Household		
	Survey of House Hold		
1	**Structure**		
a)	Kucha	25	4
b)	Pucca	68	37
c)	RCC	7	60
2	**Employment**		
a)	Govt	6	34
b)	Private	44	32
c)	Self	26	22
d)	Retired	2	4
e)	Labour	22	8
3	**Source of Water**		
a)	PHD Pipe	9	56
b)	Open well	12	3
c)	Bore well	3	14
d)	Public Tap	31	17
e)	Tube well	41	8
f)	Tanker	0	0
g)	Vendor	3	2
4	**Storage Type**		
a)	Sump	0	1
b)	OH Tank	0	1
c)	Bucket	97	42
d)	No Storage		0
5	**Water Sufficiency**		
a)	Yes	59	83
b)	No	41	17
6	**Individual Toilet in house**		
a)	Yes	47	87
b)	No	53	13
7	**Access to Toilet**		
a)	Connected to Temp Pit	34	21
b)	Connected to Soak Pit	18	59
c)	Connected to Drain	16	13
d)	Shared/ Community Toilet	8	
e)	Open Defecation	25	1

Primary Survey Result for Rourkela City			
Sl. No.	**Description**	**Slum %**	**Non-slum %**
f)	Sewer Line		5
8	**Acceptability of sewer network**		
a)	Yes	55	33
b)	No	45	67
9	**Open defecation Location**		
a)	Drain		
b)	Open Field	76	91
c)	Road side	3	3
d)	Public Toilet	21	6
10	**Kitchen water disposal**		
a)	Drain	55	65
b)	Open Field	37	19
c)	Road side	5	9
d)	Soak Pit	2	3
e)	Sewer Line	1	5
11	**Regular DTD Collection**		
a)	Yes	16	37
b)	No	84	63
12	**Access to SW Bin**		
a)	Yes	63	54
b)	No	37	46
13	**Solid Waste Disposal Point**		
a)	SW Bin		
b)	Road Side		
c)	Open Field		
d)	Drain		
14	**Drainage Facility**		
a)	Yes	58	81
b)	No	42	19
15	**Type of Drain**		
a)	Pucca	90	98
b)	Kucha	10	2
16	**Proper Drainage**		
a)	Yes	72	64
b)	No	28	36
17	**Domestic Animal**		
a)	Yes	8	5
b)	No	92	95

Annexure 7 - Focus Group Discussions (Councilors)

1. **Basic Information:**

- ☐ 1.1 Municipality Name: Rourkela Municipal
- ☐ 1.2 Place of Discussion : Vice Person Office Chamber
- ☐ 1.3 Starting Time : 11.30 AM
- ☐ 1.4 Ending Time : 01.00 PM
- ☐ 1.5 No. of Male Participants: 1
- ☐ 1.6 No of Female Participants: 3

Name of the Interviewers	Ranjan Kumar Mallick
Name of the Coordinator	Santosh Chakra and Shukla Babu

2. **List Participants in FGD**

Sl No	Name of the Participants	Designation	Signature of the Participants
1	Mrs Rasmibala Mishra	Chairperson	
2	Mrs Smita Nayak	Councilor	
3	Mrs Pramila Soni	Councilor	
4	Mr Rajendra Parichha	Councilor	
5	Rajendra Naran Mishra	Councilor	
6	Brijesh Mahato	Councilor	

3. **Basic infrastructure (MUNICPALITY)**

Items	Total No	Working/Defunct (Remarks)
Street light	5647	50
Public Stand Posts	431	10
Wells	575	50
Hand Pumps	1132	1100
Tube Wells	250	10
Pond	10	-
School	-	-
Community Toilet	6	1

Items	Total No	Working/Defunct (Remarks)
Public Toilet	90	5
Health Centre	21	-
Dusbin	NA	-

4. **Access to basic amenities:**

- Condition of Road :- Manageable
- Condition of Drain:- 100% bad and worst
- Solid Waste Management facilities:- 100% bad
- Access of Sanitation:- Mangle
- Access to health care:-poor
- Hygiene practices:- poor
- Access to safe drinking water-: Manageable
- Land tenure /Lease status:- Patta and unauthorized land
- Source of information:-Rourkela Municipal

5. **QUESTIONS**

1. HOW DO YOU FEEL ABOUT THE BASIC SERVICES IN YOUR MUNICIPALITY? (QUANTITY, QUALITY, CONNECTIVITY)

   Basic amenity condition is very poor.

   a. WATER:

   Water supply is under served in the municipal but can be improved. Also no purification and linkage of water due to old pipe immediate attention may be given on improvement in water supply and water quality.

   b. SEWERAGE:

   Except Koel Nagar no Sewerage line is available in the municipal.

   c. SOLID WASTE:

   - Solid waste situation is very worst because no door to door collection practice is the municipal. Out of 33 wards, 9 wards have been privatized and other wards are cleaning by municipal staff,
   - Rest of the wards need immediate privatization, so that proper collection of waste and timely disposed will be taken place.

d. DRAINAGE:

- In most of the areas drains are not available, where drains are available, that is broken condition
- All the drains are not connected to main drain, for that water logging is a major problem in the municipal
- Poor engineering work for construction drainage
- In most of the drain areas houses and temples are built

2. HOW CAN THE WATER SUPPLY SERVICE BE IMPROVED?

For improvement of water supply system in the municipal, following steps are needed

- Two source points for Rourkela Municipal ; Koel and Bramani Embankment in river
- Supply water to industry needs to be controlled
- Proper maintenance of pipe and stop pilferage

3. DO YOU THINK COMMUNITY TOILET IS FEASIBILE IN YOUR CITY, THEN WHICH ARE THE AREAS?

- Land is a problem for community Toilet construction.
- Also encroachment
- Community toilet is required in wards 26, 13, 9, 10, 11, 12, 19, 20, 1, & 2

4. DO YOU NEED SEWERAGE TREATMENT PLAT IN YOUR CITY. IF YES, WHERE IT SHOULD BE LOCATED?

Yes we need the sewerage treatment plant. This sewerage treatment plant should be constructed in strategic points of the municipal area.

