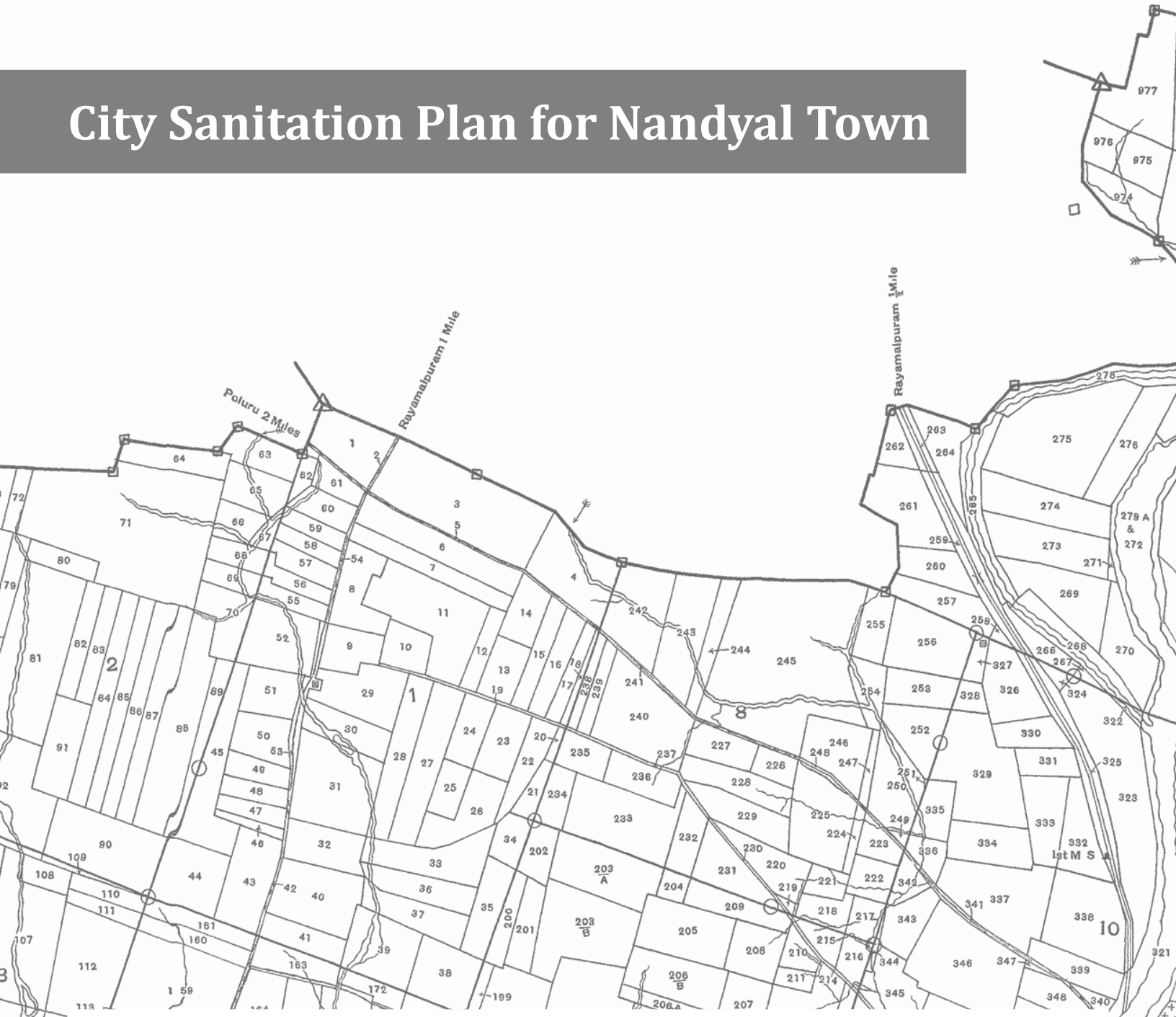
City Sanitation Plan for Nandyal Town



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Nandyal Municipality

November 2016

Nandyal City Sanitation Plan

Prepared by:

This report has been prepared within the context of GIZ's CSP template. Herein, the project team have assessed all the sectors (i.e. Access to Toilets, Wastewater management, Solid Waste Management, Water Supply, Storm Water Drain Management and Receiving water bodies management) based on a review of the existing situation in the sector and evaluating demand for each sector. The demands have been understood based on discussion with city level stakeholders and through assessment of the secondary data resources made available to the project team. The final section of the report aims to identify the way forward in terms of action points and an investment plan for the same.

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Section I – Introduction and Context

1. Introduction and Background

1.1 The NUSP and CSP Initiative

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

The overall goal of this national policy is to transform Urban India into community-driven, totally sanitized, healthy and livable cities and towns. Specific goals include:

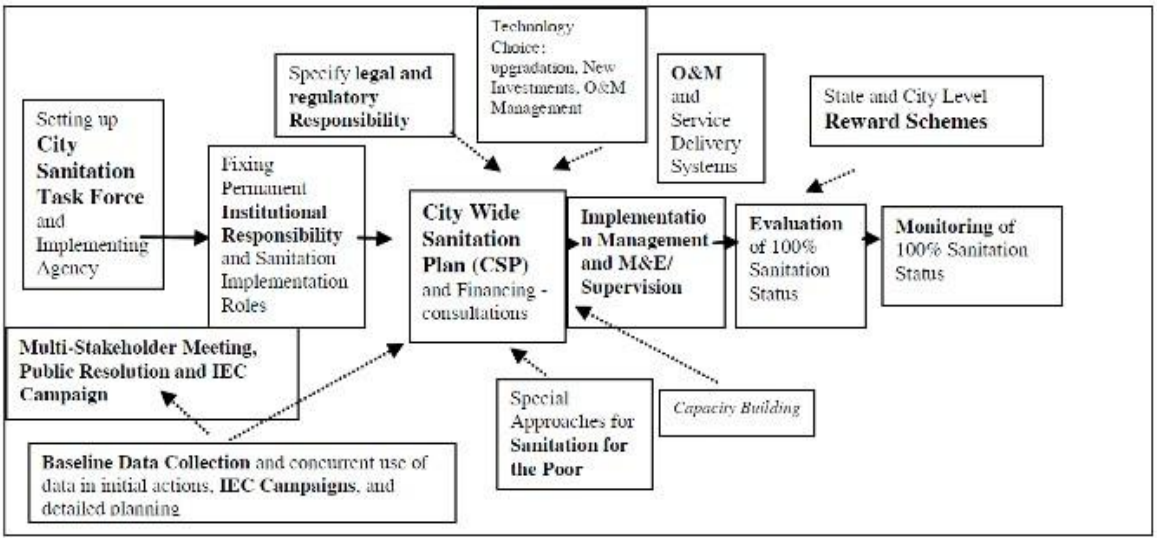
Awareness Generation and Behavior Change,
Open Defecation Free Cities,
Integrated Town-Wide Sanitation,
Sanitary and Safe Disposal, and
Proper Operation and Maintenance of all Sanitary Installations.

Believing that without a City Sanitation Plan a comprehensive planning cannot be achieved to attain the objectives of Swachh Bharat Mission, Nandyal Municipality is developing a City Sanitation Plan for Nandyal Town that identifies the issues related to governance, technical, financial, capacity enhancement, awareness raising and pro-poor interventions and proposes short, medium and long term measures to achieve the goals of National Urban Sanitation Policy (NUSP) to create community driven, totally sanitized, healthy and livable cities and towns.

The CSP's main purpose is to support urban local bodies and NGOs, CBOs, citizens and private sector agencies to take concrete steps to achieve 100% sanitation in their respective cities that includes Water Supply, Waste Water and Sewerage, Storm Water, Sanitation, and Solid Waste Management. The mentioned sectors are considered under CSP as these are directly and indirectly linked to the other sectors that ultimately affect the hygiene of the city. Thus considering the influence of all these sectors on the city sanitation, the Nandyal Municipality in consultation and considering the recommendations from citizen groups, elected representatives, government departments and City Sanitation Task Force is developing the CSP. The main aim of the CSTF is to achieve 100% sanitation in the city by involving the suggestions from public, private institutions, NGOs and Aided Organizations in coordination with Town Planning Wing.

Considering the local situations and its need, the Nandyal Municipality has followed the procedure that is depicted in the below figure while planning, implementing and evaluating a CSP.

Figure 1 Generic Elements of Planning, Implementation and Monitoring and Evaluation of city Sanitation



Source: MoUD (2008): NUSP

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

To tackle the above challenges and to accord thrust to sanitation as a priority area, the Government of India (GoI) launched the National Urban Sanitation Policy (NUSP) in 2008. The NUSP articulates the resolve of GoI to achieve United Nations Millennium Development Goals specifically, MDG 7 pertaining to secure ecological sustainability and MDGs 4, 5 and 6, pertaining to health and hygienic conditions of the poor and women. In particular, the NUSP

Envisions that all Indian cities and towns should 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 urban poor and women.
Identifies
Poor Awareness,
Social and Occupational aspects of Sanitation,
Fragmented institutional roles and responsibilities,
Lack of integrated town-wide sanitation approaches,
Limited technology choices,
Reaching the un-served and poor and
Lack of demand responsiveness

As the key policy issues to be tackled and aims to transform urban India into community-driven, totally sanitized, healthy and livable cities/towns through achieving:

The principal components of town-wide approach include:

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

1.2 Understanding of the Assignment

The assignment on 'Supporting in City Sanitation Plan Finalization' is part of a larger support project (SNUSP[1]-II) to the Ministry of Urban Development (MoUD) by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH for implementation of the National Government's sanitation policy guidelines for improving the sanitation situation. The SNUSP-II project aims to achieve this by building on lessons of providing City Sanitation Plan (CSP) support to 6 cities and collaborating with 2 states while preparing their State Sanitation Strategies.

As part of the second phase of the SNUSP, master trainers from the nominated 34 small and medium towns (which include 10 towns each in Telangana and Andhra Pradesh) for up scaling the achievements of concrete results on the ground in the sanitation sector. The trainings focus on 'Preparation of City Sanitation Plans' and capacitate state level government functionaries to be the driving up scaling agent in the sanitation sector.

As a follow up to the trainings, the towns are preparing their CSPs and related cost estimates. The objective of the assignment is to handhold and support 3 Urban Local Bodies (ULBs) out of 10 selected ULBs in Telangana and 3 ULBs out of 10 selected ULBs in Andhra Pradesh (overall 6 towns) *to shortlist projects*, *prepare the investment plan* and *finalize the CSP* in close collaboration with the ULB officials and the City Sanitation Task Force (CSTF) following the process and format developed by GIZ. The overall goal is to not just guide but work towards implementing and replicating the CSPs within the respective states, making the Sanitation Plans so prepared both implementable and sustainable.

As such, CDD Society has been commissioned to undertake this support towards finalization of the City Sanitation Plans for the following cities:

Telengana
Khammam
Karimnagar
Sircilla
Andhra Pradesh
Nandyal
Narsaraopet
Amalapuram[2]

[1] SNUSP – Support to the National Urban Sanitation Policy
[2] CDD Society (2016): Inception Report

1.3 Steps towards preparation of CSP

According to the National Urban Sanitation Policy, the preparatory actions that has been carried out in order to achieve 100% sanitation are

Formation of City Sanitation Task Force

Mobilize Stakeholders: The first step in making the cities 100% sanitized is to elevate the consciousness about sanitation in the mind of municipal agencies, government agencies and most importantly, amongst the people of the city. A multi-stakeholder City Sanitation Task Force has been formed, comprised by representatives from agencies directly responsible for sanitation (divisions and departments of the ULB, PHED, etc.), agencies indirectly involved, and practitioners, representatives of the different stakeholders sectors, NGOs and sanitary workers.

Baseline Data Collection and Creating Database

In parallel with the preparatory steps, the ULB / Implementing Agency have collated the information on sanitation that exists with the ULB itself and other agencies in the city. This has included demographic, institutional, technical, social and financial information.

Awareness Generation and Launch of 100% Sanitation Campaign

After a reasonable amount of data has been collated from secondary and primary sources, and the Task Force is in place, the first task will be of launching a citywide 100% Sanitation Campaign.

Specifying Legal and Regulatory Institutional Responsibilities

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

Planning and Financing

The task of planning and finding sources of funding will be under the oversight of the Task Force but carried out by the Implementing Agency. The Agency has developed plans for the city for different aspects including institutional, social, technical, financial, etc with the help of different departments involved in city sanitation.

Technical Options

Technology choice poses a major problem in Indian cities not only because of lack of information on what exists at present, but also because of the constraints of land, tenure, and low budgetary priority accorded to sanitation historically. Considering the current practices and obstacles that are stopping for the development of sanitation sector in the city, certain technologies that suit best for the city has been recommended.

Reaching the Un-served Population and the Urban Poor

Experiences from many Indian cities show that a differentiated approach is necessary to extend good quality sanitation services to the poor – the group that suffers the most in terms of adverse impacts on health and lost earnings.

Operation and Maintenance and Service Delivery Systems

Institutional systems for OandM are at the heart of any successful set of systems and procedures to achieve and sustain 100% sanitation.

Capacity Building and Training

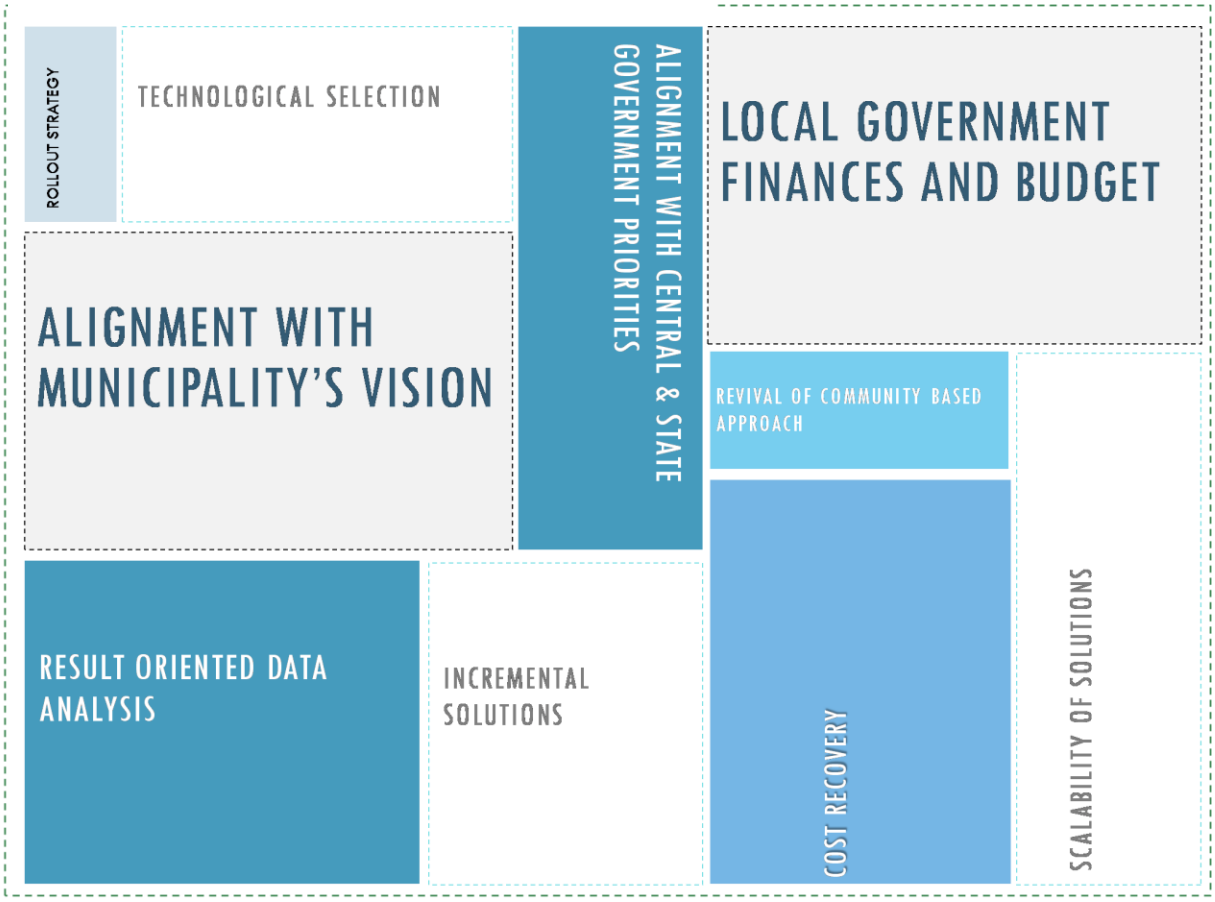
The role of capacity building and training is crucial in achieving and sustaining 100 % sanitation.

Implementation Plan and Monitoring and Evaluation

While the Implementation Agency will be responsible for overall implementation, it is useful to think about plan implementation and delivery mechanisms for each of the components of the Plan. The City Sanitation Task Force and the Implementing Agency need to think about Monitoring and Evaluation of the implementation as an integral part of the City Sanitation Plan.

1.4 Approach for the Assignment

Figure 2 Principles for an Implementable Sanitation Action Plan



The experiences from the first generation of urban sanitation reforms are that solutions fail repeatedly because they are generalized rather than being demand-responsive and site specific. Backed by our field level experiences and stakeholder consultations, we reflected on **'What makes an Action Plan Implementable?'** Our understanding is that the major tenets of successfully demonstrating sustainable sanitation solutions depend on the following principles:

Alignment with Municipality's Vision: It is essential to view the sanitation plan as a strategic planning exercise that is conducted by providing guidance but in complete collaboration with the municipality. At the end of the day, no plan however rigorous could be executed through to its rightful conclusion without the collaborative support of the municipality, also keeping in view their tacit experience in the town. As such, it becomes essential to take the municipality into confidence and seek their inputs and understanding on the sanitation reform priorities.

Local Government Finances and Budget: The solutions to be proposed across all segments of the sanitation value chain have to be sensitive to the municipal finance situation of the town to have any realistic prospect of moving into the implementation phase. Additionally, it will be essential to explore funding possibilities from donor agencies in the form of grants and loans. Additionally, the solutions

proposed within the CSP must take into account the sustainability in terms of whether the municipal government is able to meet recurring expenses to operate and maintain a sanitation system.

Alignment with Central and State Government priorities: The Central Government has reinstated its commitment to sanitation in 2014 with the launch of the Swachh Bharat Mission (SBM) and the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), another scheme to improve the urban sector of the country. It is essential that proposals suggested within a CSP are in alignment with such Governmental programs, to draw strategic leverage and receive any possible financial support. It is important for the local government to be sensitive to any available grant (due to their generally pure financial situation) for infrastructure creation from programmatic support received from State or Central Governments. Also, sanitation is a state subject and so the state can make changes in devolution of institutional responsibilities and financial devolution as well. Moreover, it is only through effective governance by the local government, that the policy guidelines of AMRUT and SBM can be implemented.