5. HOW TO SLOVE THE PROBLEM OF OPEN DEFECATION IN YOUR CITY? SUGGEST SOME MEASURES?

To solve the open defecation problem, at first to

- Community toilet
- Create awareness program for use of toilets
- IEC activity in ward level

6. ARE YOU SATISFIED WITH THE MANAGEMENT OF SOLID WASTE? HOW CAN IT BE IMPROVED FURTHER?

   - Poor solid waste management in the municipal because lack of specific dumping yard and shortage of man power
   - More vehicle is required for waste transformation
   - Also need treatment plant and large dustbins

7. HOW TO KEEP THE WATER BODIES / PONDS AND ITS SORROUNDINGS CLEAN?

   - Public awareness
   - Bush cutting
   - Stone fencing
   - Gardening and plantation

8. IS THERE ADEQUATE DRAIN NETWORK AVAILABLE IN YOUR CITY? IF NO, HOW TO SLOVE THE DRAINAGE PROBLEM IN YOUR CITY?

   - Drain network is not available in the municipal except Koel Nagar
   - All the drains needs to be connected to each other, so that proper excess water will the drain properly during rainy season

9. WHICH ARE THE AREAS (WARD) WHERE WATER LOGGING PROBLEM IS ACUTE?

   More or less water logging is problem in Rourkela Municipal but the ward having acute water logging problems are- 5,13, 12, 3, 15, 22, 4, 2, 33, 8, 14, 27 & 24.

10. WHAT ARE THE MAJOR PROBLEMS IN YOUR CITY (RELATED TO WATER AND SANITATION)?

    - First sufficient drinking water is not available and Sanitation condition is very poor.

11. HOW YOU ARE PLANNING TO SLOVE THE ABOVE MENTIOED PROBLEMS?

    - Through City Sanitation Plan above mentioned problem can be solved by intervention of the Government

12. WHICH ARE THE COMMUNITY ORGANISATIONS, ACTIVE IN YOUR MUNICIPALITY?

- Not a single CBO is active in Rourkela Municipality.

13. HOW MUCH DO YOU SPEND ON THE FOLLOWING IN A MONTH?

a. Cable TV: Rs. 150.00
b. Mobile Phone : Rs. 500.00
c. Hospital and medical expenses: Rs. 500
d. Water Supply – To Municipality and Own expenses: to PHD

14. ARE YOU WILLING TO PAY USER FEE TO GET BETTER SERVICE, A BETTER LIVING CONDITION AND CLEAN CITY? IF NO, WHY?

- Poor people cannot pay the user fee and minimum amount for all the people.

Annexure 8 - Focus Group Discussions (Officers)

1. **Basic Information:**

- ☐ 1.1 Municipality Name: Rourkela Municipal
- ☐ 1.2 Place of Discussion : Chairperson Chamber
- ☐ 1.3 Starting Time : 03.00 PM
- ☐ 1.4 Ending Time : 04.00 PM
- ☐ 1.5 No. of Male Participants: 10
- ☐ 1.6 No of Female Participants: 0

Name of the Interviewers	Ranjan Kumar Mallick
Name of the Coordinator	Santosh Chakra and Sukla babu

2. **List Participants in FGD**

Sl No	Name of the Participants	Designation	Signature of the Participants
1	Bijay Kumar Swain	Executive Officer	
2	Manoranjan Dash	City Engineer	
3	Dr Hardip Singh	Health Officer	
4	Dr P.K Nayak	Planning Officer	
5	Suresh Chandra Jena	Sanitary Inspector	
6	Purna Chandra Nayak	Sanitary Inspector	
7	B.K.Padhi	Sanitary Inspector	
8	K.P.Biswakamal	Sanitary Inspector	
9	Sisir Sahoo	Sanitary Inspector	
10	B.K swain	Sanitary Inspector	

3. **Basic infrastructure (MUNICPALITY)**

Items	Total No	Working/Defunct (Remarks)
Street light	5647	50
Public Stand Posts	431	10
Wells	575	50

Items	Total No	Working/Defunct (Remarks)
Hand Pumps	1132	1100
Tube Wells	250	10
Pond	10	-
School	-	-
Community Toilet	6	1
Public Toilet	90	5
Health Centre	21	-

4. Access to basic amenities:

- Condition of Road :- Manageable
- Condition of Drain:- 100% bad and worst
- Solid Waste Management facilities:- 100% bad
- Access of Sanitation:- Mangle
- Access to health care:-poor
- Hygiene practices:- poor
- Access to safe drinking water-: Manageable
- Land tenure /Lease status:- Patta and unauthorized land
- Source of information:-Rourkela Municipal

5. QUESTIONS

1. HOW DO YOU FEEL ABOUT THE BASIC SERVICES IN YOUR MUNICIPALITY? (QUANTITY, QUALITY, CONNECTIVITY)

   Basic amenity condition is very poor.

   a. WATER:

      - Water supply is manageable but water shortage in few pockets of the municipal. Also no purification and linkage of water due to old pipe immediate attention may be given on improvement in water supply and water quality.

   b. SEWERAGE:

      - Except Koel Nagar no Sewerage line is available in the municipal.

c. SOLID WASTE:

- Solid waste situation is very worst because no door to door collection practice is the municipal. Out of 33 wards, 9 wards have been privatized and other wards are cleaning by municipal staff,
- Rest of the wards need immediate privatization, so that proper collection of waste and timely disposed will be taken place.

d. DRAINAGE:

- In most of the areas drains are not available, where drains are available, that is broken condition
- All the drains are not connected to main drain, for that water logging is a major problem in the municipal
- Poor engineering work for construction drainage
- In most of the drain areas houses and temples are built

2. HOW CAN THE WATER SUPPLY SERVICE BE IMPROVED?

For improvement of water supply system in the municipal, following steps are needed

- Embankment in river
- PHD to purify the water from source
- Proper planning and coordination between SMC and PHD is highly important
- Proper maintenance of pipe and stop pilferage

3. DO YOU THINK COMMUNITY TOILET IS FEASIBILE IN YOUR CITY, THEN WHICH ARE THE AREAS?

- Not community toilet is not feasible in the city because of non availability of space

4. DO YOU NEED SEWERAGE TREATMENT PLAN IN YOUR CITY. IF YES, WHERE IT SHOULD BE LOCATED?

Yes we need the sewerage treatment plant. This sewerage treatment plant should be constructed in strategic points of the municipal area.

5. HOW TO SLOVE THE PROBLEM OF OPEN DEFECATION IN YOUR CITY? SUGGEST SOME MEASURES?

To solve the open defecation problem, at first to

- Create awareness program for use of toilets
- Construction of individual households
- Community Toilet

6. ARE YOU SATISFIED WITH THE MANAGEMENT OF SOLID WASTE? HOW CAN IT BE IMPROVED FURTHER?

- Poor solid waste management in the municipal because lack of specific dumping yard and shortage of man power
- More vehicle is required for waste transformation
- Also need treatment plant and large dustbins

7. HOW TO KEEP THE WATER BODIES / PONDS AND ITS SORROUNDINGS CLEAN?

  - Public awareness
  - Bush cutting
  - Stone fencing
  - Gardening and plantation

8. IS THERE ADEQUATE DRAIN NETWORK AVAILABLE IN YOUR CITY? IF NO, HOW TO SLOVE THE DRAINAGE PROBLEM IN YOUR CITY?

  - Drain network is not available in the municipal except Koel Nagar
  - All the drains needs to be connected to each other, so that proper excess water will the drain properly during rainy season

9. WHICH ARE THE AREAS (WARD) WHERE WATER LOGGING PROBLEM IS ACUTE?

  - More or less water logging is problem in Rourkela Municipal but the ward having acute water logging problems are- 5,13, 4, 2, 33, 8, 14, 27 & 24.

10. WHAT ARE THE MAJOR PROBLEMS IN YOUR CITY (RELATED TO WATER AND SANITATION)?

  - First sufficient drinking water is not available and Sanitation condition is very poor.

11. HOW YOU ARE PLANNING TO SLOVE THE ABOVE MENTIOED PROBLEMS?

  - Through City Sanitation Plan above mentioned problem can be solved by intervention of the Government

12. WHICH ARE THE COMMUNITY ORGANISATIONS, ACTIVE IN YOUR MUNICIPALITY?

  - Not a single CBO is active in Rourkela Municipality.

13. HOW MUCH DO YOU SPEND ON THE FOLLOWING IN A MONTH?
    a. Cable TV: Rs. 150.00
    b. Mobile Phone : Rs. 500.00
    c. Hospital and medical expenses: Rs. 500
    d. Water Supply – To Municipality and Own expenses: to PHD

14. ARE YOU WILLING TO PAY USER FEE TO GET BETTER SERVICE, A BETTER LIVING CONDITION AND CLEAN CITY? IF NO, WHY?
    - Poor people cannot pay the user fee and minimum amount for all the people.

Annexure 9 - Slum Status

Ward No.	Slum Name	Map Ref. No.	Authorized / Unauthorized	Population	No. of House Holds	No. of BPL family	No. of HHs with toilet	No. of HHs without toilet	No. of community / Public toilet ward wise	No. of Beneficiary under IHSDP
1	Pradhan Palli	1	A	631	137	122	110	27		
	Bandha Posh	2	A	831	174	125	139	35		71
	Tisco Area	3	A	571	127	50	102	25		
	Kissan Tolla	4	A	1446	315	234	252	63		79
	Chhend Basti	5	A	960	221	178	179	42		55
	Khadia Tolli	6	A	376	87	51	70	17		
	Bankia Basti	7	A	439	99	27	80	19		
	Tulsitolla	8	A	550	147	54	119	28		
	KhadiaTolli & Pradhanpalli	9	UA	310	72		59	13		
	Kalingavihar PH-II	10	UA	576	140		113	27		
2	Banglatoli	11	A	1471	355	130	280	75		
	Panposh Basti	12	A	1355	313	227	249	64		
	Tangritolli	13	A	753	174	45	120	54		
3	Deogaon	14	UA	4513	928	1025	732	196		
	Balughat	15	UA	1480	386	283	262	124		
	Rupatola	16	UA	2817	500	370	390	110		
4	Mani colony	17	UA	736	163	364	98	65	1	
	Mantola	18	UA	283	59		35	24		
	Shaktinagar/ Panitanki	19	UA	212	47	71	31	16		
	Gadhatola	20	UA	280	70	90	46	24		

Ward No.	Slum Name	Map Ref. No.	Authorized / Unauthorized	Population	No. of House Holds	No. of BPL family	No. of HHs with toilet	No. of HHs without toilet	No. of community / Public toilet ward wise	No. of Beneficiary under IHSDP
5	Gangadhar Palli	21	UA	1878	445	453	352	93		
	Rajiv Basti	22	UA	372	93	108	61	32		
	Gajapati palli	23	UA	348	84	99	59	25		
	Brundaban Complex	24	UA	364	89	57	68	21		
	Khariabahal	25	UA	1283	298	160	218	80		57
6	ITI Shantinagar	26	UA	1049	261	88	209	52		
	Netajinagar	27	UA	645	162	117	126	36		
	Byasanagar	28	UA	390	126	91	91	35		
	Pakistan colony	29	UA	479	108	106	73	35		
	FCI colony	30	UA	773	224	50	175	49		
	Lobour Tenament	31	UA	1118	301	13	205	96		
	Jail Road	32	UA	649	139	74	81	58		
	Kesharinagar	33	UA	394	107	233	80	27		
	Trinathnagar	34	UA	510	127	32	84	43		
7	Ambedkarnagar- Basanti	35	UA	2338	578	194	364	214		
	Durgapur DAV Jhumpudi	36	UA	444	104	80	82	22		
	DAV- Akhandalamani colony	37	UA	657	164	350	108	56		
	Basanti Colony	38	UA	547	153		117	36		
	Haripur Basti	39	UA	1434	372	290	290	82		
	Kusthashrama Basti	40	UA	615	165	85	129	36		
8	Rly Gate - Basanti	41	UA	517	160	293	120	40		

Ward No.	Slum Name	Map Ref. No.	Authorized / Unauthorized	Population	No. of House Holds	No. of BPL family	No. of HHs with toilet	No. of HHs without toilet	No. of community / Public toilet ward wise	No. of Beneficiary under IHSDP
9	Malgodam Road	42	UA	4143	922	15	636	286		
	Malgodam- Durgapur	43	UA	917	205	262	158	47		
	Malgodam Goods Side	44	UA	577	139		99	40		
	Nehru palli	45	UA	529	133		105	28		
	Malgodam- Durgapur Basti	46	UA	566	124	99	86	38		
	Malgodam Road	47	UA	919	206	624	163	43		
10	Kumbhar Para-Malgodam	48	UA	623	160	255	103	57		
	M S Palli	49	UA	605	135	7	101	34		
	Malgodam Jhumpudi	50	UA	3378	874	220	577	297		
11	M S Palli (A)	51	UA	2126	470	393	257	213		
	M S Palli (B)	52	UA	1355	330	421	264	66		
	M S Palli ©	53	UA	562	144	83	107	37		
	Water Filter House	54	UA	1313	394	185	299	95		
12	Indira nagar- I	55	UA	531	131	159	105	26		
	Indira nagar- II	56	UA	412	90	145	72	18		
	Rly Colony - I	57	UA	683	155	139	109	46		
	Rly Colony - II	58	UA	583	140	231	84	56		
13	Timbar Colony- I	59	UA	4583	134	53	75	59		
	Timbar Colony- II	60	UA	1224	263	312	194	69		
	Bangali Basti	61	UA	618	115	329	79	36		
	Tintan basti	62	UA	2290	529	560	406	123		