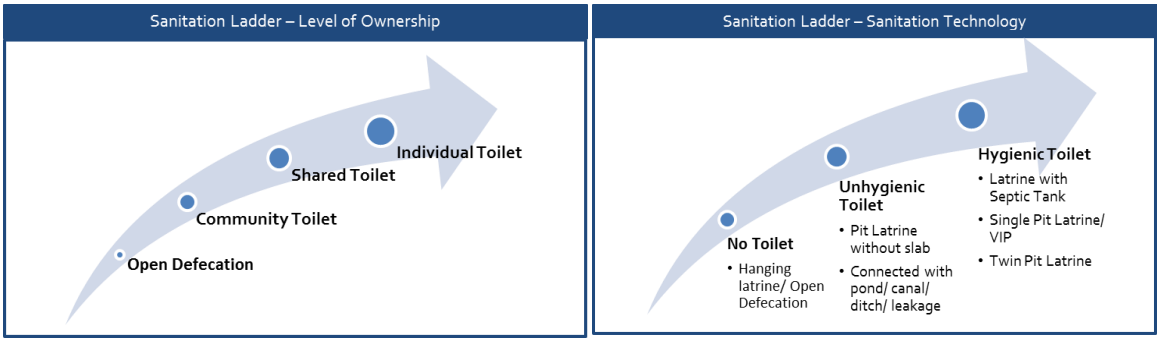
Result Oriented Data Collection: It has become clear that data collection only to back a cookie cutter solution will not help with creating an implementable CSP. Rather data collection methods should be driven with the specific purpose of solving the issue and serving a solution.

Scalability of solutions: The scale at which a solution (for e.g. a wastewater treatment or a faecal sludge treatment unit) is provided will have a major bearing on the level of financial investment required in a town. Based on the drainage and topographic profile of the town, centralized systems have to be complemented with decentralized approaches to solve the sanitation issues. There generally is a lot of resistance amongst city engineers to go for decentralized options with community involvement, which points out the need of education and capacity building. If the sanitation issues in the city are dealt properly, the natural water bodies can also be revived. Scalability can also be seen as the 'level of decentralization' at which solutions can be provided. The idea that drives this concept is that treatment of wastewater/ faecal sludge should be as close to the source as possible, rather than adopting large scale investments for conveyance. This could be relaxed in cases governed by topographic criteria of the natural setting.

Incremental Solutions: The project team will adopt an approach of incremental improvement (in terms of interventions and investments) over a period of time to address the entire sanitation value chain. For example, incremental improvements could be envisaged in terms of the level of access to a toilet. The proposed interventions will aim at elevating community from practicing open defecation to having access to a shared/ community toilet, gradually moving towards each resident having access to an "individual toilet".

Figure 3: Incremental Approach

Another type of



incremental improvement here is in terms of moving up the ladder in the quality of sanitation technologies (from pit to twin pit to septic tank). Though the function of each sanitation system is confinement of the human excreta, the physiographic setting, and socio-economic contexts will have a bearing on the selection of these technologies.

The project focuses on progressing along the sanitation ladder in a phased manner, with the primary motive to ensure that the entire population has access to a hygienic toilet. The progression must also take into consideration the institutional capacities to operate and maintain the systems, financial capacities to sustain the interventions and behavioural changes for engagement of community in the movement of sanitation improvement.

Technology selection: The technology solutions/ systems to be selected to address the complete chain of wastewater/ faecal sludge management issues must be sensitive to local situations in terms of:

The socio economic profile of the cluster
Environmental implications
Cultural acceptability
Cost considerations[3]
Operations and maintenance (O&M) requirements
Land availability
Treatment efficiency
Energy requirements
Health impact
Reuse opportunity
Adequacy of water
Ground water table
Type and permeability of soil
Climatic conditions
Compliance with discharge standards

Cost Recovery: An implementable solution should have a cost recovery model to make its implementation sustainable. This would mean that the cost incurred by the municipal government for all the infrastructure to facilitate the sanitation solutions (say the 'purchase of vacuum trucks', 'training of service delivery related to faecal sludge collection' and 'installation of the treatment plant by government') should be recovered. This could be through an effective user charge (collected from the households) collection strategy, through sale of treated wastewater/ faecal sludge etc.

[3] This is limited to understanding derived from consultations and not a detailed review of the municipal budget

Revival of Community Based Approaches: Instead of only providing the sanitation "hardware", sanitation implementation need to take a holistic approach. This means there has to be a focus on improving hygiene behaviour, and communities need to understand the O&M aspects, at least of their onsite systems to the extent necessary. The Community Based Sanitation approach also focuses on critical stress areas populated by the poorer income segments and densely populated areas, so as to closely reflect preferences of target communities.

Rollout Strategy: It is important that the roll out of the implementation of a CSP has to be done strategically focused on addressing high priority issues in the immediate term and big ticket projects in the long term. The solutions must be phased in alignment with the principle of 'incrementalism', so that the solutions are first implemented to the highest concern population segments, and the improvements are sustained (technically, environmentally and socio-economically) over a period of time to address the entire sanitation value chain.[4]

1.5 Project Activities Conducted

Submission of inception report:
First meeting with CSTF:
Field Visit to Nandyal Town: 5th and 6th of October, 2016
Submission of Action Plan to State: Second week of November, 2016

[4] CDD Society (2016): Inception Report

2. City Sanitation Task Force (CSTF)

This chapter gives an overall idea of the CSTF. It will include members of the CSTF and responsibilities of the CSTF. The CSTF should have representation of organizations / experts on women & urban poor issues. The chapter will also comprise information related to the Sanitation implementation agency, nodal officer appointed for the CSTF / CSP, roles and responsibilities of various CSTF members.

2.1 Responsibilities of the CSTF

The City Sanitation Task Force is responsible for

Launching the City 100% Sanitation Campaign
Generating awareness amongst the city's citizens and stakeholders
Approving materials and progress reports provided by the implementing agency, other public agencies, as well as NGOs and private parties contracted by the Implementing Agency, for different aspects of implementation.
Approving the CSP for the city prepared
Undertaking field visits from time to time to supervise progress
Issue briefings to the press/media and state government about progress
Providing overall guidance to the Implementation Agency
Recommend to the ULB fixing of responsibilities for city-wide sanitation on a permanent basis

The CSTF shall also responsible to monitor and guide the planning process and implementation at the initial stages of the project and shall conduct meetings and field visits at a later stage on an as-needed basis to ensure quality implementation of the project.

The CSTF shall responsibly recommend and assign below listed aspects to the ULB for the citywide sanitation.

The ULB shall have final overall responsibility for citywide sanitation, including devolving power, functions, functionaries and funds to them
Planning and financing including State Government and Government of India schemes
Asset creation including improvement and augmentation
Operations and Management (O&M) arrangements for all networks, on-site, individual, community and public sanitation facilities and systems (including transportation up to final treatment and disposal of wastes)
Fixing tariffs and revenue collections in order to make OandM sustainable
Improving access and instituting special O&M arrangements for the urban poor and un-served populations in slum areas and in mixed areas
Adopting standards
Infrastructure (e.g. design standards)
Service delivery standards (e.g. by urban development departments)
Adoption of regulatory roles including environmental standards (e.g. state pollution control boards), health outcomes (e.g. health departments)
Measures in case specific stakeholders do not discharge their responsibilities properly
Training and capacity building of implementing agency and related personnel

Monitoring of 100% sanitation involving multiple stakeholders[5]

2.2 Members of CSTF

The constitution of Town Sanitation Task Force is mandatory. As per the NUSP guidelines, considering that CSTF shall comprise of representative/agencies from some of the elected members of ULB, social volunteers, institutions involved in law, health, water supply, sanitation, town planning, slum development, eminent persons and practitioners in civil affairs, health, urban poverty, NGOs working on environmental components and representatives of unions of Safai Karmachari's etc, As per the National Urban Sanitation policy 2008 proposed with following members and the matter was placed in council meeting for approval. The council has unanimously approved the resolution vide CR No. 103, Dt. 28.08.2015.[6]

Table 1 Members of the City Sanitation Task Force

Sl.No	Name	Designation
1	Smt. Desam Sulochana	Chairperson (Head of the CSTF)
2	Sri A. Satyanarayana Rao	Commissioner (Convener)
3	Smt. S. Noorjahan	Ward member of W. No. 8
4	Sri M. Murali	Ward member of W. No. 22
5	Smt. S. Noorjahan	TLF president (Member)
6	Sri E. Narasimha Rao	Sanitary Inspector (Member)
7	Sri M. Govind Reddy	Sanitary Inspector (Member)
8	Sri A. Satyanarayana Rao	Municipal Engineer (Member)
9	Sri P. Iftequar Ahmed	Dy. E.E (Env.,) Municipality (Member)
10	Dr. Gelivi Sahadevudu	Medical practitioner (Member)
11	Sri V. Gopal Krishna Murthy	NGO- DART (Member)
12	Sri J. Chennaiah	PHW Nandyal Municipality (Member)
13	Sri S. Lakshmaiah	Contract worker president (Member)
14	Sri Shaik Khaja Mohiuddin	Social Action Committee Member (Member)

Source: Nandyal Municipality (2016)

Activities of the CSTF

According to the Monitoring Sheet for participating towns (13.4.2016), the activities to the CSTF are so far limited to one meeting in April 2016, where the Status Report was presented to the CSTF. There were plans to hold meetings of the CSTF monthly.

[5] Nandyal Municipality (2016)
[6] Nandyal Municipality (2016)

3. Town Profile

The town profile of Nandyal is given below.

Table 2 Town Profile

Category	2011
Area	19.08 Sq.Kms
Population	**2,00,516**
Population Density	11,192 p/Sq. Km
No. of Households	45,046
No. of Slum settlements/colonies	44 notified slums, 20 non-notified slums
No. of Slum households	16.085
No. of Properties	
Floating Population	50.000
No. of Commercial Establishments	
Ground water depth	
Soil Type	Black Cotton Soil
Revenue wards	30
Election wards	42
Specific town level notes (if any): Like in the case of Nandyal, the town experiences around 50,000 floating population of students as there are PO bank exam coaching centers in town.	There are PO bank exam coaching centers in town, so the floating population is high.

3.1 Location and Physical Aspects

Nandyal is spread in an extent of 19.08 Sq.kms in a scenic serene environment and is an important town in Kurnool District, Andhra Pradesh, India. The population of the town is 2,00,516 as per 2011 Census. Males constitute 50.10% of the population. The official language is Telugu and hence being adopted in all offices, Schools, etc.

Nandyal Town used to be originally called Nandalluru. It derives its name from Nandi, the vehicle of Shiva. It is surrounded by nine Nandis, hence the name Nandyala. These temples draw pilgrims from various places all over the country, predominantly from State of Andhra Pradesh and Karnataka.

The town is located at 15.480N 78.480E and has an average elevation of 203.000 meters (666 feet). It It is located at a distance of 72.00 Kms from the District Head Quarters town Kurnool and 286.00 Kms from the combined State Capital Hyderabad. Nandyal is surrounded by hills in the North, East and South, while the Kunderu River flows to its West. The Nallamala Hills to the east are extensively forested while the ones to the south have been mined for granite. The town is rich in water resources, owing to its many tanks and reservoirs.

It is a major center of trade, commerce, education and industries in the region. It is also a center of the shaivite holy places of worship. There are a number of major industries namely Nandyal Milk Powder factory, Nandi Polymers, SPY Agro Pvt., Ltd, Nandi Steels, Rayaseema Sugar Factory, Nandyal Spinning Mills etc.

The Panyam Cements and Mineral Industrials, JSW Cements are located near to the town resulting migration of people from neighboring villages thus accounts for springing up of slums in and around the town adding the burden of providing civic amenities in general and Storm Water Drainage in particular.[7]

3.2 Climate and Rainfall

The climate is referred to as a local steppe climate Only little rain falls throughout the year. But Nandyal is surrounded by hills and the Kundu River, the forests of Nallamala Hills and granite mines. These give it an equitable climate throughout the year. The average annual rainfall is 707 mm.[8]

3.2 Demography and Growth Pattern

Population is one ot the major factors in determining future pattern of progress and development of the city. As per 2001 census report, the population of the town is 1,52,676 and it is increased to 2,00,516 in the year 2011 census report, thus recording 38.72% decadal growth. The density of population comes to be about 11,147 persons per Sq.Km. Demographic Studies revealed a population of 4,20,000 for Ultimate Year i.e. 2047. [9]

Table 3 Ward Data, Population of Nandyal

Ward. No.	Name	Area (Hectare)	No. of Households	Population			Density (persons/ Hectare)
				Total	Male	Female	
1	Main Bazar	1.239	618	2773	1386	1387	2238.10
2	Balaji Complex and N.K Road	21.131	2122	9477	4770	4707	448.49
3	Byrmal Street	4.572	1088	5040	2570	2470	1102.36
4	Chandbada	7.103	1235	5857	2942	2915	824.58
5	Sunkulamma Temple	1.38	409	1759	884	875	1274.64
6	Rangaraja Street	0.485	209	884	450	434	1822.68
7	Nadigadda	8.092	1770	8994	4672	4322	1111.47
8	Maldari Peta	1.436	500	2554	1242	1312	1778.55
9	Sanga Peta	1.181	277	1348	659	689	1141.41
10	Telugu Peta	2.58	464	1881	918	963	729.07
11	Sunkulamma Temple Area	0.331	197	803	395	408	2425.98
12	Byti Peta	0.874	191	847	428	419	969.11
13	Thalliperu Street	1.194	295	1308	661	647	1095.48
14	Neeli Vedhi	0.919	257	1179	595	584	1282.92
15	Boleddula Street	1.175	162	720	361	359	612.77
16	Bondula Street	0.564	215	956	471	485	1695.04
17	Park Road	24.708	1568	6931	3544	3387	280.52
18	Botala Veedhi	0.407	274	1439	737	702	3535.63
19	Madam Vari Street	0.699	551	2300	1141	1159	3290.41
20	Gudipati Gadda	3.579	899	3896	1937	1959	1088.57
21	Farqook Nagar	34.341	2346	10391	5249	5142	302.58
22	Mahanandeswara Swamy Templa	1.46	552	2374	1178	1196	1626.03

[7] Nandyal Municipality (2016)
[8] Nandyal Municipality (2016)
[9] Nandyal Municipality (2016)

23	Kota Street	1.18	467	2103	1045	1058	1782.20
24	Harizana Wada	13.41	913	4391	2187	2204	327.44
25	Sanjeeva Nagar	342	5159	22331	10848	11483	65.30
26	M.S Nagar and V.C Colony	160	4364	18880	9386	9494	118.00
27	Mooloasagaram	75.482	1516	6303	3131	3172	83.50
28	Devanagar and Ngo,S Colony	408	9989	43910	21989	21921	107.62
29	S.B.I Colony and Tekke	163	3195	14632	7589	7043	89.77
30	Bommala Satram and Gopal Nagar	242	3244	14255	7163	7092	58.90
	Total		**45046**	**200516**	**100528**	**99988**	

Source: Census of India (2011), New Delhi

Considerable growth in population is taking place in Nandyal. The demand for water is also going up. The population densities in the ULB have considerably increased and a rational approach for arriving at the future population growth is necessary. As per 2001 census report, the population of the town is 1,57,526 and it is increased to 2,12,640 in year 2011 census report thus recording 39.27% decadal growth. The density of population comes to be about 11,192 persons per SQ.KM at an average, although main town is denser.

Table 4 Decadal Growth Rate

Sl.No.	Decadal Year	Population	Increment
1	1961	42927	
2	1971	63193	20266
3	1981	88185	24992
4	1991	119813	31628
5	2001	157526	37713
6	2011	200516	42990

Source: Census of India (2011), New Delhi

3.3 Urban Poor - Slum Profile of the Town

There are 44 notified slums and 20 non-notified slums in the town. Slum Population is around 1.09.456 while BPL Population is around 1.16.736 and the Percentage of BPL Population comes to 55.90%.[10]

Table 5 Slum Profile

Sl. No.	Slum Name	Location / Ward	Category of Slum	Area (Ha)	No. of HHs	Population			Density (persons / Ha)
						Total	Male	Female	
	Notified slums								
1	Anjaneyaswamy Temple Area	42	Notified	0.578	140	714	362	352	1235.29
2	Anjuman Mosque Area	39	Notified	0.512	295	143	743	696	2810.55
3	Sreedevi Nagar	13	Notified	0.751	120	341	156	185	454.06
4	Mullan Peta	13	Notified	0.802	242	126	667	593	1571.07
5	Rojakunta	39	Notified	1.682	363	155	822	733	924.49
6	Chandbada	12	Notified	7.103	344	152	811	710	214.13
7	Nadigadda	3	Notified	162	287	152	822	704	9.42
8	Nadigadda Bypass Road	5	Notified	4.427	368	173	904	835	392.82

[10] Census of India (2011), New Delhi

9	Kanyakaparameswari Nagar	5	Notified	3.660	187	984	492	492	268.85
10	Weekly Market Area	6	Notified	1.795	128	621	306	315	345.96
11	Antikota	6	Notified	1.238	167	839	443	396	677.71
12	Sunkulammapeta	8	Notified	0.526	177	907	450	457	1724.33
13	Bonthala Veedhi	10	Notified	1.238	236	114	578	565	923.26
14	Scavenger's Colony	8	Notified	2.491	145	772	376	396	309.92
15	Mallikarjuna peta	7	Notified	0.496	407	220	1180	1024	4443.55
16	Harijanawada 24th St.	1	Notified	13.41	462	225	1209	1050	168.46
17	Danielpuram	36	Notified	3.082	205	881	435	446	285.85
18	Ramakrishna Nagar	36	Notified	1.611	116	381	185	196	236.50
19	Saleem Nagar	35	Notified	9.745	349	174	896	847	178.86
20	Viswasapuram	32	Notified	2.887	275	115	597	560	400.76
21	Gnanapuram	32	Notified	10.424	322	137	669	704	131.72
22	M.S. Nagar	33	Notified	11.693	463	208	1054	1027	177.97
23	V.C. Colony	34	Notified	12.039	833	398	2047	1911	328.76
24	Islam Peta	31	Notified	2.572	216	996	504	492	387.25
25	Moolasagaram	31	Notified	14.577	486	208	1032	1049	142.76
26	Noonepalli Harijanawada	21	Notified	6.131	278	130	629	672	212.20
27	Noonepalli	20	Notified	9.539	412	206	1030	1030	215.96
28	Ekalavya Nagar	22	Notified	5.087	132	579	266	313	113.82
29	Nivarthi Nagar	18	Notified	7.750	206	974	485	489	125.68
30	Viswa Nagar	18	Notified	15.840	432	187	956	922	118.56
31	Sadiq Nagar	27	Notified	7.161	465	213	1098	1035	297.86
32	Nivartipuram	27	Notified	3.324	51	244	125	119	73.41
33	Kolimipeta	27	Notified	1.454	244	100	489	516	691.20
34	Railwayfeeder Road	28	Notified	5.672	154	757	387	370	133.46
35	Deva Nagar	25	Notified	18.197	833	509	2520	2573	279.88
36	Thikkaswamy Darga area	23	Notified	5.260	224	922	487	435	175.29
37	Shyam Nagar	24	Notified	4.565	140	807	398	409	176.78
38	Vevekananda Nagar	16	Notified	1.634	51	231	113	118	141.37
39	Suddula Peta	15	Notified	1.977	287	125	666	588	634.29
40	Tekke	14	Notified	3.250	514	239	1252	1146	737.85
41	Bommalasatram	30	Notified	13.138	116	511	271	240	38.89
42	Gattal Nagar	30	Notified	3.537	95	438	246	192	123.83
43	Gandhi Nagar	29	Notified	1.915	129	576	298	278	300.78
44	Gopal Nagar	16	Notified	3.920	124	480	252	228	122.45
	Un-Notified Slums								
1	Chakali Peta	41	Un Notified	0.391	111	457	222	235	1168.80
2	Pinjaripeta	41	Un Notified	0.255	112	399	195	204	1564.71
3	Sangapeta	2	Notified	0.819	139	601	308	293	733.82
4	Patanpeta	42	Notified	0.703	159	767	404	363	1091.04
5	Panpati	4	Notified	0.323	137	726	378	348	2247.68
6	Upparipeta	8	Notified	0.771	141	714	362	352	926.07
7	Balakonda Hall	8	Notified	2.368	86	449	227	222	189.61
8	Mallikarjuna Swamy Temple area	9	Un Notified						
9	Gudipatigadda	9	Un Notified	3.579	343	142	708	714	397.32

10	Nadigadda Part	3	Un Notified						
11	Rangarajula Veedhi	41	Un Notified	0.485	183	772	388	384	1591.75
12	Kuruvapeta	11	Un Notified	0.720	156	501	255	246	695.83
13	Sunkulamma Veedhi No.5	41	Un Notified	1.38	245	123	653	582	894.93
14	Maldarpeta	2	Notified	1.436	258	134	664	681	936.63
15	Parameswara Shed Area	14	Un Notified	1.776					
16	Bogguline	29	Notified	9.133	176	860	433	427	94.16
17	Rani-Maharani Theatre area	37	Un Notified	3.171	122	461	226	235	145.38
18	Nandamuri Nagar	37	Notified	42.38	693	233	1224	1107	55.00
19	Y.S.R. Nagar	38	Un Notified	186	226	607	295	312	3.26
20	P.V.Nagar	1	Un Notified	12.314	578	156	790	775	127.09

Source: Census of India (2011), New Delhi

3.4 Economic Base of Town

Nandyal is one of the important Commercial Centers in Kurnool District, being surrounded by a number of villages whose activity is mainly agriculture. The major crops cultivated here are Paddy, Jowar, Tobacco and Cotton. Other crops that are grown here are Groundnuts, Bengal gram, Sunflower, Toor dal, Mustard seeds and Sugar cane. The vegetation of most famous Polur Brinjals has its native here. Other vegetables include Chillies, Cucumber, Tomatoes, Ridge Gourd, Indian Broad Beans, Cluster Beans. All types of leafy vegetables are grown here. The soil is of mixed varieties making it suitable to grow many crops. The world famous varieties of mangoes are grown in Banganapalli. Commercial crops like Castor Seeds are also grown. Bananas are extensively grown in and around Nandyal though its productivity declined gradually. National Seed Corporation Ltd is established at Noonepalli, Nandyal which ensures to meet the demand for quality seed of the farmers. Hence there is busy commercial activity for the agricultural produce.[11]

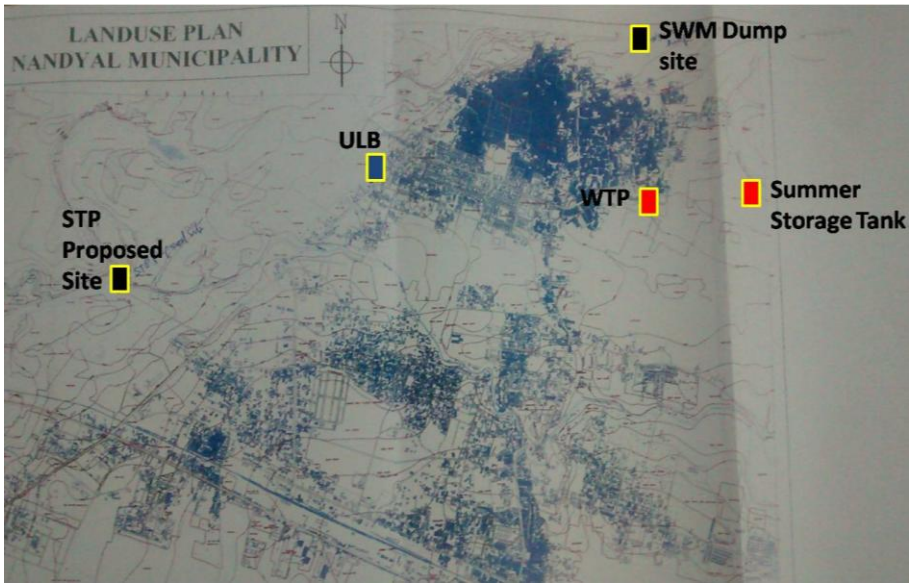


Figure 4: Town Map, Nandyal

[11] Nandyal Municipality (2016)

Section II – Technical Sectors

This study report shall be based on the following objectives:

Envisage providing the Municipality with a report on better improvements under water supply utility in a phased manner aiming to meet the demands of population for intermediate and ultimate in affordable rates including barrier free to the Nandyal residents. This would entail:

To assesses the identification of deficiencies in the existing system with the enabled measures to improve the level of service.
To suggest the institutional mechanisms for improving operation and maintenance.
To suggest improved measures for training and capacity building.

To suggest the ULB to equip with the necessary skills and arrangements for achieve 24x7 systems.

4. Water Supply

This chapter presents the analysis of the existing water supply scenario of the city as well as the analysis of gaps and issues in this sector. The main indicators taken for this analysis are raw water drawl, water treatment, summer storage tanks, water distribution and financial issues concerning water supply.

4.1 Baseline Status

Per capita water supply is arrived at 14.83 MLD and 73 LPCD.
Only 50.85% of the households (23,459) have water supply connections. The remaining half of the population gets access to water supply through 1230 public stand posts (PSPs).

Source of Water Supply

Raw Water Drawl for drinking water supply is from the KC canal that runs in 3 Kms distance from Nandyal for six months.
During canal closure time the town takes water from Velugodu Balancing Reservoir for four months because the S.S. tanks can provide water only for two months.
Clear water is supplied to the town through a chain of ELSRs located at locations all over town.
Water is supplied every day for two hours.[12]

Options Available to Supplement Source Deficiency

In the process of exploring possibilities of reliable sources, a number of discussions were held with irrigation officials, PH, municipal officials. The options are suggested after studying the irrigation sources around Nandyal.

Construction of Additional SS tank

> The Existing full storage capacities of both SS Tanks 409 + 2720 = 3129 ML put together are sufficient for only 65 days for the present and 49 days for the prospective, considering 135 LPCD. The construction of additional SS Tank of Capacity 6300 ML to meet the balance

[12] Nandyal Municipality (2016): Sector Wise Slip Template: Water Supply

prospective requirements is necessary. The requirement of land for SS Tank will be around 250 acres, the land cost worked out to be 25.00 Crores at 10.0 Lakhs per acre. The cost of construction of SS Tank is approximately works out to Rs 213.00 crores and the maintenance cost is Rs 2.0 Crores per annum.

Velugodu Balancing Reservoir as Source

Velogodu is a dependable source as there is an allocation of 0.3 TMC from Telugu ganga project. In G.O.Ms.No. 34 of IandCAD (PW-TGP) Department, Dated 30-01-1993. Whenever required water is being drawn from Velugodu Balancing Reservoir for which 0.3 TMC water is allocated to Nandyal Municipality.

It is proposed to draw water through gravity for a length of about 39.5 KM from Velugodu Reservoir (telugu ganga canal) to Nandyal Town for which estimated cost works out to be about 83.00 Crores. After going through the merits and demerits of each alternative, option 2, i.e. Velugodu Balancing Reservoir as Source is suggested in view of the assured allocations.[13]

Water Treatment Plants

There are two Water Treatment Plants in Nandyal, but their capacity is limited because they are not working properly.

Table 6 Capacity of Water Treatment Systems

Water Treatment System	Capacity
Bharat Head Water Works at OLD RG filters (Defunct)	5.460 MLD
Bharat Head Water Works at New RG filters	5.460 MLD
Head Water Works at Weekly Market	14.860 MLD
Total installed Capacity of WTPs	**25.780 MLD**
Bharat Head Water Works at OLD RG filters (Defunct)	10.92 MLD
Total Available Capacity of WTPs	**14.86 MLD**

Source: Nandyal Municipality (2016)

Summer Storage Tanks

There are two Summer Storage Tanks for drawing water during closure period of canal, they have a capacity of 400 ML and 2730 ML, but the bigger one is restricted to 1100 ML due to failure of one side earthen bund. Hence the combined capacity is 1500 ML.
According to CPHEEO Manual domestic supply should be 135 LPCD, 73 LPCD are provided to Nandyal Town.[14]

Table 7 Summer Storage Tanks

Existing Summer Storage Tank for Prospective and Ultimate Demands	
Existing Full Capacities of SS Tank (409+2720)	3129.00 ML
Less. 33 1/3% Losses for Evaporation, Seepage and Dead Storage	1043.00 ML
Available Raw Water for SS Tank	2086.00 ML

[13] Nandyal Municipality (2016)
[14] Nandyal Municipality (2016)

Source: Nandyal Municipality (2016)

Table 8 Demand of Water Supply

Population	Per Capita Demand		
	135 LPCD	100 LPCD	50 LPCD
Present Population (2017)	65 days	88 days	176 days
Prospective Population (2032)	49 days	67 days	134 days
Ultimate Population (2047)	38 days	51 days	102 days

Source: Nandyal Municipality (2016)

Storages of Water (ELSR)

Nandyal Town has 10 ELSRs that have a combined capacity of 8330 Kl.
They are located at various places across the city.
The treated water is being pumped to the ELSRs directly without any intermediate ground level sump.[15]

Water supply distribution network

There are about 25 Kms clear water mains ranging from 800mm dia to 250 mm dia.
Out of those 9.725 Kms are clear water gravity mains, for the rest pumps are used.[16]

Water Supply Connections

This has 46.127 Households, of which 23,459 Households have Water Supply Connections and hence the percentage of coverage is 50.85%.
Out of all water connections only 9.8% are metered.[17]

Table 9 Zone Wise Coverage of Households

Zone No	Total No of Households	Households with Water Tap Connection	Households without Water Tap Connections
1	9600	4882	4718
2	2982	1517	1465
3	2357	1199	1158
4	4662	2371	2291
5	2536	1290	1246
6	3192	1623	1569
7	5979	3041	2958
8	4438	2257	2181
9	4951	2517	2449
10	5430	2762	3549
Total	**46,127**	**23,459**	**22,669**

Source: Nandyal Municipality (2016): Sector Wise Slip Template: Water Supply

Distribution Network

[15] Nandyal Municipality (2016): Sector Wise Slip Template: Water Supply
[16] Nandyal Municipality (2016)
[17] Nandyal Municipality (2016): Sector Wise Slip Template: Water Supply

The total length of pipelines in the city is 171 Kms, the total road length is 252 Kms, so not all the streets are provided with pipelines.
The materials used for pipelines are HDPE, AC, CI.
The existing distribution network in part is over 50 years old and outlived.[18]

Table 10 Zone Wise Length of Distribution Network

Zone No	Total Street Length (kms)	Street length with water distribution pipe line (kms)	Street length without water distribution pipe line (kms)
1	52.45	35.59	16.86
2	16.29	11.05	5.24
3	12.88	8.74	4.14
4	25.47	17.28	8.19
5	13.85	9.40	4.45
6	17.44	11.83	5.61
7	32.66	22.17	10.49
8	23.75	16.45	7.80
9	27.05	18.36	8.69
10	29.66	20.13	9.53
Total	**252**	**171**	**81**

Source: Nandyal Municipality (2016): Sector wise Slip Template for Water Supply

Water supply charges

This Municipality is presently collecting monthly consuming charges from the domestic users Rs. 80/- P.M and beside this from the commercial consumer users Rs. 20 per KL.
The total current demand of water charges are 230.00 Lakhs and collection made 218.50 Lakhs during the year 2014-15.[19]

Operation and Maintenance

This Municipality is having 179 outsourced workers and 60 permanent workers who are working for the maintenance of water supply.

Table 11 Water Supply Revenue and Costs for Operation and Maintenance

Cost Recovery		2006-07	2007-08	2008-09	2009-10 (till Dec)
Operating Expenses	Rs. Million	548	587	616	485.1
Revenue billed	Rs. Million	297.34	297.99	299.42	235.79
Cost recovery %		54%	51%	49%	49%

Source: Nandyal Municipality

Table 12 Other Water Related Expanses

Cost	Rs.
Regular staff salary	180.00 Lakhs
Out sourcing staff salary	213.60 Lakhs

[18] Nandyal Municipality (2016): Sector Wise Slip Template: Water Supply
[19] Nandyal Municipality (2016)

Power charges	72.00 Lakhs
Chemicals	40.00 Lakhs
Other maintenance and repairs	24.50 Lakhs
Total	**530.00 Lakhs**

Source: Nandyal Municipality

Figure 5 Designated Spot for WWTP

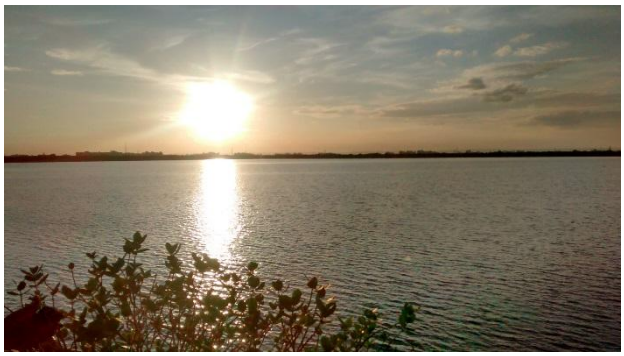


Figure 6 Summer Storage Tank Nandyal

Figure 7 Waste Water Treatment Plant

4.2 Gaps and Issues

Water demand

Water Demand Forecasting

Table 13 Water Demand Forecasting

No.	Parameter	Calculation
A	Current population of city with piped water supply	2,25,000
B	Current Treatment Capacity of WTP / Treated water supplied to the city	25.50 MLD
C	Current technical / distribution losses	assume 20 %
D	Hence actual treated water supplied	20.40 MLD
E	Hence per capita water supply	approx. 90.66 LPCD
F	Water requirement of the city	135 LPCD

G	Hence current required treatment capacity / water demand	37.96 MLD

Source: Nandyal Municipality (2016)

Table 14 Future Water Demand

NO.	Component	Present Year 2011	Base Year 2017	Prospective Year 2032	Ultimate Year 2047
1	Population	200516	237187	312277	406968
2	Prorata Supply	135	135	135	135
3	Clear Water requirement in MLD	28.71	32.02	42.16	54.94
4	UFW @ 15% in MLD	4.31	4.80	6.32	8.24
5	Clear Water to Distribution in MLD	33.01	36.82	48.48	63.18
6	Raw Water Requirement in MLD	33.01	36.82	48.48	63.18

Table 15 Demand Gap Assessment for Water Supply

Component	2015			2012	
	Present	Ongoing Projects	Total	Demand	Gap
Source	2097 ML	0	2097 ML	10279	8182
Treatment Capacity	14.83 MLD	0	14.83 MLD	35 MLD	20.17 MLD
Elevated Storage Capacity	8330 KL	0	8330 KL	11487 KL	3157 KL
Distribution Network Coverage	171 KM	0	171 KM	252 KM	80 km

Source: Nandyal Municipality (2016)

Neither for the present nor the future water demand the capacity of the S.S. Tanks is adequate.
The treatment plants are not sufficient for present and future demands.
Storage units are not sufficient for present and future demands.

Zonal Level Water Supply

The Nandyal Town population is 2,00,516 as per 2011 census and requires 28.50 MLD at the rate of 135 LPCD including UFW Losses.
Depending on the source the actual water supply rate in Nandyal varies from 73 to 127 LPCD.
There are 19.989 house connections, 223 commercial taps and water charges collected from domestic service connections is about Rs 80/- per month, 20/- per 1000 Liters (minimum 100/- Per Month) water charges collected from commercial service connections. That means only 1% of the households have meters for their water supply.
Only 50.85% of the households have piped water connections.
There are about 6 power bore wells and 497 hand bores.
The existing distribution is very old in the old town area and needs remodeling. The distribution is not up to the satisfaction of the citizens of Nandyal.
Ward no. 12,24,25 and 34 is not included under and water supply zone.

Table 16 Zonal Level Water Supply

No	Zone name	Reservoir Type	Capacity (KL)	Wards served	No. of HH	No. of connections	Water Quality	Per capita supply	Frequency of water supply	Hours of supply	Pressure Adequate/Inadequate
1	Noonepalli	ELSR	700	20,21,22,23,	9600	4882	Good	Inadequate	Daily	2 Hhs	Adequate
2	Noonepalli	ELSR	500	26,27,28	2982	1517	Good	Inadequate	Daily	2 Hhs	Adequate
3	Gnanapuram	ELSR	1100	28,29,30,31,32,33	4662	2371	Good	Inadequate	Daily	2 Hhs	Adequate
4	SBI Colony	ELSR	1200	14,15,16,17	3192	1623	Good	Inadequate	Daily	2 Hhs	Adequate
5	Sandyya tank	ELSR	900	10,13,7,8	5979	3041	Good	Inadequate	Daily	2 Hhs	Adequate
6	Municipal Office	ELSR	850	35,36,37,40,42	4438	2257	Good	Inadequate	Daily	2 Hhs	Adequate
7	Prakasham park	ELSR	700	9, 10,4,5,3	2357	1199	Good	Inadequate	Daily	2 Hhs	Adequate
8	Municipal High school	ELSR	1000	1,2,3,5,11, 39,40,41,42	4951	2517	Good	Inadequate	Daily	2 Hhs	Adequate
9	NGO'S Colony	ELSR	900	18,19,20	5430	2762	Good	Inadequate	Daily	2 Hhs	Adequate
10	YSR Nagar	ELSR	500	38	1505	356	Good	Inadequate	Daily	2 Hhs	Adequate

Source: Nandyal Municipality (2016)

Non-Revenue Water (NRW)[20]

The extent of Non-Revenue water is arrived keeping in view of the total quantity of water supplied. Water gets supplied through 23.459 service connections at the rate of 5 l/m. Water gets supplied through 230 metered connections at the rate of 10 l/m.[21]

Table 17 Cost Recovery Non-Revenue Water

Cost Recovery	2014	2013	2012	2011	2010
Operating Expenses (Rs. In Lakhs)	513.18	354.80	356.48	301.52	293.52

[20] Real losses (eg. leakages in the transmission and distribution networks), apparent water losses (e.g. illegal water connections, water theft, metering inaccuracies) and consumption which is authorized but not billed (e.g. stand-posts).
[21] Nandyal Municipality (2016): Sector wise Slip Template: Water Supply

Operating Revenues (Rs.in Lakhs)	218.60	206.39	196.80	181.78	163.62
Cost Recovery (% in Lakhs)	42.59%	58.17%	55.20%	60.28%	55.74%

Source: Nandyal Municipality (2016)

Table 18 Water Supply DCB

Water Supply	2011-12	2012-13	2013-14	2014-15
No of Assestments	18936	21458	21798	22647
Demand				
Arrears	186.87	220.73	223.41	225.02
Current	178.36	195.66	215.19	218.23
Total	**365.23**	**416.40**	**438.60**	**443.25**
Collection				
Arrears	26.83	44.67	25.09	34.94
Current	117.32	141.98	133.26	139.96
Total	**144.15**	**186.65**	**158.35**	**174.89**
Balance				
Arrears	160.04	176.06	198.32	190.08
Current	61.04	53.72	81.93	78.27
Total	**221.07**	**229.78**	**280.25**	**268.35**

Source: Nandyal Municipality (2016)

Table 19 Overview Table Water Supply

Sr. No.	Indicators	Present status	MOUD Benchmark
1	Coverage of water supply connections	**50.85%**	100%
2	Per capita supply of water	**73 LPCD**	135 LPCD
3	Extent of metering of water connections	**9.8%**	100%
4	Extent of non-revenue water	**18.13%**	20%
5	Quality of water supplied	**98%**	100%
6	Cost recovery in water supply services	**62.12%**	100%
7	Efficiency in collection of water supply related charges	**90%**	90%

Source: Nandyal Municiaplity (2016): Sector Wise Slip Template: Water Supply

4.3 Main issue of Water Supply

The coverage of individual water supply connections to households is low.