Ward No.	Slum Name	Map Ref. No.	Authorized / Unauthorized	Population	No. of House Holds	No. of BPL family	No. of HHs with toilet	No. of HHs without toilet	No. of community / Public toilet ward wise	No. of Beneficiary under IHSDP
14	Old Station Road	63	UA	421	85	48	70	15	1	
	Bisra Road to Gandhi Road	64	UA	1049	272	467	207	65		
	Bihari Basti to Kela bagan PWD	65	UA	2003	427	135	335	92		
15	Lal building to Telugu para	66	UA	1018	218	38	152	66	1	
	Daily market	67	UA	1428	257	76	203	54		
	Old Out Station Road	68	UA	505	82	71	48	34		
16	Birja palli	69	UA	1701	418	330	275	143		
	Maa kalyani jhumpudi	70	UA	1037	230	295	174	56		
	Kumbhar Para	71	UA	1183	294	262	223	71		
17	Khariapara & Orampara Upper	72	UA	1523	369	322	322	47		
18	Orampara near National club-2	73	A	1727	423	204	320	103	1	
19	Plantsite & Janata Niwas Gali	74	UA	1756	338	220	222	116		
20	Plantsite Routpara	75	UA	1910	359	153	247	112		
	Sarala Market	76	UA	986	238	214	140	98		
	Glamour Gali	77	UA	1234	229	295	180	49		
21	Mit Basti Azad mahla to Mehru house	78	UA	1266	232	18	157	75		
	Islam Nagar	79	UA	2258	444	42	345	99		
22	Ganjam Basti (Mahul Palli)	80	UA	1587	293	250	191	102	1	

Ward No.	Slum Name	Map Ref. No.	Authorized / Unauthorized	Population	No. of House Holds	No. of BPL family	No. of HHs with toilet	No. of HHs without toilet	No. of community / Public toilet ward wise	No. of Beneficiary under IHSDP
	G T Lant to Traffic Gate	81	UA	281	57	107	41	16		
	Siv mandir to Delux Gate	82	UA	529	113	58	59	54		
23	Diesel chowk Jhumpudi to Sai Mandir Basti	83	UA	834	226	156	181	45		
	Barkani Basti	84	UA	356	109	124	80	29		
	E sect-2 Gandhi Nagar	85	UA	1064	241	43	192	49		
24	Bagda Basti	86	UA	1160	259	126	206	53		
	Chudi Basti	87	UA	1399	287	83	183	104		
	Nepali Basti	88	UA	2208	408	93	322	86		
	Sarada Palli	89	UA	921	210	103	164	46		
25	Adarshagram D cabin	90	UA	680	152	372	122	30		
	Gaula Khatal	91	UA	664	154	64	122	32		
	C Sect. Jhumpudi	92	UA	429	103	98	78	25		
26	Gundicha palli - I	93	UA	611	158	106	110	48		
	Gundicha palli - II	94	UA	378	109	187	81	28		
27	Sect A Jhumpudi	95	UA	291	64	228	49	15		
	Sect B Filter House	96	UA	406	90	12	67	23		
28	Koel Nagar A, E, & D Block	97	UA	297	125	93	83	42		
29	Koel Nagar B & C block	98	UA	555	63	58	47	16		
30	Shakti Nagar	99	UA	1597	367	223	281	86		
	kantajhar	100	UA	1332	369	181	208	161		
31	Giridharipara	101	UA	536	133	190	100	33		

Ward No.	Slum Name	Map Ref. No.	Authorized / Unauthorized	Population	No. of House Holds	No. of BPL family	No. of HHs with toilet	No. of HHs without toilet	No. of community / Public toilet ward wise	No. of Beneficiary under IHSDP
	Utkal Palli	102	UA	440	104	143	68	36		
	Bank colony Back side area	103	UA	665	143	194	93	50		
	Bhawanipur Basti	104	UA	754	177	458	100	77		
	Nayabazar Market	105	UA	690	181		136	45		
	Nanda para	106	UA	998	244	49	146	98		
32	Bagbudi Basti- A	107	UA	1074	222	19	169	53		
	Bagbudi Basti- B	108	UA	738	176	35	134	42		
	Bagbudi Basti- C	109	UA	611	118	17	86	32		
	Bagbudi Basti- D	110	UA	487	111	19	97	14		
	Kalyan Nagar	111	UA	395	95	30	83	12		
	Hariharr Basti	112	UA	382	92	61	79	13		
	Siva Basti Bagudi basti E	113	UA	488	109		87	22		
	TOTAL			**114,773**	**25,344**	**18,081**	**18,502**	**6,842**	**5**	**262**

Annexure 10 - Existing Sanitation Status

Ward No.	No. of Households	No. of Slum	No. of Individual Toilets	No. of Shared Toilets	No. of Community Toilet Seats	No. of Public Toilet seats	Sewer Line
1	1652	10	1452	55			
2	1249	3	1056	42			
3	3129	3	2647	105			
4	2407	5	2036	81		10	
5	2100	5	1833	70			
6	2500	9	2115	84			
7	1707	6	1444	57			
8	2600	1	2199	87			
9	2309	6	1953	77			
10	2580	3	2182	87			
11	1351	5	1143	45			
12	2241	4	1896	75			
13	3006	4	2543	101			
14	1680	3	1421	56		12	
15	1020	3	863	34		8	
16	1960	3	1658	66			
17	1091	1	923	37			
18	960	1	812	32		10	
19	1280	1	1083	43			
20	1615	3	1366	54			
21	983	2	931	33			
22	857	3	725	29		14	
23	1103	3	933	37			
24	1559	4	1319	52			
25	1153	3	975	39			
26	795	2	672	29			
27	1361	2	1151	46			
28	1600	1	1488	54			18
29	1463	1	1360	49			17
30	1504	2	1399	50			
31	2453	5	2075	82			
32	2606	7	2204	87			
33	3365		2897	113			
Total	**59,239**	**114**	**50,754**	**1,988**		**54**	**35**

Annexure 11 - Condition Assessment Survey of Community/ Public Toilet

Sl. No	Ward No.	Location	Total No. of Seats	Functional Seats	Default Seat	Fees (Rs.)		
						Bathing	Toilet	Both
Public Toilets								
1	4	Panposh Market Complex	10	10		2.00	3.00	5.00
2	14	New Bus stand	12	12		2.00	2.00	3.00
3	15	Daily Market	8	7	1		3.00	
4	18	Udit Nagar Market	10	10			4.00	
5	22	Traffic Gate	14	14			3.00	