5. Access to Toilets

Proper access to sanitation is very important to maintain health and hygiene of the citizens and it is also necessary from the town's aesthetic point of view. Human waste (feces and urine) can pollute water, food, and soil with germs and worms, leading to serious health problems. The safe disposal of human waste does not only involve the building of sanitation infrastructure but also demands proper conveyance (sewerage system) and treatment of the waste (sewage). The city of Nandyal needs safe, clean and well-designed sanitation facilities to prevent the practice of open defecation, spread of diseases and environmental pollution. The following section describes the present sanitation status of Nandyal Town and delineates various issues which need to be tackled to provide better access to sanitation to the city dwellers.

This chapter presents the analysis of the existing sanitation sector of the city as well as the analysis of gaps and issues. The main indicators taken for this analysis are numbers and access to different kinds of toilets.

5.1 Baseline Status

Individual Household Toilets: Pour flush type toilets: 40,844 as against 46,127 Households

Community Toilets: There are 34 Community toilets, hat 15.997 Households depend on.

Table 20 Coverage of Toilets (Individual and Community)

Ward	Total HHs	Urban poor HHs	No. of HHs		No of urban poor HHs	
			Having individual toilets	Dependent on community toilets	Having individual toilets	Dependent on community toilets
1	552	380	148	24	98	282
2	575	350	53	172	35	315
3	516	378	78	60	50	328
4	524	294	29	201	12	282
5	709	500	159	50	110	390
6	864	679	108	77	68	611
7	646	409	48	189	25	384
8	456	250	86	120	50	200
9	435	250	128	57	95	155
10	348	200	60	88	41	159
11	574	260	6	308	3	257
12	507	235	78	194	52	183
13	750	400	11	339	8	392
14	219	125	2	92	30	95
15	609	400	75	134	51	349
16	649	412	38	199	18	394
17	850	600	11	239	9	591
18	618	423	169	26	189	234
19	442	200	8	234	4	196
20	239	108	38	93	20	88
21	486	250	216	20	180	70
22	651	350	125	176	109	241
23	717	500	188	29	170	330
24	782	256	400	126	200	56
25	550	230	187	133	150	80
26	421	210	134	77	102	108

27	289	130	58	101	49	81
28	630	300	292	38	150	150
29	632	400	210	22	190	210
30	581	400	149	32	132	268
31	403	180	81	142	72	108
32	553	290	219	44	195	95
33	577	400	70	107	61	339
34	653	300	133	220	102	198
35	882	400	16	466	14	386
36	481	200	24	257	15	185
37	436	200	195	41	152	48
38	1860	750	730	380	680	70
39	401	120	43	238	30	90
40	669	400	3	266	1	399
41	256	159	10	87	6	153
42	736	439	109	188	78	361
Total	**24728**	**13717**	**4925**	**6086**	**3806**	**9911**

Source: Census of India (2011), New Delhi

Table 21 Community Toilet Blocks

Though this table contains information only about 34 Community Toilet Blocks, on the ground there are 43 blocks in Nandyal Town.[22]

No	Location / Ward	Population dependent	No of Seats		Waste disposal arrangement	Functional status	Design consideration for men and women (privacy) – Yes / No	Is complaint redressal system available ?
			Men	Women				
1	24th Street Harijanawada	728	-	26	Septic Tank	Water, Lighting	Yes	Yes
2	Sangapeta	560	-	20	Septic Tank	Water, Lighting	Yes	Yes
3	Pathan Peta	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
4	Pathan Peta	378	14	-	Septic Tank	Water, Lighting	Yes	Yes
5	Maldar Peta	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
6	Nadigadda	540	20	-	Septic Tank	Water, Lighting	Yes	Yes
7	near Kalikamma Temple at Nadigadda	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
8	Pandurana Swamy	392	-	14	Septic Tank	Water, Lighting	Yes	Yes

[22] Disussions with Municipal Officer 2016

	Temple area							
9	Panipatti	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
10	Panipatti	432	16	-	Septic Tank	Water, Lighting	Yes	Yes
11	Uppari Peta	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
12	Balakonda Hall	224	-	8	Septic Tank	Water, Lighting	Yes	Yes
13	Gudipati Gadda	392	-	14	Septic Tank	Water, Lighting	Yes	Yes
14	Tekke	560	-	20	Septic Tank	Water, Lighting	Yes	Yes
15	Revenue Quarters	560	-	20	Septic Tank	Water, Lighting	Yes	Yes
16	Noonepalli Harijanawada	448	-	16	Septic Tank	Water, Lighting	Yes	Yes
17	Ekalavya Nagar	504	-	18	Septic Tank	Water, Lighting	Yes	Yes
18	R.F. Road	448	-	16	Septic Tank	Water, Lighting	Yes	Yes
19	Maruthi Nagar	448	-	16	Septic Tank	Water, Lighting	Yes	Yes
20	Talari Peta	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
21	Tikka Swamy Darga area	560	-	20	Septic Tank	Water, Lighting	Yes	Yes
22	Sadiq Nagar	448	-	16	Septic Tank	Water, Lighting	Yes	Yes
23	Gandhi Nagar	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
24	Gattal Nagar	392	-	14	Septic Tank	Water, Lighting	Yes	Yes
25	Moolasagaram	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
26	MS Nagar Road	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
27	MS Nagar Road	270	10	-	Septic Tank	Water, Lighting	Yes	Yes
28	Viswasapuram	224	-	8	Septic Tank	Water, Lighting	Yes	Yes
29	Gnanapuram	224	-	8	Septic Tank	Water, Lighting	Yes	Yes
30	Danielpuram	392	-	14	Septic Tank	Water, Lighting	Yes	Yes
31	Byti Peta near slaughter house	560	-	20	Septic Tank	Water, Lighting	Yes	Yes
32	Sunkulamma Peta	280	-	10	Septic Tank	Water, Lighting	Yes	Yes
33	Telugu Peta	280	-	10	Septic Tank	Water,	Yes	Yes

						Lighting		
34	Telugu Peta	270	10	-	Septic Tank	Water, Lighting	Yes	Yes

Source: Sencus of India (2011), New Delhi

Public Toilets

There are 3 public toilets for the floating population dependent.

Table 22 Public Toilet Blocks

No.	Location	People dependent	No of Seats		No of Urinals		Waste disposal arrangement	Functional status	Design consideration for men and women (privacy) – Yes / No	Complaint redressal system available	Owned and Maintained by	Charges (Rs)
			Men	Women	Men	Women						
1	RTC Bus Stand	2000	10	10	4	4	Septic tank	Yes	Yes	Yes	PPP	5
2	Veg Market	500	5	5	2	2	Septic tank	Yes	Yes	Yes	PPP	5
3	General Hospital	1000	5	5	2	2	Septic tank	Yes	Yes	Yes	PPP	5

Source: Nandyal Municipality (2016)

School Sanitation: There are 37 Municipal schools.

Open defecation: Open defecation is happening in certain slums in Nandyal Municipality, which should now be covered with Individual House Hold Toilets under Swachh Bharat Mission. Nandyal is declared as open defecation free town.[23]

Figure 8 Toilet in Nandyal

5.2 Gaps and Issues

The households of the urban poor are significantly more dependent on community toilets, about 16.000 households depend on 43 community toilet with 525 total number of seats.

All the community toilet blocks and public toilet blocks have septic tanks but there is no information about their disposal arrangements and functional status.

It can be assumed that the waste disposal arrangement is improper.

There is no mapping of unhygienic toilets available. It is recommended for the town to collect data in this field like:

[23]Nandyal Municipality (2016)

Toilets connected to containment units which leak/open into ponds/canals/ditches
Toilets connected to no containment or underground drainage system
Toilets connected to a pit with no squatting slab

6. Waste Water Management

This chapter presents the analysis of the existing waste water management of the city divided into the sector sewerage management and septage management. Also issues concerning storm water management will be discussed up to a certain extent, following the situation in Nandyal. The analysis of the baseline and the definition of gaps and issues focusses on existing infrastructure like drains and treatment plants as well as the generation of wastewater and fecal sludge.

6.1 Sewerage Management

6.1.1 Baseline Status

Existing Infrastructure for collection and conveyance of Fecal Sludge and Waste Water

This Municipality does not have a proper sewerage system.
As there is no sewerage system and no treatment plant, reliable numbers for the sewerage generated are also missing.
Most households have pits or septic tanks, but the households are not connected to a sewer network.
There is no systematic and organized method to collect and treat waste from septic tanks. The duration of cleaning of septic tank varies it, organized by the municipality or privates. Overflows are let into the nearby drains/open fields.
Fecal Sludge collected from the tanks and pits gets disposed into the open, for example stone quarry mines.
Sometimes waste water and the sewage of the septic tanks and pits from the households goes directly into the storm water drains, the katcha drains or the pucca drains.
There is no treatment for sullage or sewage water, these are let out into the nearby natural stream called Maddileru, Uddi Banda, Chama Kaluva.
Eventually all the water will join the Kundu River. This is not a perennial river, so the Telugu Gnaga water will be released into the Kundu River. There are 34 villages dependent on the Kundu River for drinking water, which face epidemics regularly.
Water resources in the area are polluted, water stagnates in low-lying areas and health hazards are created.
The Municipality wanted to have a proper underground drainage system but due to the lack of funds it could not be constructed.
Especially during the monsoon season the drainage system overflows because it cannot carry the load.[24]

Existing Treatment Facilities

There are decentralized sewerage systems in Taylors Colony, YSR Nagar and Nandamuri Nagar which were partly covered with network. But the treatment was not taken up.[25]

6.1.2 Gaps and Issues

Waste Water Generation

[24] Nandyal Municipality (2016): Template for Service Level Improvement Plan: Sewerage
[25] Nandyal Municipality (2016): Template for Service Level Improvement Plan: Sewerage

As there is no proper treatment plant for wastewater it is not possible to measure how much wastewater is created in a day. But considering the inhabitants and the drinking water provided, there is an estimate of 21 MLD of sewerage generated per day.

Sewer Network and Pumping Stations

There is poor coverage of data concerning the sewer network and no data concerning pumping stations.
In general the sewer network covers only a small part of town, it is old and mostly defunct.
There is poor collection efficiency of the sewer network.
There are a lot of breakages, leakages, blockages, etc. that lead to overflows etc.

Sewerage Treatment Plants

There are decentralized sewerage systems in Taylors Colony, YSR Nagar and Nandamuri Nagar which were partly covered with network. But the treatment was not taken up.
The capacities of the STPs are inadequate to handle present and future sewage.
There is no recycling or reuse of sewage, most of it goes directly into open water bodies.

6.1.3 Main Issue of Sewerage Management

The town has no wastewater/fecal sludge management system in place which is the most detrimental issue in terms of environmental impact.

6.2 Septage Management

6.2.1 Baseline Status

- Approximately 36.81 cu.m[1] of septage is generated by population of 2,0061 on daily basis in Nandyal
- Desludging is carried out by private service providers in Nandyal. There is no formal fecal sludge emptying service provided by the municipality.
- The septic tanks and pits in the town are serviced by informal fecal sludge emptying operators, regarding whom there is no database with the municipality.
- The sludge emptied from the septic tanks of households is dumped in open fields and open environment. There is no regulation or awareness against such practices.
- The duration of cleaning varies based on the size of the tank and pit, for which there is no existing database.

As the septic tanks are not connected to a soak pit, the tanks outflow conveniently empties into an adjacent drain, thus not requiring the households to desludge regularly.
There are no Sewerage Treatment Plants.

6.2.2 Gaps and Issues

Septic Tanks

Non-conformity of the design of existing septic tanks in the city to IS 2470 (Part 1)-1985,
Septic tanks are single chambered and are not water tight,

[1] Assuming sludge accumulation rate of 30 liter per capita per year for septic tanks.

Septic tanks are broken and are of inadequate size,
Grey water is entering the septic tanks,
Septic tanks are inaccessible for cleaning,
Design of septic tanks is not controlled through building / planning rules
Absence of secondary treatment systems (eg. soak pits) for disposal of grey water & septic tank effluent.

Septage Collection and Conveyance

Lack of data on private operators involved in desludging.
The private operators are not authorized and not regulated.
Desludging of septic tanks is not carried out regularly (once in every 2-3 years).

Septage Treatment and Disposal/Reuse

Absence of fecal sludge treatment plant.
Disposal of untreated sludge into open water bodies, such as the natural streams called Maddileru, Uddi Banda and Chama Kaluva, which later join the river Kundu.
The polluted river Kundu serves the drinking water needs of 34 villages, which face water-related epidemics.

Table 23 Overall status of Sewerage Network and Service Levels

No.	Indicators (per SLB framework)	Existing Service Level	MOUD Benchmarks
1	Coverage of latrines	**88.54%**	100%
2	Coverage of sewerage network services	**0%**	100%
3	Efficiency of collection of sewerage	**0%**	100%
4	Efficiency in treatment: Adequacy of sewerage treatment capacity	**0%**	100%

Source: Template for Service Level Improvement Plan: Sewerage (2016)

6.2.3 Main Issues of Septage Management

No systematic or organized method to collect, convey and treat fecal sludge (Fecal sludge management) collected from the pits and septic tanks of the town.

7. Solid Waste Management

One of the major issues next to waste water management in Nandyal Town is solid waste management. This chapter presents the gaps and issues concerning solid waste in the city. The analyses follows solid waste along all points of the solid waste value chain, from generation to disposal and reuse.

7.1 Baseline Status

Table 24 Overview Solid Waste Management

Total Zones in the city		10 Zones
Activity Performed by respective actors	DTD collection of waste	√
	Segregation of waste	x
	Street sweeping	√
	Transportation of waste to dumper Placer / waste collection vehicle	√
	Transportation of waste to transfer station	√
	Transportation of waste to processing / landfill site	√
	Processing & disposal of waste	x

Solid Waste Generation

Solid Waste Generation depends on factors such as food habits, standards of living, degree of commercial activities and seasons.

Major sources of solid waste generation in the town are domestic waste, commercial establishments, markets and restaurants.

There is almost no segregation of solid waste at any point.[26]

Table 25 Calculation for Solid Waste Generation

No.	Parameter	Calculation
1	Current population of city	2,00,516
2	Total waste generated	63 TPD
3	Hence, per capita waste generation	314 gm

Source: IL&FS Environmental Infrastructure&Services Limited (2016): Detailed Project Report for Implementation of MSWM in Zone V of Andhra Pradesh. Nandyal Municipality

Primary Collection of Solid Waste

Primary Collection refers to waste from source of its generation such as households, markets, institutions and commercial establishments to the transfer station/transit point/storage place/ directly to disposal site. Primary collection includes door to door collection of waste from several points. Equipment/vehicles used for primary collection are bins, tricycles and auto rickshaws.

90% of the total households gets serviced by door to door collection on a daily bases.

The remaining 10% waste is collected two to three times a week.

In some of the slum areas the domestic waste is being dumped on the streets, open spaces, and vacant places thereby creating unhygienic conditions in the neighborhood.

[26] Nandyal Municipality (2016)

The collection is done by municipal sanitary workers free of cost for residents.
Route maps show that waste collection timings are from 7.00 am to 10.00 am, but in fact the time schedule for collection is from 6.00 am to 12.00 pm.[27]

Table 26 Collection of Solid Waste

Ward No. and Name	No. of HHs	Total waste generated (MT/day)	If Household Door to Door collection system is available				
			No. of HHs covered	Qty. of waste collected (MT/day)	Source segregation (Yes/No)	Waste collection frequency	Existing manpower (Nos.)
1	650	0.92	650	0.92	Yes	Daily	4
2	978	1.38	978	1.38	Yes	Daily	6
3	1365	1.91	1365	1.91	Yes	Daily	9
4	958	1.34	958	1.34	Yes	Daily	6
5	896	1.26	896	1.26	Yes	Daily	6
6	1020	1.43	1020	1.43	Yes	Daily	6
7	958	1.34	958	1.34	Yes	Daily	6
8	752	1.05	752	1.05	Yes	Daily	4
9	892	1.25	892	1.25	Yes	Daily	5
10	1011	1.42	1011	1.42	Yes	Daily	6
11	1011	1.42	1011	1.42	Yes	Daily	6
12	1099	1.55	1099	1.55	Yes	Daily	7
13	1859	2.61	1859	2.61	Yes	Daily	12
14	2006	2.81	2006	2.81	Yes	Daily	12
15	953	1.34	953	1.34	Yes	Daily	6
16	1063	1.49	1063	1.49	Yes	Daily	7
17	731	1.03	731	1.03	Yes	Daily	4
18	854	1.2	854	1.2	Yes	Daily	5
19	1088	1.53	1088	1.53	Yes	Daily	6
20	1821	2.55	1821	2.55	Yes	Daily	11
21	856	1.2	856	1.2	Yes	Daily	6
22	589	0.82	589	0.82	Yes	Daily	3
23	1259	1.76	1259	1.76	Yes	Daily	8
24	1322	1.83	1322	1.83	Yes	Daily	8
25	423	0.59	423	0.59	Yes	Daily	2
26	1536	2.16	1536	2.16	Yes	Daily	10
27	1254	1.76	1254	1.76	Yes	Daily	8
28	1000	1.4	1000	1.4	Yes	Daily	6
29	560	0.79	560	0.79	Yes	Daily	3
30	1233	1.73	1233	1.73	Yes	Daily	8

[27] IL&FS Environmental Infrastructure&Services Limited (2016): Detailed Project Report for Implementation of MSWM in Zone V of Andhra Pradesh. Nandyal Municipality

31	1025	1.44	1025	1.44	Yes	Daily	6
32	425	0.59	425	0.59	Yes	Daily	2
33	1233	1.73	1233	1.73	Yes	Daily	8
34	865	1.21	865	1.21	Yes	Daily	5
35	1035	1.45	1035	1.45	Yes	Daily	6
36	1352	1.9	1352	1.9	Yes	Daily	9
37	1688	2.37	1688	2.37	Yes	Daily	11
38	1866	2.62	1866	2.62	Yes	Daily	11
39	550	0.77	550	0.77	Yes	Daily	2
40	1824	2.56	1824	2.56	Yes	Daily	11
41	654	0.92	654	0.92	Yes	Daily	4
42	752	1.05	752	1.05	Yes	Daily	4
Total	**45266**	**63.48**	**45266**	**63.48**			**275**

Source: Nandyal Municipality (2016)

Road Sweeping Waste

Street Sweeping is a function of the Municipality.
Only main roads are swept daily, other roads are swept twice or less per week.
Dust, soil, sand, paper and fallen leaves are collected by tractors and autos, then transported to the dump yard.
Sanitary workers sweep streets with brooms and throw the waste to the nearest bin.

Secondary Collection

Secondary Collection refers to collection of waste from community bins, waste storage depots, transfer stations and transporting to waste dumping yard or processing facility or final disposal point.
There are 9 plastic bins, 91 push carts, 13 autos, 13 tractor trolleys and 5 truck tippers available. Most of them are in good condition. [28]

Table 27 Secondary Collection of Solid Waste

Ward No.	Population	Waste generated (MT/day)	If Community bins are available for secondary collection				
			No. of community bins available	Location of bins	Capacity of bins (MT)	Collection frequency	System of collection
1	650	0.92	-				
2	978	1.38	1 No	Nadigadda	0.05	Daily	
3	1365	1.91					5 Autos are lifting the Garbage at Bins.
4	958	1.34	1 No	Beside Mahanandiswara Swamy Temple	0.05	Daily	

[28] IL&FS Environmental Infrastructure&Services Limited (2016): Detailed Project Report for Implementation of MSWM in Zone V of Andhra Pradesh. Nandyal Municipality

5	896	1.26	1 No	Maldharpeta	0.05	Daily	
6	1020	1.43	1 No	Urban Health Centre, Atmakur Bustand	0.05	Daily	
7	958	1.34	1 No	Beside NTR Shadikhana, Atmakur Bustand	0.05	Daily	
8	752	1.05	2 Nos	1.Antikota Maseed opp 2. Upparipeta Public Latrine	0.1	Daily	
9	892	1.25					
10	1011	1.42	2 Nos	Vegitable Market	0.1	Daily	
11	1011	1.42					
12	1099	1.55	1 No	Srinivasa Tank	0.05	Daily	
13	1859	2.61	Nos	1.Sandhya Tank 2. SBI Bank, Srinivasa Centre 3. Beside National Degree College 4. Mulangi Apartment opp, Srinivasa Centre	0.2	Daily	
14	2006	2.81					
15	953	1.34					
16	1063	1.49	1 No	Near II Town Police Station, Tekke.	0.05	Daily	
17	731	1.03					
18	854	1.2					
19	1088	1.53					
20	1821	2.55	1 No	Maruthi Nagar	0.05	Daily	
21	856	1.2					
22	589	0.82	Nos	1.Ply Over Bridge starting 2. Burrial Ground, Noonepalli 3. Municipal School, NGOs Colony	0.15	Daily	
23	1259	1.76	1 No	Teachers Colony	0.05	Daily	
24	1322	1.83					
25	423	0.59					
26	1536	2.16					
27	1254	1.76	1 No	Kolimipeta	0.05	Daily	
28	1000	1.4					
29	560	0.79					
30	1233	1.73					
31	1025	1.44					
32	425	0.59					
33	1233	1.73					
34	865	1.21					
35	1035	1.45					
36	1352	1.9					

37	1688	2.37					
38	1866	2.62					
39	550	0.77					
40	1824	2.56					
41	654	0.92	2 Nos	1.Peddabanda 2.Kamela	0.1	Daily	
42	752	1.05	1 No	1.Bhimavaram Bye-pass road	0.05	Daily	
Total	**45266**	**63.48**			**1.2**		

Source: Nandyal Municipality (2016)

Conveyance to Treatment Facility

There is a transfer/transfer point in each division of the Municipality. Waste from primary and secondary collection is transported to transfer/transit point by autos and tractors and then sent to waste dump yard by truck tippers.

The capacity of vehicles is not fully utilized as there is no compaction facility which may lead to excess number of trips.[29]

Processing and Disposal of Solid Waste

Solid Waste from the ULB is collected and transported to a designated disposal site located near PV Nagar, about 3 Kms from Nandyal. This is used since 1995.

This site has an area of 19 acres.

Waste is openly dumped onto the ground with lining. It is an open area which is surrounded by open area, agricultural lands and scattered houses. It has a gate and a fence.

Though vermi-composting facility is available at site, it is not in operation.

Post processing only 3.33% of municipal solid waste is recovered.[30]

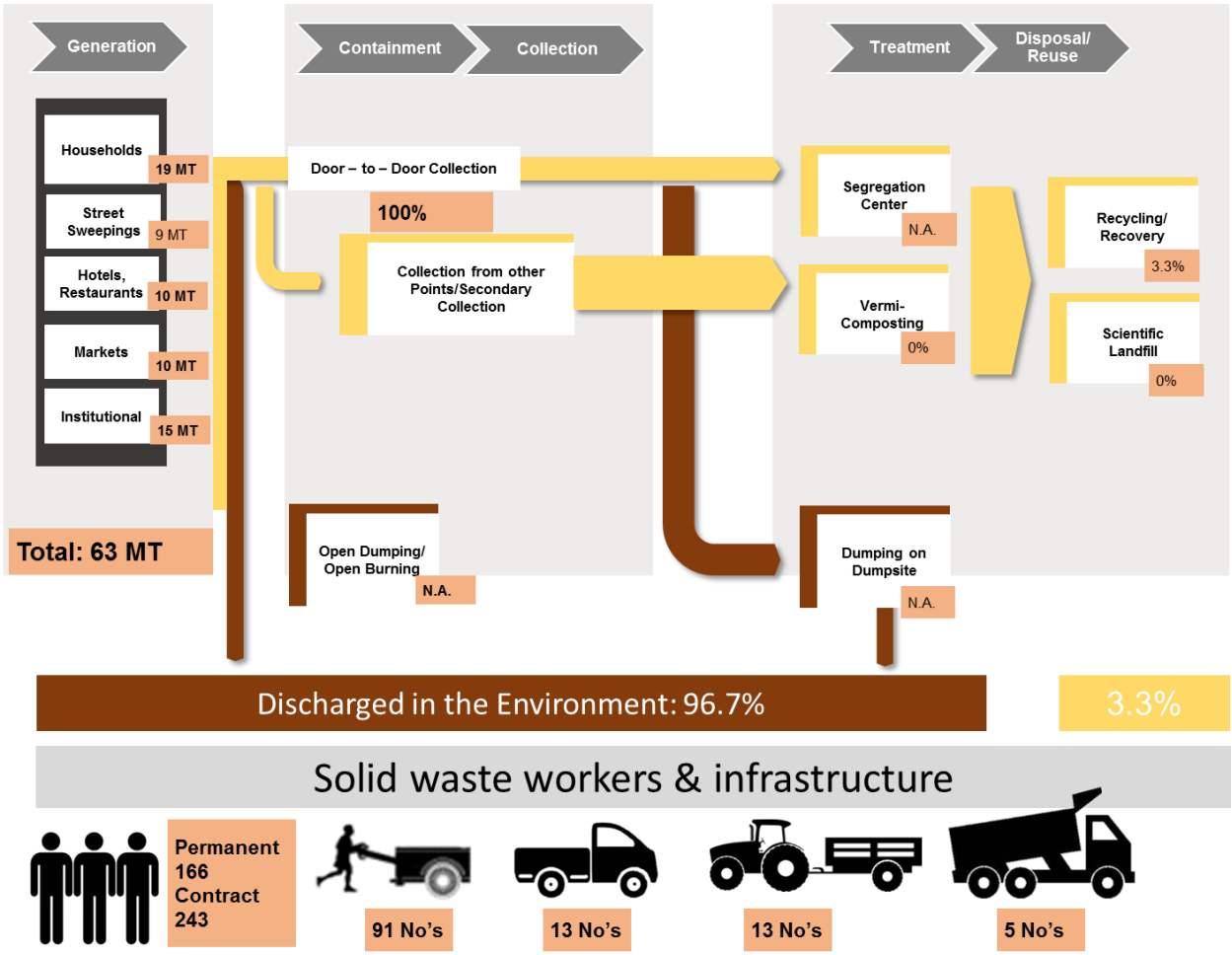
Figure 9 Reclaimed Landfill Nandyal

Figure 10 Solid Waste Nandyal

[29] IL&FS Environmental Infrastructure&Services Limited (2016): Detailed Project Report for Implementation of MSWM in Zone V of Andhra Pradesh. Nandyal Municipality

[30] IL&FS Environmental Infrastructure&Services Limited (2016): Detailed Project Report for Implementation of MSWM in Zone V of Andhra Pradesh. Nandyal Municipality

Figure 11 Solid Waste Mass Diagram



7.2 Gaps and Issues

Solid Waste Generation

There is a lack of understanding of the importance to minimize the generation of solid waste throughout all the generators

Primary Collection

Workers do not have proper equipment and handle waste unsafely.
Source segregation is not happening
Street sweeping should happen in all streets regularly.

Secondary Collection

Community bins are only in certain areas of Nandyal VERFUEGBAR. So their overall capacity is 1.2 MT though 63.48 MT of waste is generated every day.
Information about collection of waste from community bins is missing in most of the cases.

Conveyance to Treatment facility

Capacity of vehicles is not fully utilized.
Route-maps and logistic management have to be evaluated for proper utilization of vehicles.

Waste processing/Disposal

Vermi-composting site is available but not in use.
Segregation/Recycling is not happening at the disposal site. Open dumping of solid waste is inadequate.
Improper handling of waste by workers.

7.3 Main Issue of Solid Waste Management

Lack of solid waste processing facility (for biodegradable & non-biodegradable waste).

8. Storm Water Management

Storm water management goes hand in hand with waste water management, as there is only one set of drains in Nandyal town. This chapter is adding special information about storm water infrastructure, water logging and clogging of drains.

8.1 Baseline Status

Existing Infrastructure for Storm Water Management

There is no pucca comprehensive storm water drainage system in Nandyal.
There are some existing drains but they are damaged and small in section and hence cannot meet the increased demand, so they cause overflows.
The Municipality contemplated to have an underground sewage system but due to paucity of funds it did not happen.
As stated in chapter 6 – Wastewater and Faecal Sludge Management the effluent from pits and septic tanks are discharged in the drains. From there the sewage is discharged into open areas.
There are no ongoing projects concerning drainage systems in Nandyal Town.[31]

8.2 Gaps and Issues

Water Logging/Flooding

Certain areas of this Municipality are being effected with water losing and flooding when the heavy rains are falling due to cyclone.
The problem of water logging is now handled in an unsatisfactory way: Temporary kucha drains are dug in private sites and the stagnated water gets pumped in cess pools.[32]

Clogging of Drains

As the Septic Tanks and the Pits are directly emptied into the Storm Water Drains and solid waste gets also dumped there, they tend to clog. The problem does not get addressed seriously, only sometimes the drains get cleaned manually.

Table 28 Flood Prone Points in the City

No.	Area	No. of points	Reportet water loggings/year (Stagnant water, >4hrs, >6 ft. deep)
1	Key Road Intersection	14	20 to 30
2	Along Roads (50 meters or more)	51	20-30
3	Locality (affection 50 HHs or more)	26	20-30

Source: Nandyal Municipality (2016): Template for Service Level Improvement Plan (Storm Water Drainage)

Table 29 Detail of Locations prone to chocking of drains due to solid waste

No.	Location	Stretch Length Affected	Reason
1	Opp to Municipal office to Y-Junction	1000 Mtrs	Indiscriminate disposal of

[31] Nandyal Municipality (2016): Template for Service Level Improvement Plan (Storm Water Drainage)
[32] Nandyal Municipality (2016): Template for Service Level Improvement Plan (Storm Water Drainage)

2	Padmavathi arch to Saleem Nagar	1500 Mtrs	garbage in the major out fall drains
3	24 Harijana Wada	500 Mtrs	
4	Back side of Anjineya Swamy Temple	600 Mtrs	
5	Haneef Nagar	1000 Mtrs	

Source: Source: Nandyal Municipality (2016): Template for Service Level Improvement Plan (Storm Water Drainage)

Table 30 Status of Storm Water Service Level

No.	Indicators	Sustainable Standards	Black (Caution for Improvement)	Red (Immediate action for improvement)	Present Status
1	Coverage of Storm Water Drainage Network	100%	<75%	<50%	**4.5%**
2	Incidence of sewerage mixing into drains	0%	<25%	<50%	**100%**
3	Incidence of Water Logging	0%	<25%	<50%	**10%**

Source: Nandyal Municipality (2016): Template for Service Level Improvement Plan (Storm Water Drainage)

8.3 Main Issues of Storm Water Management

Open drains are not lined at all places.

Drains are poorly maintained. Dumping of solid waste in drains and chocking/blockages is prevalent.

There is improper provision for water flow and there is stagnation of water at many places.

There is need for an integrated drainage plan for the study to be planned in coordination with institutional arrangements for systematic cleaning and involvement /awareness programs among communities to prevent solid waste dumping and upkeep through community level ownership and maintenance.

Apart from storm water the drains carry the grey water, leading to the unsanitary conditions.

The Storm Water Drainage is uncovered in most of the commercial areas across the town. That is leading to dumping of all kinds of waste.

Section III – Cross-Cutting Aspects

9. Environmental Management of Water Bodies

This chapter contains general information about the legislative frameworks, roles and responsibilities of Andhra Pradesh and Nandyal. Also there is an analysis of the institutional arrangement in Nandyal Municipality, the organogram and department-wise staff is given.

9.1 Baseline Status

Legal Framework

The Government of Andhra Pradesh had issued a Government order, in 2009 to upgrade Nandyal as a special grade Municipality. There are 30 revenue wards and 42 election wards within the Municipality.
A number of institutions are involved in the governance of the town and surrounding villages. Some of them are established through Acts of Legislation and others are part of states governance framework.[33]

Table 31 Legislative Basis of Governing Institutions

Names of Institutions	Corresponding acts
Municipal Council, Nandyal	Andhra Pradesh Municipalities Act, 1965
Andhra Pradesh Pollution Control Board	Water (Protection and Control of Pollution) Act, 1974
Village Panchayats	Andhra Pradesh Gram Panchayats Act, 1964

Source: Nandyal Municipality (2016

Responsibilities of Municipality

Nandyal Municipality, like other urban local bodies in Andhra Pradesh, is primarily responsible for providing basic infrastructure services and other civic services within its jurisdiction. The Municipality is responsible for the following functions:

Construction and maintenance of roads, bridges, causeways and culverts
Construction and maintenance of storm water and sullage water drains
Supply of protected water
Cleaning of streets, drains, removal of rubbish and scavenging
Lighting of public streets
Maintenance of burial grounds
Maintenance of hospitals and dispensaries for the treatment of the poor
Maintenance of elementary schools
Registration of births and deaths
Vaccination
Provision of slaughter houses and markets
Maintenance of parks and play grounds
In addition, the Municipality implements a number of plan and non-plan schemes, funds for which are received from state and central governments. They include:
Integrated Development of Small and Medium Towns (IDSMT)
Swarna Jayanthi Sahari Rozgar Yojana (SJSRY)
National Slum Development Programme (NSDP)

[33] Nandyal Municipality (2016)

Andhra Pradesh Urban Services for the Poor (APUSP)
Rajeev Nagara Bata (RNB)
Andhra Pradesh Urban Reforms and Municipal Services Project (APURMSP)
Integrated Low Cost Sanitation (ILCS)
Construction of School Buildings[34]

The functional domain of the Nandyal Municipality, as with other urban local bodies in the state, was expanded in 1994, when the Andhra Pradesh Municipalities Act was amended incorporating the functions included in the 12th Schedule of the 74th Constitution Amendment Act. In Andhra Pradesh, the Municipalities Act provides for a majority of the functions listed in the 12th Schedule of the Constitution. They include:

Urban Planning including Town Planning
Regulation of land use and construction of buildings
Roads and bridges
Water supply for domestic, industrial and commercial purposes
Public health, sanitation, conservancy and solid waste management
Slum improvement and upgrade.
Provision of urban amenities and facilities such as parks, gardens, play grounds
Burials and burial ground; cremations, cremation grounds and electric crematoriums
Cattle ponds; prevention of cruelty to animals
Vital statistics including registration of births and death
Public amenities including street lighting, parking lots, bus stops and public conveniences.
Regulation of slaughter houses and tanneries.[35]

In 2004, the Government of Andhra Pradesh after a review of functions of urban local bodies, transferred five more functions to the urban local bodies through government orders. They are:

Planning for economic and social development
Urban forestry, protection of the environment and promotion of ecological aspects
Urban Poverty alleviation
Safeguarding the interest of weaker sections including the handicapped and mentally retarded
Promotion of cultural and aesthetic aspects.

The Government decided that the remaining function i.e. Fire Services, should continue to remain with the state government and will be transferred after a review later. Though the five functions were transferred, they have no statutory basis as they were transferred through government orders.[36]

Organization Structure

The organizational structure of Nandyal Municipality consists of an elected body – the Municipal Council - and an executive body. The elected body is headed by a Chairperson and has 42 councilors each representing a ward - one of the 42 wards into which the town is divided. The Chairperson is elected directly by all the elected ward councilors of the town. Based on the 74th Constitution Amendment Act,

[34] Nandyal Municipality (2016)
[35] Nandyal Municipality (2016)
[36] Nandyal Municipality (2016)

1992, the constitution and composition of the urban local bodies in the state was changed. All the mandatory provisions like reservations to SCs and STs, fixed tenure to the local body, constitution of State Election Commission with responsibility to hold elections to the local bodies in the state, etc., have been incorporated in the Act. After 1995, elections to the urban local bodies were conducted thrice based on these amended provisions.[37]

The civic administration is headed by Municipal Commissioner belonging to the cadre of state municipal commissioners. The Commissioner is assisted by officials in the areas of public health, engineering, town planning, health, poverty, etc. Technical officials head each of these areas and in administration, the Manager assists the Commissioner.[38]

Role of Parastatals and State Department

A number of institutions – State government agencies and parastatals are associated with the governance of the town. They include:

State Departments
Municipal Administration and Urban Development Department
Commissionerate of Municipal Administration
Directorate of Town and Country Planning (DTCP)
Public Health Engineering Department (PHED)
Medical and Health Department
Revenue Department
Andhra Pradesh Urban Services for the Poor
Social Welfare Department
RandB Department
Home Department
Parastatals
AP State Highways Authority
AP State Road Transport Corporation (APSRTC)
AP Transmission Corporation (AP Transco)
AP Housing Board (APHB)
AP Pollution Control Board (APPCB)
Andhra Pradesh Industrial Infrastructure Development Corporation (APIIC)

The Municipal Administration and Urban Development Department (MAUD)

The MAUD Department is responsible for policy formulation, preparation of municipal laws, monitoring and evaluation of programs, supervision of municipal administration, coordination with related state government departments, liaison with the central government and external funding agencies, etc. It controls, supervises and guides the line departments like Directorate of Municipal Administration, Department of Town and Country Planning, and Public Health Engineering Department.

The Directorate of Municipal Administration (CD and MA)

[37] Nandyal Municipality (2016)
[38] Nandyal Municipality (2016)

The CD and MA is the executive arm of MAUD and is responsible for the implementation of laws, policies and programs relating to the urban sector. It is responsible for administrative and financial management of municipalities, implementation of development programs like IDSMT, SJSRY, UIDSSMT, IHSDP, ILCS, etc. The CD and MA acts as a conduit between the municipalities and the government and provide guidance, help and assistance to all local bodies. To assist the Commissioner and Director of Municipal Administration, there are six regional offices, which are considered to be field offices of the Directorate of Municipal Administration. The Regional Directors are responsible broadly for the implementation of municipal laws and schemes, and monitoring and review of projects. They periodically to review and provide necessary guidance to local bodies and liaise with other related departments like Town and Country Planning, Public Health Engineering and the District Collectors for proper functioning of municipalities in their jurisdiction. The Nandyal Municipality comes under Ananthapur Region.

Directorate of Town and Country Planning (DTCP)

The DTCP is responsible for the planning orderly growth of cities and towns, preparation of Master Plans, their review and revision, preparation of regional development plans, etc. To assist the Directorate six regional offices are established and the Nandyal Municipality comes under the jurisdiction of Anathapur regional office.