Annexure 12 - Staff Position

Category of Post	Original Sanctioned Strength	Sanctioned abolished	Present Sanctioned	Staff in Position	Vacancy
General Establishment					
Tax Collector	10	1	9	7	2
Octroi Tax Sarkar	34	8	26	20	6
Octroi Tax Peon	46	10	36	31	5
Work Sarkar	7	2	5	3	2
Amin	1		1	1	
Chainman	1		1	1	
Lineman	3	1	2	2	
Lineman Helper	10		10	10	
Mason	1		1	1	
Mason Helper	4		4	4	
Tube well Mechanic	1		1	1	
Tube well Helper	7		7	7	
Market Care Taker	1		1	1	
Driver	3		3	2	1
Driver cum Mechanic	1		1	1	
Tempo Driver	1		1	1	
Road Roller Driver	1		1	1	
Arch. Asst.	1		1	1	
Transport Supervisor	1		1	1	
Town Bus Driver	9		9	7	2
Town Bus Conductor	9		9	8	1
Town Bus Helper	10	2	8	8	
Project Officer	1		1	1	
Mechanic Helper	1		1	1	
Demolition Worker	10	1	9	9	
Sr. Stenographer	3	2	1	1	
Peon	11		11	11	
Watchman	1		1	1	
Treasury Sarkar	1		1	1	
Mali	18		18	13	5
Library Attd.	2		2	2	
Medical Officer (Allopathic)	1		1	1	
Dresser	1		1	1	
Male Attd.	1		1	1	
Female Attd.	1		1	1	
Chowkidar	1		1	1	

Category of Post	Original Sanctioned Strength	Sanctioned abolished	Present Sanctioned	Staff in Position	Vacancy
Supervisor	1		1	1	
Scavenging					
Driver	3		3	3	
Truck Cleaner	1		1	1	
Super Zamadar	10		10	7	3
Sweeper	120		120	120	
Defunct NAC (ST)					
Tax collector	22	1	21	21	
Treasury Sarkar	1		1	1	
Fees Collector	10	2	8	8	
ATS	1		1	1	
Fees Peon	4		4	4	
Work Sarkar	2		2	2	
Electrician	1		1	1	
Electrician Wireman	1		1	1	
Electric Helper	2		2	2	
Plumbing Helper	2		2	2	
Ward Attendant	3	2	1	1	
Process Server	1		1	1	
Peon	3		3	3	
Mali	1		1	1	
Sweeper Jamadar	2		2	2	
Sweeper	24	15	9		9
Peon cum Chowkidar	4	2	2	2	
Chowkidar	6	2	4	4	
Driver	4		4	4	
LFS CADRE					
Executive Engineer	1		1	1	
Asst. Engineer	1		1	1	
Junior Engineer (Civil)	3		3	3	
Junior Engineer (Electrical)	1		1	1	
Sr Asst.	5		5	3	2
Jr. Asst.	17		17	11	6
Community Organiser	4		4	4	
Homeopathic Doctor	5		5	5	
Pharmacists	1		1	1	
TOTAL	**482**	**51**	**431**	**387**	**44**

Annexure 13 - Budget estimate for the year 2010-11 & 2011-12

Sl. No.	Head of Receipt	Estimate for the year 2011-12	Estimate for the year 2010-11
1	Rates & Taxes	7,68,30,000.00	4,98,75,000.00
2	Licence & other fees	1,00,15,000.00	95,05,000.00
3	Receipts under Special Act.	20,000.00	1,000.00
4	Revenue derived from Municipal property & from Taxation	4,83,00,000.00	4,37,96,450.00
5	Grants, Contributions for General & Special purposes	35,78,67,000.00	30,39,83,922.00
6	From Local funds	2,00,000.00	1,00,000.00
7	Grants & contributions from other sources	9,33,00,000.00	8,05,33,550.00
8	Miscellaneous	1,73,95,000.00	1,31,20,000.00
9	Extraordinary & Debts	26,00,000.00	41,00,000.00
10	Advances	15,50,000.00	20,60,013.00
	Total	**60,80,77,000.00**	**50,70,74,935.00**

	Head of Expenditure	Estimate for the year 2011-12	Estimate for the year 2010-11
1	General Administrative	2,27,53,000.00	72,03,000.00
2	Collection; Octroi & Demolition Est.	2,21,00,000.00	2,06,30,000.00
3	Collection	80,00,000.00	1,35,00,000.00
4	Public Safety	1,34,30,000.00	1,47,30,000.00
5	Public Health	4,82,70,000.00	5,20,20,000.00
6	Water supply & water works	64,00,000.00	64,00,000.00
7	Conservancy	27,23,00,781.00	12,57,75,100.00
8	Medical	35,50,000.00	35,50,000.00
9	Public Convenience	82,25,000.00	79,23,000.00

10	Public Works	7,62,21,000.00	5,42,87,000.00
11	Public Institutions	39,75,000.00	46,00,000.00
12	Miscellaneous	10,35,38,000.00	17,21,00,000.00
13	Extraordinary & Debt	85,67,330.00	74,15,490.00
	Total	**59,73,30,111.00**	**49,01,33,590.00**

Annexure 14 - 2nd Consultation & Observation during other intermediate consultation

Presentation and 2nd Consultation meeting held on 10th July 2011

Members Present in the 2nd C S P meeting held on 11.8.2011 Council Hall Rourkela Municipality 12.00 pm.

Sl No.	Name	Signature
1	Kalikanda Mishra	
2		
3	Manoranjan Dash. (EE) Rourkela municipality	11.8.11
4.	Narayan Das AEM/BNDM.	11/8/11
5	Ramesh Ku Patra, AEE SPC Rand, RMC.	11/08/11
6)	Dr Hareram Singh IAS	11/8/11
7)	Sri Pramod Ku. Nayak. Rourkela Mpg	11/8/11
8)	Manoj Kumar Mohapatra (AE). PHE Mpty	11/08/11
9.	Dr. MR Thoti,	CMO, RSH, RMC.
10	Manoj Ranjan Dhal, HOCS Asst-	
11.	Ranjan Kumar Mallick, OP/HS	11/8/2011
12.	Bibhuti Mahapatra, OP/HS	
13.	Balmukund Shukla.	
14.	Santosh Ky Chaby.	OP/HS Analyst.
15.	Pradip Ku Dora	

Observation and suggestions provided by the participants during 2nd consultation meeting on 11th Aug. 2011

- Combined system of drainage and sewerage is advisable
- Provision for septage management should be incorporated in the CSP
- Initiation on integrated SWM with RSP needs to be reflected in the report

Observation and suggestions provided by the participants during consultation workshop on 12th Sept. 2011

- Combined system is not acceptable by MoUD for funding and hence should not be adopted
- Option analysis should be taken up to conclude the best feasible sanitation option
- Ongoing projects on sanitation needs and DPRs to be reflected in the report

Observation and suggestions provided during Review meeting with Commissioner cum Secretary, H&UD Dept., Odisha on 31st Jan. 2012

- Household survey data from 2011 census available with ULBs may be used for better mapping of the sanitation facility
- ULB observation by 15th Feb and final report by 31st Mar.