Public Health and Municipal Engineering Department (PHED)

The PHED provides technical support to local bodies in the execution of major public health engineering works like water supply schemes, drainage and sewerage works, major roads, etc. Apart from directly executing the major works, the Department also provides technical guidance to the municipalities in the preparation and execution of similar schemes. This Department accords the technical scrutiny and sanction of the public health engineering works. The PHED is organized into five Circle Offices for administrative convenience and Nandyal Municipality comes under Ananthapur Circle.

Roads and Buildings Department (RandB)

RandB Department is responsible for development and maintenance of road network in the state. They maintain all state roads that pass through Nandyal Municipality.

Andhra Pradesh Urban Finance and Infrastructure Development Corporation (APUFIDC)

The APUFIDC extends technical assistance to the local bodies in the preparation and implementation of development schemes. It acts as a conduit between the ULBs, the Government of India and financing agencies like HUDCO. The Corporation, on behalf of the municipalities borrows loans from HUDCO and other financial institutions and acts as a financial intermediary.

Andhra Pradesh Pollution Control Board (APPCB)

The APPCB is responsible for controlling of water and air pollution caused by various sources across the state including Nandyal.

Andhra Pradesh Housing Corporation (APHC)

The APHC is responsible for formation of layouts, land development, preparation and implementation of housing schemes particularly for the weaker sections, etc. Implementation of the prestigious Rajiv Gruha Kalpa is their responsibility.

Other State Agencies

At the district and local levels also there are several agencies with which the Nandyal Municipality liaises in the management of the civic affairs. Most important of them being the administrative offices of the state government departments like Director of School Education, Director of Medical and Health, Tahsildar, Director of Treasuries etc. The APHC is responsible for formation of layouts, land development, preparation and implementation of housing schemes particularly for the weaker sections, etc. Implementation of the prestigious Rajiv Gruha Kalpa is their responsibility.

The District Collector

At the district level the District Collectors have supervisory powers over the municipalities. They facilitate coordination and convergence between different agencies involved in the management of the town – particularly implementation of welfare programs.[39]

Table 32 Institutional Arrangements for all Water and Sanitation Services

Urban Services	Institutions incharge of planning	Institutions in charge of implementation	Institutions incharge of OandM	Institutions incharge of collecting user charges
Water Supply	Commissioner	Municipal Engineer	Municipal Engineer	Meter Reader/Bill Collector
Sewerage	NIll	Nill	NIll	NIll
Septage Management	NIll	NIll	NIll	NIll
Storm water Drainage	Commissioner	Municipal Engineer	Municipal Engineer	NIll
Solid Waste Management	Commissioner	Municipal Engineer	Municipal Engineer	Sanitary Inspector
Public Toilets	Commissioner	Municipal Engineer	Municipal Engineer	NIll

Source: Nandyal Municipality (2016)

Municipality Staff

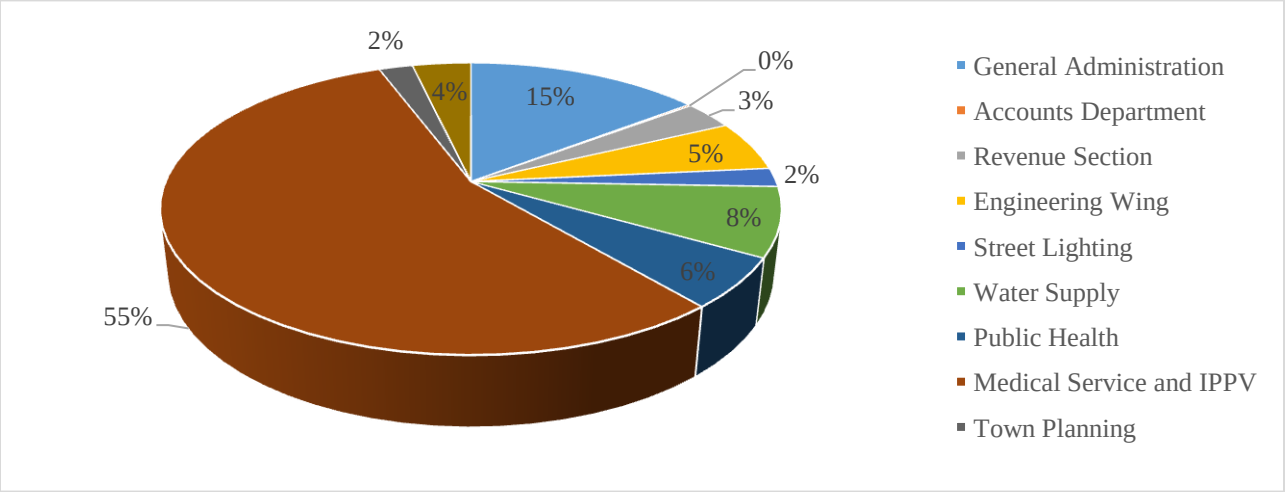
[39] Nandyal Municipality (2016)

Table 33 Sanctioned Posts Department Wise

Department	Sanctioned Posts
General Administration	84
Accounts Department	1
Revenue Section	18
Engineering Wing	32
Street Lighting	12
Water Supply	44
Public Health	32
Medical Service and IPPV	319
Town Planning	12
Parks and Gardens	21
Total	**575**

Source: Nandyal Municipality (2016)

Figure 12 Sanctioned Posts Department Wise



Source: Nandyal Municipality (2016)

Table 34 Statement Showing the Vacancy Position of Nandyal Municipality

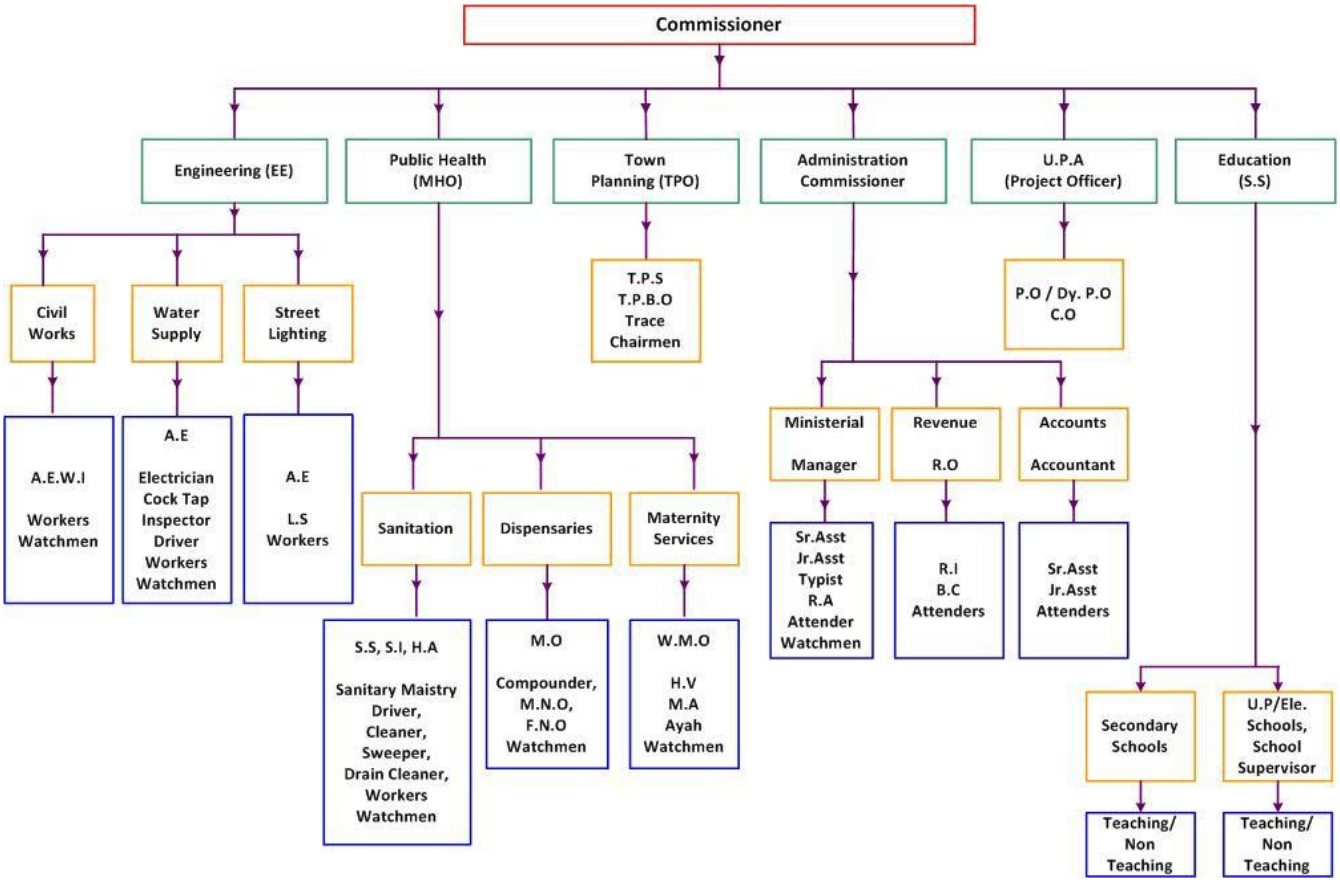
Sl. No.	Category of posts	Total No. of Sanctioned posts	Working Strength	No. of post Vacant	Reason for vacancy
Administration Wing					
1	Municipal Commissioner	1	0	1	
2	Mpl. Assistant Commissioner	1	1	0	
3	Office Manager	1	0	1	Deputed to Srikakulam Municipality
4	Senior Assistants	6	4	2	1 under Suspension

5	Junior Assistants	17	13	4	2 under Suspension
6	System Manager	1	0	1	
7	System Assistant	1	0	1	
8	Typist	3	0	3	
9	Attender	11	10	1	1 Under Suspension
10	Night Watchmen	1	1	0	
11	AandV Mazdoor	1	0	1	
12	Water Women	2	2	0	
13	Record Assistant	6	6	0	
14	Sweeper	3	3	0	
Total		**55**	**40**	**15**	
Engineering Wing					
15	Municipal Engineer Grade-I (Executive Engineer)	1	1	0	
16	Dy. Executive Engineer	3	3	0	
17	Municipal Asst. Engineer	5	3	2	
18	Filter Bed Operator	1	1	0	
19	Lighting Superintendent	1	0	1	
20	Turn Cock	3	3	0	
21	Park Mazdoor	4	4	0	
22	Switch Board Operator	3	2	1	
23	Driver	2	2	0	
24	Meter Reader	1	1	0	
25	Electrician	3	3	0	
26	Work Inspector	1	1	0	
27	Cleaner	26	20	6	
28	Non-Ph worker	2	1	1	
29	Watchmen	4	3	1	
30	Gang Mazdoor	11	11	0	1 Absent
31	Fitter	2	1	1	
Total		**73**	**60**	**13**	
Sanitation Wing					
32	Sanitary Supervisor	1	0	1	
33	Sanitary Inspector	4	3	1	
34	Asst Statistical Officer	1	1	0	
35	Medical Officer	1	0	1	
36	Women Medical Officer	1	0	1	
37	Health Assistant	3	2	1	
38	PH Masteries	9	7	2	
39	Health Visitor	1	1	0	
40	Pharmacist	3	1	2	
41	Librarian	1	0	1	
42	Maternity Assistant	4	3	1	
43	Male Nursing Order	1	0	1	
44	Female Nursing Order	1	1	0	
45	Ayah	5	1	4	
46	Sweeper Cum Water men	2	2	0	
47	Tractor Cleaner	2	2	0	
48	Driver	4	4	0	
49	Public Health Workers	213	138	75	

Total		**257**	**166**	**91**	
Town Planning Wing					
50	ACP / TPO (Sel. Grade)	1	0	1	
51	Assistant City Planner	1	0	1	
52	Town Planning Officer	2	1	1	
53	Town Surveyor	1	0	1	
54	Health Officer	1	0	1	
55	Town Planning Supervisor	3	0	3	
56	Town Planning Building Overseer	4	2	2	
57	Tracer	1	1	0	
58	Town Surveyor	0	0	0	
59	CAD Operator	1	0	1	
60	CAD / GIS Operator	1	0	1	
61	Chainmen	2	2	0	
Total		**18**	**6**	**12**	
Accounts Wing					
62	Accounts Officer	1	0	1	
63	Senior Accountant	3	1	2	
64	Junior Accountant	3	2	1	
Total		**7**	**3**	**4**	
Revenue Wing					
65	Revenue Officer	1	1	0	
66	U.D Revenue Inspector	1	1	0	
67	L.D Revenue Inspector	0	0	0	
68	Bill Collector	11	9	2	6 (under suspension)
Total		**13**	**11**	**2**	
Grand total		**423**	**287**	**136**	

Source: Nandyal Municipality (2016)

Figure 13 Organigram Nandyal Municipality



Source: Nandyal Municipality (2016)

9.2 Gaps and Issues

As the Nandyal Municipality does not have the capacity to execute the projects in the field of Sanitation and sanitation related issues, the Public Health and Municipal Engineering Department will execute the projects for and on behalf of the Municipality. A tripartite Memorandum of Understanding (MOU) amongst the Andhra Pradesh Government, Public Health and Municipal Engineering Department and Nandyal Municipality will be entered. The Nandyal Municipality will maintain and upkeep the created assets. The APUFIDC is the Mission Directorate.[40]

Out of 423 Positions with the Nandyal Municipality, 136 are vacant. Out of those 10 are vacant because the employees are under suspension. In the Sanitation Wing 91 positions are vacant, in the Town Planning Wing 12 positions are vacant, so the Municipality is clearly understaffed.

Institutional Issues:

lack of coordination between various sanitation related departments of ULB,

poor inter-institutional coordination mechanism (ULB, Parastatals, PHED, NGOs, SPCB),

[40]Nandyal Municipality (2016): Sectorwise Slip Template: Storm Water Drainage

overlapping / diffused / unclear roles and responsibilities (with respect to planning, implementation, OandM and MandE) concerning water supply, public toilets, waste water, septage management, storm water, water bodies and solid waste management.

Governance Issues:

weak regulations and its poor enforcement,

poor citizen grievance redressal system,

improper management of private service providers,

lack of e-governance,

absence of reforms leading to poor services

10. Municipal Finance

10.1 Baseline Status

This section provides a measure of the financial capacity of Nandyal to maintain the new infrastructure built in Nandyal. In maintaining new facilities like Public Toilets, and operating a city FSM, or water supply related activities such as increasing metering or the number of connections, the MC would have to undertake the operating expenses related to running these infrastructures, and so the existing gap in the water supply and sanitation budget is bound to increase. As such, the new interventions are proposed to make the MC as self-sufficient as possible.

The income and expenditure patterns under sanitation have been calculated for Nandyal Municipality by analyzing the revised budgets for the years of 2014-15, 2015-16, and 2016-17 respectively . It has been observed that

Nandyal registers a surplus of about 16.4% in 2014-15, 5.47% in 2015-16 and 17.42% in 2016-17. The maximum revenue generators are taxes and fees.
Income from water supply and drainage related activities form a maximum of about 14.1% (2016-17) in the overall income in Nandyal
Expenditure from water supply and drainage related activities form a maximum of about 24.6% (2016-17)in the overall expenditure in Nandyal
Income on sanitation related activities forms a maximum of about 2.68% (2016-17) of the overall income in Nandyal.
Expenditure on sanitation related activities forms a maximum of about 24.6% (2016-17) of the overall expenditure in Nandyal.

The following tables show the important heads under income and expenditure and their percentage of the total water supply and sanitation budgets respectively for the three years. It is observed that the major income source for water supply and drainage has been from water tax (all three years) as shown in Table 35 The major expenditure head has been road and drain construction (2014-15), electricity charges (2015-16) and new roads, drainage (2016-17) as shown in Table 36. The major source of income for sewerage and sanitation has been vermicompost fertilizers (2014-15), slaughterhouses (2015-16) and Swachh Andhra Community toilets (2016-17) as shown Table 36. The major expenditure head has been public health private sanitation contract workers (all three years) and new community toilets (2016-17) as shown in Table 37. Presently, there is no specific budget head to record water supply and sanitation based expenditure.

Table 35 Income Heads and Percentage for Water Supply and Drainage (All Figures in Lakhs)

Income Heads- Water supply and drainage	2014-15	2015-16	2016-17
Water tax	226 (60%)	250 (84.7%)	200 (37.7%)
Water supply donations	15 (4%)	20 (6.8%)	27 (5.1%)
Tap repairs	3.45 (0.9%)	5 (1.7%)	8 (1.51%)
Mineral water charges	0.5 (0.13%)	1 (0.34%)	0
Rainwater harvesting scheme (under town planning dept.)	7.8 (2.1%)	12 (4.1%)	12 (2.26%)
Water supply grant for adverse seasons/drought conditions	30 (8%)	-	-
SC sub plan- road and drain building	93.65 (24.9%)	-	169 (31.9%)

New pipeline construction and housing board grants/funds	-	7.15 (2.4%)	14.1 (2.7%)
AMRUT scheme water supply	-	-	100 (18.9%)
Total Income from Water Supply and Drainage	**376.40**	**295.15**	**530.1**

Source: Source: Assessment of the Municipal Budgets for MC Nandyal (2014-15, 2015-16 and 2016-17)

Table 36 Expenditure Heads and Percentage for Water Supply and Drainage (All Figures in Lakhs)

Expenditure Heads for Water supply and drainage	2014-15	2015-16	2016-17
New S.S tank	48.2 (9.3%)	40 (7%)	-
Drainage construction	-	50 (8.8%)	20 (2.5%)
Culvert repair, manholes	-	20 (3.5%)	20 (2.5%)
Electricity charges, street lights, water supply, etc.	-	220 (38.6%)	-
Pipelines, public taps	-	6 (1.1%)	5 (0.62%)
Drainage implementation	17 (3.3%)	-	-
Chlorine and alum for cleaning water supplied	30 (5.8%)	-	40 (4.9%)
Water supply (to bring Telugu Ganga water)	3.7 (0.7%)	-	5 (0.62%)
Mineral water supply implementation	6 (1.2%)	5 (0.88%)	-
Water cess	10 (1.9%)	5 (0.88%)	-
BPL tap equipment	-	-	6 (0.74%)
BPL tap constructions	16 (3%)	-	-
Maintenance of rainwater harvesting	20 (3.8%)	-	-
New roads, drainage	85 (16.4%)	-	500 (61.6%)
New tube wells	4 (0.8%)	-	2 (0.25%)
Sump construction	15 (2.9%)	-	-
O & M of water supply pipelines	66 (12.7%)	-	-
New pipelines	70 (13.5%)	-	14.1 (1.74%)
Balance work in reservoirs	5.3 (1.0%)	-	-
Water supply laying	-	-	100 (12.3%)
AMRUT scheme water	-	-	100 (12.3%)
Water supply adversary seasonal grant	30 (5.8%)	23.95 (4.2%)	-
Road and drain construction	93.65 (18%)	--	-
Total Expenditure from Water Supply and Drainage	**519.85**	**569.95**	**812.1**

Source: Assessment of the Municipal Budgets for Nandyal Municipality (2014-15. 2015-16, 2016-17)

Table 37 Expenditure Heads and Percentage for Sewerage and Sanitation (All Figures in Lakhs)

Expenditure Heads- Sanitation	2014-15	2015-16	2016-17
School sweepers, building rent and other outsourced staff salaries	4.75 (0.97%)	7.31 (1.1%)	-
Community toilet implementation	42.3 (8.6%)	-	-
Compost yard plant growth and maintenance	9.6 (1.95%)	-	-
Resources arrangement for compost yard, vermicomposting	-	30 (4.52%)	-
Crematorium development	10 (2.0%)	5 (0.75%)	5 (0.62%)
Public health private sanitation contract workers	225 (45.8%)	300 (45.2%)	320

			(39.4%)
Community toilet construction	-	-	35 (4.3%)
Vehicle maintenance and diesel bills	-	80 (12.1%)	80 (9.9%)
Vermicompost and other waste management products	-	-	10 (1.2%)
Conservancy tools and plastic bags	11 (2.2%)	15 (2.3%)	30 (3.7%)
Lime and bleaching powder	4 (0.8%)	10 (1.51%)	10 (1.2%)
Anti-bacterial medicines	4 (0.8%)	3 (0.45%)	20 (2.5%)
P.H and non P.H staff	11.7 (2.4%)	20 (3.0%)	20 (2.5%)
Pamphlets and other communication material	-	5 (0.75%)	15 (1.85%)
Public health containment	-	5 (0.75%)	5 (0.62%)
Desilting operations	-	-	5 (0.62%)
Preparation of project reports, maintenance	-	30 (4.5%)	-
Oil and soaps	4.5 (0.9%)	-	-
Fogging machine purchase	10.1 (2%)	10 (1.5%)	5 (0.62%)
Dogs, monkeys and pig eradication	3.5 (0.7%)	5 (0.75%)	5 (0.62%)
Compost yard implementation	37 (7.5%)	-	-
Auto, tipper, tractor repairs and mechanic payments	12 (2.4%)	-	-
Security guard salaries	3 (0.6%)	6 (0.9%)	16 (2.0%)
New community toilets	4 (0.8%)	40 (6%)	120 (14.8%)
Building toilets for underprivileged	95.2 (19.4%)	--	-
Night shelter operations	-	2 (0.3%)	10 (1.2%)
Community toilet maintenance and payments to Sulabh International	-	90 (13.6%)	-
Swachh Andhra community toilets	-	-	100.75 (12.4%)
Total Expenditure from Sewerage and Sanitation	**491.65**	**663.31**	**811.75**

Source: Assessment of the Municipal Budgets for Nandyal Municipality (2014-15. 2015-16, 2016-17)

The Nandyal Municipality budget calculates revenue and developmental budget accounts. The revenue income budget has heads on taxes and fees, rent, own source income. The developmental income budget includes SFC and grants awarded to the municipality. The revenue expenditure budget has heads on own income expenditure, delegated functions, maintenance/repair / depreciation of assets and other expenditure heads. The developmental expenditure budget has expenditure from the SFC and grants awarded.

The budget analysis has been done by combining water supply and stormwater drainage- "Water Supply and Drainage" under one head, and sewerage, sanitation and solid waste management as another component- "Sewerage and Sanitation". This has been consciously done keeping in mind the trends in the budget details.

Table 38 Property Tax DCB

Property tax	**2011-12**	**2012-13**	**2013-14**	**2014-15**
No of Assessments	30090	31613	33211	34224
Demand				
Arrears	493.37	574.24	675.49	800.70

Current	629.78	744.24	779.30	802.69
Total	**1123.15**	**1318.48**	**1454.79**	**1603.39**
Collection				
Arrears	147.70	163.17	157.69	152.35
Current	443.10	489.50	473.08	457.04
Total	**590.80**	**652.67**	**630.77**	**609.39**
Balance				
Arrears	345.67	411.07	517.80	648.35
Current	186.68	254.74	306.22	345.65
Total	**532.35**	**665.81**	**824.02**	**994.00**

Source: Nandyal Municipality (2016)

10.2 Gaps and Issues

- The overall surplus/ deficit of the town, including the initial stock has been 16.40% (2013-14), 5.47% (2014-15), and 17.42% (2015-16)
- The revenue budget surplus/ deficit for the town has been 41.32% (2013-14), -6.97% (2014-15), and 42.60% (2015-16)
- The capital budget surplus/ deficit for the town has been -57.94% (2013-14), 0.33% (2014-15), and -97.71% (2015-16)[41]
- poor cost recovery from water supply, public toilets, waste water and solid waste management,
- poor collection efficiency for cost of services,
- lack of budget for efficient OandM of existing assets,
- poor asset management,
- dependency on state / central support for implementing / improving sanitation services,
- excessive expenditure for managing solid waste,
- high establishment cost for managing sanitation services,
- lack of financial reforms (eg. double entry accounting) and monitoring mechanisms for transparency
- lack of incentive and punitive measures to increase fund flow.

Table 39 Overview Water Suplly and Drainage Budget

OVERVIEW Water Supply and Drainage Budget	**Overall deficit**	**-53.20%**
	Revenue budget surplus	61.13%

[41] Nandyal Municipality (2016)

	Capital budget deficit	-152.95%

Source: Nandyal Municipality (2016)

11. Capacity Enhancement

11.1 Baseline Status

Table X: Capacity Enhancement

Institution/Department(Engineering, Sanitation, Poverty Alleviation, etc)	**Tasks to be performed**	**Permanent Staff**	**Contractual Staff**
Engineering	67	59	178
Sanitation	241	144	275

11.2 Gaps and Issues

As per the review of the information provided in the CSP status report, the following issues were flagged with respect to capacities:

Lack of planned capacity building strategy – There is no planned capacity building strategy. There is a large need for training need assessment in order to ascertain the area of training required and it should also cover all classes of employees as the nature and type of training required will be different for different class of employees.

Overlapping/diffused/unclear roles and responsibilities – The roles and responsibilities with respect to planning, implementation, operation and maintenance concerning water supply. Public toilet, waste water, septage management, storm water, water bodies and solid waste management are often overlapping and unclear. This affects the long term planning also. Greater inter agency co-ordination is required among various department/agencies

Section IV – Key Issues, Action Plan and Investment Plan

12. City Wide Key Issues

Of all the issues identified in the town, following key issues with respect to sanitation have been identified for Nandyal town.

Key Issue 1	The town has no wastewater as well as fecal sludge management system in place which is the most detrimental issue in terms of environmental impact
Rationale for this key issue	1. Both grey and blackwater outlets from households discharge into open earthen drains making them combined sewers, carrying this untreated wastewater into natural water bodies, namely the Chama Kaluva (a local stream) which finally enters the River Kundu, thus polluting it. Presently, the town is not serviced by a comprehensive underground drainage system. However, 39.46 kms of sewerage network have been laid, but not functioning. 2. 40,844 households (88.5%) of the total 46,127 households have a septic tank, which in almost all cited and quoted cases are not connected to a soak pit (as per discussions with the Municipality and observations from site visits). As such, the outflow of the septic tanks flow into the open environment or empties into adjacent open kutcha/pucca drains, thus polluting the environment. 3. 20.4 MLD wastewater is generated in the town which all goes untreated 4. The storm water getting mixed with wastewater also lies stagnant in low lying areas further causing groundwater pollution. 5283 of the households (11.45%) in the town were reported as having no outlets for the toilets. 5. There are some areas within the city, i.e. Taylors Colony, YSR Nagar and Nandamuri Nagar which are partly covered by a network. However, the network here is not not connected to any treatment unit.

Key Issue 2	No systematic or organized method to collect, convey and treat fecal sludge (Fecal sludge management) collected from the pits and septic tanks of the town.
Rationale for this key issue	1. There is no formal fecal sludge emptying service provided by the municipality. 2. The septic tanks and pits in the town are serviced by informal fecal sludge emptying operators, regarding whom there is no database with the municipality. 3. The sludge emptied from the septic tanks of households are dumped in the open environment (presently in stone quarry mines; which cannot serve as a sustainable solution). There are no

	regulations or awareness initiatives against such practices. 4. The desludging frequency varies based on the size of the tank and pit. Regarding the sizing of the pits and septic tanks there is no existing database with the municipality. 5. As the septic tanks are not connected to a soak pit, the tank's outflow conveniently empties into an adjacent drain, thus not requiring the households to desludge regularly.

Key Issue 3	Lack of solid waste processing facility (for biodegradable & non-biodegradable waste)
Rationale for this key issue	1. Monthly 170 metric tons of waste is generated from markets (apart from street sweeping waste of 76 metric tons). The vermi-composting plant (60 MT/month capacity) at solid waste disposal site is presently discontinued. As such, with no waste processing facility, biodegradable waste is only being dumped at the dump site and not being processed. Over time, the leachate from the waste would have severe adverse effects on the environment. 2. Similarly, the non biodegradable waste facility at the SWM dump site is understaffed. As such all incoming waste is getting accumulated at the dump site. 3. Post processing only 3.33% of municipal solid waste is recovered presently 4. Additionally, a WTE (Waste to Energy) based 1 MW power plant is envisaged to come up in the district (to serve 8 municipalities in the district) at Gargipuram. As there shall be an agreement to supply 63 MT of solid waste to this plant daily, the municipality has stalled from developing its Vermi composting unit as they assume this could be a waste of resources.

Key Issue 4	The coverage of individual water supply connections to households is low
Rationale for this key issue	Only 50.85% of the households (23,459) have water supply connections. While the remaining half of the population get access to water supply through 1230 public stand posts (PSPs). Part of the universal coverage achievement will also require building more distribution lines, i.e. 81 kms of water supply distribution lines.

Key Issue 5	There are four major high footfall areas in Nandyal with no public sanitation facility in place
Rationale for this key issue	During discussions with the ULB, it was noted that the following high footfall areas presently would require public sanitation facilities: In Byrmal street, floating population is 10,000. No PT presently

	Potti Sreeramulu street, main road area has a high footfall of 9,000-10,000. No PT presently Nunapally, floating population 5,000. Athmukur Bus stand, floating population 2000-3000

Key Issue 6	The cost recovery from the water supply sector is low
Rationale for this key issue	The cost recovered for water supply services rendered in the town is only 62.12%, which is low considering only 50.85% of the households (23,459) have water supply connections. Remaining half of population receive access to water supply by means of 1230 public stand posts (PSPs). This essentially means water supply charges are recovered only from half of the population. 18.13% of the water supplied is constituted of Non revenue water. This includes free authorized water for which payment is not collected (such as water supplied through PSPs) as well as water lost in transmission and distribution. The metering of connections is only done for 9.8% of the household connections. Households flat rate Tariff: Rs.80 per month; Commercial flat rate tariff: Rs.20 per kilolitre; Bulk rate tariff: Rs.20 per kiloliter The prevailing collection efficiency of 90% (stated by the SLBs) is only for the water supply connections to half of the households of Nandyal.

Key Issue 7	The confinement of excreta in majority of containment units is inadequate, and this could pose as a major environmental concern
Rationale for this key issue	As per the census 2011 figures, 66.1% of the town have access to septic tanks while as per the SLBs, 80% of the households have access to septic tanks. As per discussions with the municipality, all septic tanks have no connection with soak pits. The outflow of the septic tank opens into the open or into storm water drains. These septic tanks do not qualify the definition of a hygienic toilet as set by the World Health Organization.

Key Issue 8	An important issue with the municipality is the limited quality of data (due to lack of monitoring and evaluation). Across all the basic needs services – covered within the SNUSP program – there is lack of consistency in the data availability for the service level benchmarks of Water Supply, Access to Toilets, Solid Waste Management, Wastewater management and Storm water drainage. Presently, the arrangement is to

	have specific ad-hoc arrangements to furnish data, whenever there is a documentation required (of service levels) for a municipal program like AMRUT, SBM and other independent grant projects (from the state government or non-governmental sources). Hence, the prevailing situation is that we have multiple values for the same indicator (for e.g. one report states 112 lpcd, while another states 99 lpcd).
Rationale for this key issue	A Performance Assessment framework needs to be introduced by 2018 to unify all service level benchmarks of the town under one window to avoid any contradiction of data and lack of comparability. This includes unifying information from all sources like: SLB[42]/SLIP[43] Swachh Sarvekshan PAS[44] Logistical Data concerning implementing GO 279 SBM[45] Focus on the organizing a citywide database (by end of 2017) of wastewater disposal process – as an aftermath of the ODF declaration - at the household level (i.e. type of containment: Septic Tank, Pits, Twin Pits). This can be in alignment with the sanitation census forms last organized in 2011. A listing of insanitary latrines must be inventoried and geo-tagged by 2018

[42] SLB – Service Level Benchmarks
[43] SLIP – Service Level Improvement Plan
[44] PAS – Performance Assessment Systems template for service level benchmarking
[45] SBM – Swachh Bharat Mission

13. Goals corresponding to City-Wide Key Issues

To gradually and effectively improve the sanitation situation in Nandyal, following goals with respect to key issues have been arrived after consultation with the CSTF:

No.	Key Issue	Goal
1	The town has no wastewater as well as fecal sludge management system in place which is the most detrimental issue in terms of environmental impact	Implement a holistic faecal sludge management program spread across 3 years for Nandyal by: Targeting construction of FSTP in 2 years (by 2018), Streamlining collection and conveyance of fecal sludge operations by 2017 and having low O&M decentralised wastewater treatment units for gated communities.
2	No systematic or organized method to collect, convey and treat fecal sludge (Fecal sludge management) collected from the pits and septic tanks of the town.	Streamline the operations for collection and conveyance process of fecal sludge and its emptying in a regulated manner by 2017
3	Lack of solid waste processing facility (for biodegradable & non-biodegradable waste) leading to unhygienic & unhealthy conditions	The situation of commencement of Waste to Energy Plant is tentative. As an interim measure, processing activities must immediately begin at the now unused vermi-compost unit. The waste to energy plant has wider regional level advantages, but in terms of cost viability (especially considering that land is already available at solid waste dump site), composting would be a viable practice (up to even 3 years, if the WtE plant gets delayed that far).
4	The coverage of individual water supply connections to households is low	Increasing the access of households to individual water supply connections over three years: 75% by 2017, 85% by 2018 and 100% by 2019.
5	There are four major high footfall areas in Nandyal with no public sanitation facility in place	Target the provision of public sanitation facilities in major footfall areas by end of 2017
6	The cost recovery from the water supply sector is low	Targeting a cost recovery improvement over three years from 62.12% to 70% by 2018 and 90% by 2019.
7	The confinement of excreta in majority of containment units is inadequate, and this could pose as a major environmental concern	Retrofit/convert all unhygienic toilets to hygienic toilets (i.e. that facilitate confinement of excreta appropriately) by 2019. This would involve primarily fixing leakages from pits and septic tanks into the open environment.
8	An important issue with the municipality is the limited quality of data (due to lack of monitoring and evaluation). Across all	• A Performance Assessment framework needs to be introduced by 2018 to unify all service level benchmarks of the town under one

	the basic needs services – covered within the SNUSP program – there is lack of consistency in the data availability for the service level benchmarks of Water Supply, Access to Toilets, Solid Waste Management, Wastewater management and Storm water drainage. Presently, the arrangement is to have specific ad-hoc arrangements to furnish data, whenever there is a documentation required (of service levels) for a municipal program like AMRUT, SBM and other independent grant projects (from the state government or non-governmental sources). Hence, the prevailing situation is that we have multiple values for the same indicator (for e.g. one report states 112 lpcd, while another states 99 lpcd).	window to avoid any contradiction of data and lack of comparability. This includes unifying information from all sources like: • SLB[46]/SLIP[47] • Swachh Sarvekshan • PAS[48] • Logistical Data concerning implementing GO 279 • SBM[49] • Focus on the organizing a citywide database (by end of 2017) of wastewater disposal process – as an aftermath of the ODF declaration - at the household level (i.e. type of containment: Septic Tank, Pits, Twin Pits). This can be in alignment with the sanitation census forms last organized in 2011. A listing of insanitary latrines must be inventoried and geo-tagged by 2018

[46] SLB – Service Level Benchmarks
[47] SLIP – Service Level Improvement Plan
[48] PAS – Performance Assessment Systems template for service level benchmarking
[49] SBM – Swachh Bharat Mission

14. Action Plan

No.	Key Issue	Goal	Actions			Agency responsible for action (ULB, PHED, etc.)
			Short term (within 2 year)	Midterm (3-5 years)	Long term (5-10 years)	
1	The town has no wastewater as well as fecal sludge management system in place which is the most detrimental issue in terms of environmental impact	Implement a holistic fecal sludge management program spread across 3 years targeting construction of FSTP in 2 years (by 2018) and alongside streamlining collection and conveyance of fecal sludge operations by 2017 and having low O&M decentralised wastewater treatment units for gated communities.	Land identification and confirmation of FSTP site by Municipality. Attainment of all required environmental and regulatory clearances Float tender for selection of technical consultant to design FSTP Tendering and selection of contractor for Management, Design and Supervision Training on faecal sludge treatment and disposal to municipal staff. Awareness campaign for citizens; detailed interaction with citizens living in the vicinity of the FSTP site Construction and commissioning of Plant on a BOT (Built Operate Transfer) Model Training on O&M for municipality staff	Planning for scaling up the treatment capacity of FSTP Scaling up activities - Construction of FSTP with an extended capacity		Engineering Department of ULB
2	No systematic or organized method to collect, convey and treat fecal sludge (Fecal sludge management) collected from the pits and septic tanks of the town.	Streamline the operations for collection and conveyance process of fecal sludge and its emptying in a regulated manner by 2017	By designating an interim sludge dumping and basic drying site at quarry facility by 2017 (till a treatment plant is ready by 2018), Organizing a registry/association of informal/service providers (for better regulation) by early 2017, Building an inventory of existing containment systems and their sizes (by mid-2017), Establishing management systems and standard operating procedures at Municipality level Floating tender documents for procurement Workshop on desludging and transportation of faecal sludge	Planning for scaling up of construction of new toilets Scaling up activities - Construction of new toilets		Engineering Department of ULB
3	Lack of solid waste processing facility (for biodegradable & non-biodegradable waste) leading to unhygienic & unhealthy conditions	The situation of commencement of Waste to Energy Plant is tentative. As an interim measure, processing activities must immediately begin for the now un-used vermi-compost unit. The waste to energy plant has wider regional level advantages, but in terms of cost viability (especially considering that land is already	Begin processing activities at the presently un-used vermi-compost plant by 2017 Also identify & allocate land for material recovery facility for sorting of recyclable materials (glass, metal, plastic and paper) Definition of micro pockets towards the implementation of GO Ms. No. 279. (implementation is focused on out	Commence construction and commissioning of WtE plant Confirmation of site by the Municipality Satisfaction of all required environmental regulatory clearances Tendering and selection of contractor for construction.		Health Department of ULB

		available at solid waste dump site), composting would be a viable practice (up to even 3 years, if the WtE plant gets delayed that far).	sourcing all collection, conveyance and street sweeping of solid waste to private parties) Tendering and selection of private parties for solid waste collection and conveyance Streamlining the street sweeping activities across Nandyal (at the rate of 500 meter of unit length per worker) among the prevailing sanitary health workers (133 staff strength). This essentially means 66.5 kms (of 233 kms of road length) will be swept by the municipal sanitary staff For the remaining 166.5m, contracts would be outsourced under the provision of GO Ms. 279 Carry out IEC (Information, Education and Communication) activities to control littering, minimize waste generation, segregation, etc Streamline segregation of biodegradable and non –biodegradable waste from households	Construction and commissioning of WtE Plant Training workshop on WtE Plant Operation and Maintenance activities for municipal staff. Carry our IEC activities to control littering, minimize waste generation, segregation, etc		
4	The coverage of individual water supply connections to households is low	Increasing the access of households to individual water supply connections to 75% by 2017, 85% by 2018 and 100% by 2019.	Implementing water supply connections to 25.14% (targeting 75% of households have HSCs[50] by 2017) of the total households (through AMRUT funding) Implementing construction of distribution network (81 kms) starting 2016, to convey water to un served households	Implementing water supply connections to another 25% (targeting 100% of households have HSCs50 by 2018) of the total households (through AMRUT funding) Completion of construction of distribution network (81 kms) to convey water to unserved households Building of Reservoirs (ELSRs) for unserved wards	Providing water supply connections to all additional households that are added to the city, due to extension of urban limits	Engineering Department of ULB
5	There are four major high footfall areas in Nandyal with no public sanitation facility in place	Target the provision of public sanitation facilities in major footfall areas by end of 2017	Site level survey during peak hours to calculate the footfall in the four areas identified for public sanitation Expression of Interest to be floated to hire private service provider to build, own, operate and transfer the toilet infrastructure.			Engineering Department of ULB
3	The cost recovery from the water supply sector is low	Targeting a cost recovery improvement from 62.12% to 70% by 2018 and 90% by 2019.	Technical assessment of water distribution pipes to ascertain the degree of leakage due to losses while conveying water through pipes. This is to ‘spot and fix’ the loss of non revenue water lost due to	Enforce meters to be installed across all 100% of households connected by water supply system Introducing the volumetric water tariff of Rs. 20 per kilo liter will be	Enforcing meters to additional water supply connections for all additional households that are added to the city, due to	Engineering Department of ULB