Annexure 15 - Calculation of Solid Waste Generation

Present Generation

Present Population

The total population by 2011 - **269602**

The total Non Slum population - **154622**

The total population in slums -**114980**

Approximate no. of Commercial Estt. - **4000**

Present Level of Generation

Per capita generation rate in households = 350gm/c/day

Slum pockets = 200 gm/cap/day

I) from residential zone - (154622x 0.350)/ 1000 M.T = 54.12 MT

II) From slums - (114980 x 0.200)/ 1000 MT = 23.00 MT

III) From commercial Establishment - (4000x 2.00 Kg)/1000MT = 08.00 MT

Total = 85.12 MT

Say 86 **MT/day**

Total Generation at end of Implementation period (2015)

Projected Population

The projected population by 2015 - 280756

Projected households population - 161019

Projected population in slums -119737

Projected no. of Commercial Estt. - 5000

Projected Generation

I) From residential zone - (161019 x 0.350)/ 1000 = 56.35 MT

II) From slums - (119737 x 0.200)/ 1000 = 23.95 MT

III) From commercial Establishment (5000x 2.00 Kg)/1000 = 10.00 MT

IV) MSW from hospitals & nursing homes = 0.56 MT

Total = 90.86MT

Say 91 MT/day

Out of which, organic waste would be **57 MT** (63.00%); Inert waste would be **22 MT** (24%) and **12 MT** (13.00%) of recyclables waste.

Generation at end of 2030

Projected Population

The projected population by 2030	- 336525
Projected households population	- 191819
Projected population in slums	- 144706
Projected no. of Commercial Estt.	- 15000

Projected Generation of Solid Waste by 2030:

I) From residential zone	- (191819 x 0.350)/ 1000 M.T	= 67.14 MT
II) From slums	- (144706x 0.200)/ 1000 MT	= 28.94 MT
III) From commercial Establishment	- (10000x 2.00 Kg)/1000MT	= 20.00 MT
IV) MSW from hospitals & nursing homes		= 1.00 MT
	Total	= 117.08 MT
		Say 118 MT/day

Out of which, organic waste would be **75 MT** (63.00%), Inert waste would be **28 MT** (24%) and **15 MT** (13.00%) of recyclables waste.

Annexure 16A - Infrastructure Need (Sewerage)

Ward No.	No. of Slum	INDIVIDUAL TOILETS		SHARED TOILETS		COMMUNITY TOILETS SEATS		PUBLIC TOILETS SEATS		URINALS		SEWER LINE (Km)	
		Existing	New Requirement	Existing	New Requirement	Existing	New Requirement	Existing	New Requirement	Existing	New Requirement	Existing	New Requirement
1	10	1452	52	55	-		5		5		1		34
2	3	1056	105	42	2				5		1		18
3	3	2647	224	105	5		5				2		58
4	5	2036	165	81	3		5	10			2		22
5	5	1833	121	70	3						1		10
6	9	2115	133	84	4		10				2		25
7	6	1444	107	57	2		5						11
8	1	2199	181	87	4		5				2		8
9	6	1953	158	77	3		5						9
10	3	2182	178	87	4		5						4
11	5	1143	114	45	2				5				8
12	4	1896	189	75	3				5		1		18
13	4	2543	215	101	4		5				1		8
14	3	1421	143	56	2			12			2		5
15	3	863	87	34	1			8			1		5
16	3	1658	164	66	3						1		4
17	1	923	90	37	2						2		5
18	1	812	82	32	1			10					4
19	1	1083	107	43	2				5				4
20	3	1366	99	54	2		5				1		2
21	2	931		33	1						1		2
22	3	725	34	29	1		5	10			1		17

Ward No.	No. of Slum	INDIVIDUAL TOILETS		SHARED TOILETS		COMMUNITY TOILETS SEATS		PUBLIC TOILETS SEATS		URINALS		SEWER LINE (Km)	
		Existing	New Requirement	Existing	New Requirement	Existing	New Requirement	Existing	New Requirement	Existing	New Requirement	Existing	New Requirement
23	3	933	92	37	2								48
24	4	1319	94	52	2		5		5		1		6
25	3	975	96	39	2				5		1		5
26	2	672	63	29	1						1		23
27	2	1151	114	46	2								22
28	1	1488	4	54	-						1	18	30
29	1	1360	5	49	-							17	33
30	2	1399	5	50	-				5		1		55
31	5	2075	168	82	4		5				1		25
32	7	2204	140	87	6		10				1		8
33		2897	217	113	13						1		20
Total	**114**	**50,754**	**3,746**	**1,988**	**86**	**-**	**80**	**50**	**40**		**30**	**35**	**556**

Annexure 16B – Infrastructure Need (Drainage & Solid Waste)

Ward No.	No. of Slum	ROAD LENGTH (Km)	DRAINAGE (Km)		SOLID WASTE MANAGEMENT			
					GARBAGE BINS		Existing Collecting Centre	Secondary Transport Station
			Existing	New Requirement	Existing	New Requirement		
1	10	38.8	11.8	27.0	3	5		
2	3	19.9	6.1	13.8	3	3		
3	3	65.5	20.0	45.5	2	3		
4	5	24.9	7.6	17.3	8	2		
5	5	10.7	3.3	7.5	6	2		
6	9	28.7	8.7	19.9	5	3		
7	6	11.9	3.6	8.3	7	2		
8	1	8.8	2.7	6.1	7	2		
9	6	10.4	3.2	7.2	4	3		
10	3	4.0	1.2	2.8	4	3		
11	5	9.4	2.9	6.5	2	3		
12	4	19.9	6.1	13.8	2	3		
13	4	9.2	2.8	6.4	3	2		
14	3	6.2	1.9	4.3		4		
15	3	5.2	1.6	3.6		4		
16	3	4.8	1.5	3.3		4		
17	1	6.2	1.9	4.3	2	2		1
18	1	4.0	1.2	2.8	1	2		
19	1	4.4	1.3	3.0		4		
20	3	2.4	0.7	1.7		4		
21	2	2.2	0.7	1.5		3		
22	3	18.9	5.8	13.1		3		
23	3	54.1	16.5	37.6		3		

Ward No.	No. of Slum	ROAD LENGTH (Km)	DRAINAGE (Km)		SOLID WASTE MANAGEMENT			
					GARBAGE BINS		Existing Collecting Centre	Secondary Transport Station
			Existing	New Requirement	Existing	New Requirement		
24	4	6.8	2.1	4.7	4	1		
25	3	6.0	1.8	4.1	1	3		
26	2	25.7	7.8	17.8	1	3		
27	2	24.5	7.5	17.0	3	3		
28	1	36.6	11.2	25.4	9	0		
29	1	37.0	11.3	25.7	5	2		
30	2	62.3	19.0	43.3	1	4		
31	5	28.1	8.6	19.5	3	3		
32	7	9.2	2.8	6.4	4	3		
33		22.7	6.9	15.8	7	2		
Total	**114**	**629**	**192**	**437**	**97**	**93**		

Annexure 16C - Location of Proposed Infrastructure

Community Toilets	Map Ref. No.	Public Toilets	Map Ref. No.	Proposed Urinals	Map Ref. No.
New		**Existing**		**New**	
Tisco Area	NC1	Panposh market complex	P1	Tisco Area	U1
Mani Colony, Circuit House	NC2	New Bus stand	P2	Panposh Chowk	U2
Old Station Road	NC3	Daily Market	P3	Grid Station	U3
Mantola	NC4	Udit Nagar	P4	Deogaon	U4
Labou Tenament	NC5	Traffic Gate	P5	Civil Township	U5
ITI Shanti Nagar	NC6	**New**		Hanuman Vatika	U6
Ambedkarnagar	NC7	Tisco Area	NP1	Khariabahal	U7
Malgodam Durgapur	NC8	Panposh Basti	NP2	Gangadhara Palli	U8
Indira Nagar	NC9	Shakti Nagar	NP3	Jail Road	U9
Bangali Basti	NC10	M S Palli	NP4	DAV Polytechnic	U10
Titan Basti	NC11	Mal Godam Road	NP5	Basanti Colony Market	U11
Basanti Colony	NC12	Pump House Road	NP6	Mal Godam Road	U12
Sarada Palli	NC13	Bandamunda Road	NP7	Gopabandhu Palli	U13
Nayabazar Market	NC14	Gaula Khatal	NP8	Railway Station	U14
Hariharr Basti	NC15			New Bus Stand	U15
Bagbudi Basti- B	NC16			Daily Market	U16
				Udit Nagar	U17
				Basanti Main Road	U18
				Municipality Chowk	U19
				Plant side Road	U20
				Old Station Road	U21
				Traffic Gate	U22
				Bandamunda Road	U23
				Adarshagram D cabin	U24
				Bandamunda Road	U25
				Koel Nagar Maret	U26
				Shakti Nagar Market	U27
				Naya Bazar	U28
				Near BPUT	U29
				Chhend	U30

Annexure 17 - 3rd Consultations held on 27.02.2012

Presentation and 3rd Consultations meeting held on 27th Feb 2012

Members Present in the 3rd C.S.P
3rd Consultative Committee meeting held on 27.02.2012 at 11 a.m. in the Council Hall.

Sl No.	Name of Members		Signature
1	Rashmibala Mishra	Chairperson	
2	Dr. Pramod Ranjan Pd.		
3	D. Hardy Sing	HO	
4	G. S. Mishra	AE, PH, RKL	
5	Ramesh Kumar Ekka, AEE, State pollution Control Board Rourkela		
6	Manoranjan Dash. (EE)		27-2-2012
7	Santosh kumar Chabra	Opn HS.	
8	Kishan ch Nayak	JE	
9	Bibhas Mahapatra	OPEHS	
10	Bijaya Kumar Swain.	EO & Convener	27/02/2012
11	Manoj Ranjan Kanl	Sanitary Supervisor	27/2/2012

Annexure 18 - City Sanitation Rating Methodology & Questioner

National Rating and Award Scheme for Sanitation for Indian Cities
Ministry of Urban Development (GOI)




Goal

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 intends to institute an annual rating award scheme for cities.

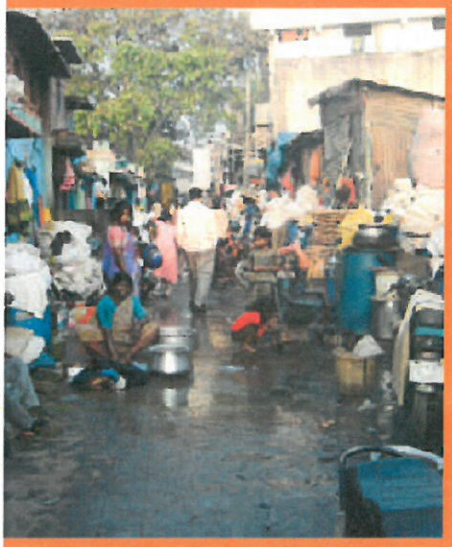
The award is based on the premise that improved public health and environmental standards are the two outcomes that cities must seek to ensure for urban citizens. In doing so, governments in states and urban areas will need to plan and implement holistic city-wide sanitation plans, thereby put in place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

Concept of Totally Sanitized Cities

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

- Cities must be open defecation free.
- Must eliminate the practice of manual scavenging and provide adequate personnel protection equipment that addresses the safety of sanitation workers.
- Municipal wastewater and storm water drainage must be safely managed.
- Recycle and reuse of treated wastewater for non potable applications should be implemented wherever possible.
- Solid waste collected and disposed off fully and safely.
- Services to the poor and systems for sustaining results.
- Improved public health outcomes and environmental standards.

NUSP
TOWARDS CITY WIDE SANITATION



Cities will need to raise the awareness of city stakeholders since improved sanitation can ensure improved public health and environmental outcomes only if considerable changes in behavior and practice take place across the spectrum of society.

Baseline, Eligibility and Selection Procedure

a) *Baseline and Planning:* First, each of the cities will conduct a survey (based on secondary and primary data sources) and establish a comprehensive baseline with respect to (liquid and solid) waste generation, collection and disposal in the city. This will enable them to place themselves through objective self-assessment, in the relevant sanitary category (Table 2). This will form the basis for a City Sanitation Campaign to mobilize all stakeholders, and raise awareness about and priority to 100 percent sanitation. Based on the baseline, the city will draw up and implement with support from the State Government and Government of India, a comprehensive City Sanitation Plan to address the situation in order to reach the goal of becoming 100 percent sanitized.

b) *Implementation:* The city will implement its City Sanitation Plan in a strategic manner, clearly prioritizing areas that need urgent attention, and implementing long-term plans in parallel. Again, emphasis will be on mobilizing all city stakeholders and raising the importance of behavior change, practices and installations for safe and sanitary disposal of all wastes of the city on a sustainable basis.

c) *Achievement of Milestones:* The cities/urban areas that have achieved the sanitation outputs and outcomes described above and have systems and procedures in place to sustain these, will apply to their State Governments (State Urban Development / Municipal Administration Department), for recognition and nomination for the national award.

d) *State-level Verification and Awards:* The state government will be fully responsible for supporting and supervising their cities to implementing the above steps, and in this regard, may consider instituting a state-level award scheme to promote competition amongst the urban areas within the state. State Governments will also need to launch state-level awareness campaigns.

e) *National Cities' Sanitation Rating:* The Ministry of Urban Development (MoUD), Government of India, will commission independent agencies to carry out surveys of all urban centers in India and publish the results nationally as the basis for recognizing performance. In addition, Government of India may also request states for recommending cities showing commendable performance, that will be followed by a due verification process.

f) *Criteria for Awards:* The National Urban Sanitation Advisory Group, constituted by the MoUD, will be responsible for setting out and revising criteria for the national award. This Committee will also be the final authority in deciding annual awards to applicant cities.

g) *Type of Awards:* The award scheme will recognize the achievement of cities at the national level. However, no monetary incentive or reward is envisaged for the award. The award may however include, for city and state representatives, sponsorship to participate in national events, trainings, and exchange and learning visits to other locations.

Rating and Categorization of Cities

- The rating of cities with regard to their performance in sanitation improvements will be based on set of objective indicators of outputs, processes and outcomes, as presented in Table 1.

Table 1: Indicative Objective Rating Chart for Sanitation in Cities

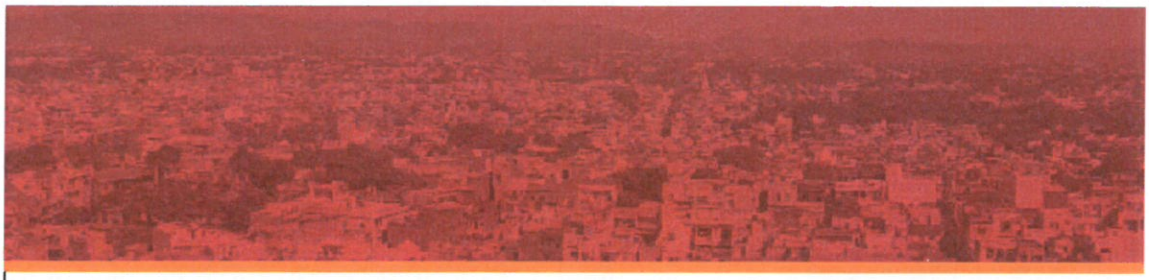
No	Indicators	Points*
1	**Ouput-related**	**50**
A	No open defecation sub-total	16
i.	Access and use of toilets by urban poor and other un-served households (including slums) - individual and community sanitation facilities	4
ii.	Access and use of toilets for floating and institutional populations – adequate public sanitation facilities	4
iii.	No open defecation visible	4
iv.	Eliminate manual scavenging and provide personnel protection equipment to sanitary workers	4
B	Proportion of total human excreta generation that is safely collected (6 points for 100 percent)	6
C	Proportion of total black waste water generation that is treated and safely disposed off (6 points for 100 percent)	6
D	Proportion of total grey wastewater generation that is treated and safely disposed off (3 points for 100 percent)	3
E	Proportion of treated wastewater that is recycled and reused for non potable applications	3
F	Proportion of total storm-water and drainage that is efficiently and safely managed (3 points for 100 percent)	3
G	Proportion of total solid waste generation that is regularly collected (4 points for 100 percent)	4
H	Proportion of total solid waste generation that is treated and safely disposed off (4 points for 100 percent)	4
I	City wastes cause no adverse impacts on surrounding areas outside city limits (5 points for 100 percent)	5
2	**Process-related****	**30**
A	M&E systems are in place to track incidences of open defecation	4
B	All sewerage systems in the city are working properly and there is no ex-filtration (Not applicable for cities without sewerage systems)	5
C	Septage/sludge is regularly cleaned, safely transported and disposed after treatment, from on-site systems in the city (MAXIMUM 10 marks for cities without sewerage systems)	5
D	Underground and surface drainage systems are functioning and are well-maintained	4
E	Solid waste management (collection and treatment) systems are efficient (and are in conformity with the MSW Rules, 2003)	5
F	There is clear institutional responsibility assigned; and there are documented operational systems in practice for B)/C) to E) above	4
G	Sanctions for deviance on part of polluters and institutions is clearly laid out and followed in practice	3
3	**Outcome-related**	**20**
A	Improved quality of drinking water in city compared to baseline	7
B	Improved water quality in water bodies in and around city compared to baseline	7
C	Reduction in water-borne disease incidence amongst city population compared to baseline	6

** The marks for the above indicators will be revised every two to three years. Over time, indicators about more stringent conditions e.g. re-utilisation, or spitting in open/public spaces, etc. will be introduced as indicators. The weights accorded to each category and specific indicators will also be revised. ** In this context, bigger cities may consider instituting good practice systems that comply with ISO (International Standards Organisation) and/or BIS (Bureau of Indian Standards) process systems.*

- On the basis of the above rating scheme, cities will be placed in different categories as presented in Table 2. National rating survey data will utilize these categories for publication of results.

Table 2: City Color Codes: Categories

No.	Category	Description	Points
1	RED	Cities on the brink of public health and environmental 'emergency' and needing immediate remedial action	<33
2	BLACK	Needing considerable improvements	<34 ≤66
3	BLUE	Recovering but still diseased	<67 ≤90
4	GREEN	Healthy and Clean city	<91 ≤100



- On the basis of plans prepared and implemented, cities will be able to measure the results of their actions, and be able to clearly chart out their improvements over time compared to their baseline situation.
- On achievement of remarkable results, i.e. coming into the Green category (Healthy and Clean City), cities will typically become eligible for the national award. Other cities showing remarkable incremental performance or selective achievements may also be given special or honorary awards. Cities in different size-classes may also be considered for category-wise awards.
- Based on results of the Rating survey and selection of awardees, cities will be invited to participate in a National Urban Sanitation Award ceremony.

Special and Honorary Awards

In order to mobilize cities to participate in the competition, two strategies will be followed:-

- Institution of award schemes as a part of State Strategies
- Institution of special and honorary awards to cities showing spectacular performance in selective dimensions or substantial increments

Special Awards: will be given to recognize special achievements, especially in the initial stages, since achievement of 100 percent sanitation may be difficult especially in the initial stages. For instance, a city may demonstrate remarkable performance in the area of stopping open defecation although 100 percent treatment may be constrained because of lack of time and resources within a given year. In such cases of selective performance, awards will be

instituted – in the initial years, these awards will be to accord recognition to:

- Stopping open defecation.
- Remarkable performance in awareness generation.
- Institutional assignment and implementation of operational procedures.
- Mobilization of community organizations or non-government agencies in sanitation campaigns.

Honorary Awards for Exemplary Performance: It may be difficult for many urban areas to immediately show all-round performance in sanitation. Therefore, cities showing maximum overall improvements in a given year, compared to their baseline situation, may also be given an award with a view to recognition of incremental efforts made.

If State strategies incorporate award schemes, many of the above category of performers will be pre-selected from states, and sent up for the national competition.

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