[50] HSC – House Service Connections

			engineering defects and old pipes. Pass a resolution for mandatory installation of water meters for all household connections (by 2017). Enforce meters to be installed across all 75% of households connected by water supply system	introduced as an enforcement of the water byelaws for the municipality	extension of urban limits	
6	The confinement of excreta in majority of containment units is inadequate, and this could pose as a major environmental concern	Retrofit/convert all unhygienic toilets to hygienic toilets (i.e. that facilitate confinement of excreta appropriately) by 2019. This would involve primarily fixing leakages from pits and septic tanks into the open environment.	Citywide survey (during the first half of 2017) of containment units to assess the type and number of containment units (single pits, twin pits, septic tanks); flag the number of unhygienic containment units, which have an outflow leaking to the open environment or to storm water drains Exploration of possible funding opportunities to undertake retrofitting/conversion of unhygienic to hygienic toilets. Tendering and selection of a MDS[51] for detailed cost estimates and drawings for each of the toilet designs proposed. Construction of toilets based on the Detailed Project Report (DPR) submitted by MDS Consultant			Engineering Department of ULB
7	An important issue with the municipality is the limited quality of data (due to lack of monitoring and evaluation). Across all the basic needs services – covered within the SNUSP program – there is lack of consistency in the data availability for the service level benchmarks of Water Supply, Access to Toilets, Solid Waste Management, Wastewater management and	A Performance Assessment framework needs to be introduced by 2018 to unify all service level benchmarks of the town under one window to avoid any contradiction of data and lack of comparability. This includes unifying information from all sources like: SLB[52]/SLIP[53] Swachh Sarvekshan PAS[54] Logistical Data concerning implementing GO 279 SBM[55] Focus on the organizing a citywide database (by end of 2017) of wastewater disposal process – as an	a. Anchor all data management activities of the town (SLB/SLIP/CSP/PAS/SBM) with one post (preferably the environmental engineer/executive engineer serving as data manager from the public health section) b. Organize a database management workshop for the executive wing of the municipality c. Streamline all data sources to one source point within the municipality, which needs to be updated timely.	a. Continuous updation and revisit of citywide sanitation, solid waste, water supply data once in 4 months b. A yearly workshop to present the latest best practices to improve database management practices in the town.		Engineering Department and Health Department of ULB

[51] MDS – Management, Design and Supervision
[52] SLB – Service Level Benchmarks
[53] SLIP – Service Level Improvement Plan
[54] PAS – Performance Assessment Systems template for service level benchmarking
[55] SBM – Swachh Bharat Mission

	Storm water drainage. Presently, the arrangement is to have specific ad-hoc arrangements to furnish data, whenever there is a documentation required (of service levels) for a municipal program like AMRUT, SBM and other independent grant projects (from the state government or non-governmental sources). Hence, the prevailing situation is that we have multiple values for the same indicator (for e.g. one report states 112 lpcd, while another states 99 lpcd).	aftermath of the ODF declaration - at the household level (i.e. type of containment: Septic Tank, Pits, Twin Pits). This can be in alignment with the sanitation census forms last organized in 2011. A listing of insanitary latrines must be inventoried and geo-tagged by 2018				

15. CSTF meeting at Nandyal

Table 40: Members of the Meeting

Name	Designation	Number
Bhaskar Naidu	Commissioner, Nandyal Municipality	CSTF Convener
Dr. Gelivi Sahadevudu	Representative from Health Dept and Govt Hospital (A medical practitioner)	Health Standing Committee Chairman
Sri. Satyanarayana, Municipal Engineer	Representative from ULB or PWD (Engineering)	Sanitation Standing Committee Chairman
Sri. P. Iftequar Ahmed	Asst./Deputy Commissioner or MHO of ULB	Solid Waste Mgmt Standing Committee
Sri. M. Govinda Reddy	ULB PH Supervisor	Member
Sri. Shaik Khaja Mohiddin	Representatives from Residence Association	Member
Sri. P. Subramanyam	Representative from NGOs/Associations of Public Health workers, sewage sanitary workers, recycling agents	Member
Sri. Madhu Sai	Elected Members of Council	Member

Wastewater, fecal sludge and Greywater management related discussion points:

Interception and Diversion for all drainage clusters to tap and treat greywater. Presently, 90% if the Nandyal city drains into the Chama Kaluva and the Madileru streams. For the same, an STP of 10 MLD capacity has been proposed which incorporates SBT technology[56] as proposed by the consultants (Tata Consulting Engineers). However, as Mr. Satyanarayan Garu (Ex Eng, Nandyal Municipality) stated, the city is also exploring the prospects of implementing this STP with MBBR technology (considering his opinion on it being a better technology). A land parcel of 2.5 acres has been identified for the same.

SBT technology – as per Mr. Satyanarayana – requires large land requirement compared to MBBR; even the DMA has stated to propose the more viable and advanced technology in the city

27 Cr for SBT plant as per DPR (20% extra approx for MBBR)

2.5 acre told to be acquired for the inception point at Chama Kaluva where the MBBR STP should be set up

10 MLD volumes are expected. Same STP will treat black and greywater. Effluent of septic tank, greywater will all arrive to the STP

25 MLD is the water supplied to the town, which means that the wastewater generated in the town is 20 MLD (80% of that is the WW generation). However, the STP presently being proposed is for 10 MLD as a pilot demonstration. Later, after commencement of the plant, the capacity will be enhanced.

Fecal sludge management related discussion points:

Another Fecal treatment plant is also envisaged to treat sludge collected by emptier trucks This consultancy has also been assigned to Tata Consulting Engineers, but this is still in DPR stage and is expected to take one more year for implementation (this project is meant from 2017-20 and is now in the DPR phase)

The FSTP and STP location is at the same location

[56] No SBT technology based STP installed and proved capacity more than 2 MLD in India.

Cost of FSTP not yet finalized

Before finalizing the capacity, the number of the septic tanks and other kinds of containment units needs to be evaluated, for which a study has been initiated. (Size, sustenance, what they have constructed municipality has no idea to assess the same). Mr. Satyanarayana added that during the provision of building permissions there is a clear mandate to review whether these containment units are properly constructed but this supervision and vigilance process is not implemented.

How many HHs have septic tanks

What is the capacity

What is the desludging frequency

Note: Expected to finish in 1-2 months.

A septage treatment facility is envisaged to be built adjacent to the above mentioned STP, which is expected to be finalized by January.

A study has been initiated in Nandyal for evaluating the septic tanks across households, in terms of their sizes, and desludging frequency.

The municipality presently owns one emptier truck of 4000 liters capacity

There are 10-15 vehicles (exact number not known to municipality, as the sector is unregulated) of 2000-4000 liters each. This has not been exactly assessed by the municipality, but they wish to gather all this information now.

Government's focus – as per Mr. Satya – is also on septage treatment

The site for the solid waste dump site is 1.5 kms away from the STP site

19 acres and lots of free space

The existing solid waste dump site is 19 acres in area. Considering the land availability, Avinash suggested the prospect of combined treatment of septage and biodegradable solid waste at this parcel.

Presently, the Vanam Manam Program (dedicated to plantation of plants) propagates the soil reuse approach.

No objection to propose the septage treatment at that site. Mr. Satyanarayana elaborated that his initial sense was to have the septage treatment facility adjacent to the STP, but he said the municipality would have no objection for such a proposal to have the FSTP at the solid waste dumping site.

Mr. Satyanarayana stated they presently there is no established market potential for sludge, but the local farmers could be accustomed to its use through awareness generation facilitated by the municipality (as this is the first time).

Mr. Satya stated that previously the solid waste compost was sieved and though a large quantum of this compost was generated, but the municipality failed to sell it because of the prevalence of glass pieces in the compost (farmers walk bare foot while farming and as such this sale fell flat).

FSM Operations management related discussion points:

Upon hearing the case of how Dakar in Sengal is implementing a call centre model for linking consumers and service providers for fecal sludge emptying services, Mr. Satya shared the prospect of implementing a similar system through the Mee Kosam centres in the town. Presently, there is a call centre service provided by the town – under the provision of the MEPMA program – which is called "Mee Kosam centre", under which all new service providers in the town like plumbers, carpenters. Mr. Satyanarayan suggested that they could register these private emptier truck operators into the Mee Kosam centre thus allowing people to directly call the centre which would link them up to the service provider.

FSM treatment approach related discussion points:

1. Coco peat technology was shared as an example. The team suggested co-treatment demonstrated at 3 facilities in Bangladesh.
2. They bring the fecal sludge, which is then applied to an unplanted drying bed, where the fecal sludge is applied. The water from the sludge seeps down and is collected and treated separately. The dried top layer of the sludge is scrapped out and mixed with the organic waste and thereby composting it. This compost then undergoes thermal heating which kills the helminth eggs in the compost, further treating it. What we get is a powdered form of soil conditioner. This requires effective waste segregation to avoid any non-biodegradable waste in the compost.

Solid waste management related discussion points:

G.O. MS. No. 279 implementation within 2 months. By January it will be implemented.
130 permanent
271 is contract
163 Micro pockets have been identified (24 pockets will be managed by the 130 permanent workers, while the remaining will be outsourced)
The contract will be for 3 years.
SWM presently:
63 MT of solid waste is generated in the town
2-2.5 MT of this is biodegradable waste arriving to vermin compost unit
1 ton is in the form of recyclables
2.5 MT is inert (building debris)
57 MT – Aerobic composting/windrow composting

Waste to Energy Plant related discussion points:

The solid waste WTE plant will be decided by 2017 end, 8 municipalities are covered – from the district (except Aadhoni) – within the scope of this project and the location is Gargipuram
The agreement within the scope of the WTE project between the plant operator and the town is to provide 63 MT (+ or – 10%). In case the amount is lower, the ULB can get penalized.
Tenders have been finalized for the building of this 1 MW power plant
Whether to augment the vermin compost unit – as stated by Mr. Satyanarayana – depends on the progress of the WTE plant. In case the plant comes up, all the 63 MT of waste needs to be supplied to the power plant operator, failing which the ULB will be penalized.
However, CDD Society suggested the ULB that they should immediately establish and begin operations at the vermin composting unit as the cost of dismantling this unit is marginal and the cost of accumulating all waste without processing is substantial on the environment. The ULB agreed to this.
Biomedical waste: Private agency will collect (presently being done in Kurnool)

Water Supply related discussion points:

8000 households have water supply service connections (27 crore) and:
the per capita water supplied is 113 lpcd,
total supply: 25.5 MLD
40 MLD from new source which will allow 135 lpcd (within 2 years)
135 envisaged within 2 years

120 Cr dedicated under AMRUT for Water Supply, which includes drawing water from the reservoir to site
14 MLD earlier from reservoir
2-3 Hrs presently being supplied. But govt's aim is for 24*7 supply
23,459 HHs have HSCs, while totally there are 45266 HHs. So there is a gap of 50% the demand supply gap for water related HSCs.
Now 8000 HSCs will be given (only for BPL). Public on their part will also expected to build 5000-6000 HSCs.
Additional 5000-6000 will be given house service connections
Government is planning to institute universal byelaws for the water supply sector. This includes the resolution to mandate water metering

Cost recovery from water supply related discussion points:

Regarding the measure of subsidizing the implementation of water meters for all HSCs, Mr. Satyanarayana stated that this was the policy the government was in favor as well, but the funding to facilitate such a measure was substantial. So for now, this was discarded till the implementation of the state level universal bye laws for water supply (which is expected in 3-4 months).
He suggested that when the universal bye laws come into action, the government could incorporate PPP models to raise funding for financing the implementation of water meters.
62% is the prevailing cost recovery from the WS sector.
Presently the state government decides the rates for supplying water which is incorporated by the municipality into its bye laws. Mr. Satyanarayana stated that the rates for water supply should be decided at the municipal level (as opposed to the state level) in alignment with the O&M costs of the water supply system of the town. As such, rationalization of the water supply sector is essential thereby allowing the municipal officials to decide the tariff rates.
Main Action points are:
Technical improvements in system;
Tariff rationalization
Metering
NRW: Regularizing public taps and un authorized connections (would require an assessment)

Access to Toilets related discussion points:

Almost 99% have access to some kind of toilets, which includes 43 community toilets
The issue with insanitary toilets is the less space
2100 toilets built since last 2 years under SBM
Min 25 sft required
For those who have no, community toilet access have been built (under SBM and other own revenue).
600 seats in all
25 for one seat
10 members for one seat as per new SBM guidelines
Detailed survey is an activity envisaged in this segment to know about the containment size and desludging pattern
Public toilets are built based on the private providers interest to provided services in high footfall demand areas
In Byrmal street, floating population is 10,000. No PT presently
Potti Sreeramulu street, main road area has a high footfall of 9,000-10,000. No PT presently

Nunapally, floating population 5,000.
Athmukur Bus stand, floating population 2000-3000
Existing public toilets are managed through a BOOT for a period of 25 years, with water supply and electricity provided by the ULB.
Existing public toilets needs to be refurbished in terms of the seat availability.
Govt general hospital: 1000
Govt has sanctioned 98,000 Rs. For PT or CT. But constraint is land.
Mr. Satya stated that public sanitation is considered a key issue in the town
One approach the city is planning is the use of inoculums with mobile toilets (as demonstrated in Kurnool)

Storm water drain management related discussion points:

Storm water drains: Rs. 148 Cr was requested for building 40% of the remaining storm water drain network. Not sanctioned yet. The storm water drainage is maintained by the engineering department of the municipality. If the size of the drains is less than 450 mm, the in house sanitary workers do the maintenance and cleaning, and when its more than 450 mm, its contracted out.

Training Needs related discussion points:

Training needs were suggested for:
Segregation of solid waste and related operations
Treatment operations at plant for solid waste (Vermi composting unit and for fecal sludge treatment)
Treatment of sewage and greywater

16. Cost Estimates for City-Wide Action Plan for CSP

Table 41: Cost Estimates for City-Wide Action Plan for CSP

Intervention Areas	Phase wise investment			Total
	Short-term (2 to 5 Years)	Mid-term (5 to 10 Years)	Long-Term (10 to 15 Years)	
Access to Toilets				
Individual Household toilet construction	2100 toilets have been constructed under SBM Additional Rs. 3.15 Cr disbursed till now			Rs. 3.15 Cr
Public toilet augmentation				
Construction of new public toilet blocks	Govt has sanctioned Rs. 98,000 per seat for PT/CT. Presently the constraint is land.			The cost for one toilet block will be Rs. 7,50,000 (which will have 5 WCs for Males and 5 WCs for females and 5 wash basins). This will cater to a floating population of 1000 people. The actual gross cost for building all public toilets will be dependent on a survey of the actual footfall in these areas.
Sewage (Wastewater and Greywater)				
Sewage treatment plant	Totally, Rs. 5.25 Cr has been dedicated under SAAP for septage management for the year 2016-17 Note: As per the DPR submitted by Tata Consulting Engineers, the CAPEX for constructing STP for sullage and blackwater combined is Rs. 20 Cr (If SBT[57]) and 20% higher CAPEX if the technology proposed is MBBR[58]			Rs. 20 Cr
Sewerage Network	Sewerage Network (256 km) (2017 to 2019): Rs. 70 Cr 58728 households to be covered by the sewerage system (2017 to 2019): Rs. 20 Cr	Sewage Treatment Plant (33.10 MLD): Rs. 55 Cr		Rs. 145 Cr
Technical assessment[59] of containment units	This would require a survey of all households within the town, which would entail the cost of human resource as survey personnel			
Storm water drain management				
Construction of storm water drain network	Construction of out fall and rejuvenation of existing drains: Rs. 18.5 Cr Construction of major drains and rejuvenation of existing drains: Rs. 60.53 Cr Construction of minor drains and rejuvenation of existing drains: Rs. 45.5 Cr			Rs. 124.53 Cr
Water Supply[60]				
New House Service Connections	Providing House Service Connections (2015-16): Rs. 3.5 Cr			Rs. 192.29 Cr (AMRUT)

[57] SBT – Soil Bio Technology
[58] MBBR – Moving Bed Bio Reactor
[59] Desludging pattern and sizes
[60] Totally 35.55 Cr has been dedicated within the SAAP for Nandyal

Augmentation of supply Water Treatment Plant	Distribution System + HSCs: Rs. 11 Cr ELSR + Distribution system + HSCs with existing source: Rs. 6 Cr Source Improvement, ELSR + Distribution system & HSC: Rs. 160 Cr For other objectives: Rs. 11.79 Cr			
Metering of connections	Presently, only 9.8% of households are metered, i.e. 4436 HHs.	The total cost for metering the remaining households (i.e. 40,830), provided all these remaining households are provided HSCs, will be Rs. 10,20,75,000 This is subject to the implementation of the State level Universal Bye Laws		Rs. 10.25 Cr (Metering)
Solid Waste Management				
Outsourcing work packages to private providers	Costs will include the man hour cost for labor deployed to collect solid waste, drain cleaning (@ 2 workers per 350 Households) and street sweeping (@ 500 meter per worker). This will depend on the outcome of the tender floated and procurement process undertaken by the municipality (expected to complete by 2017 January) This amount is estimated at Rs. 10.58 Cr (As per the Micro planning study undertaken by Nandyal ULB)			Rs. 10.58 Cr
Vermi composting interim arrangement	The City already has a vermin composting unit, which just needs to be refurbished. A Vermi-Composting unit targeting a yield of 200 MT per annum would cost Rs. 12 Lakh (Source: NABARD). The requirement in Nandyal is for a 700 MT per annum facility. For the same, the Vermi compost beds (15 m * 1.5 m * 24 nos (for 200 TPA) = 540 m^2 + 20 m^2 pathways/utility = 560 m^2) = Cost of Rs. 5,60,000. Within the above cost abstract, the number of beds can be increased to marginally increase the cost as per the requirement of the city.			Rs. 12 Lakh

17. Annexures

Table 42 Municipality Employees

Sl.No.	Name	Designation
1	Sri A. Satyanarayana Rao	Commissioner (FAC) and Executive Engineer
2	Sri P. Ramesh	Assistant Commissioner
3	Sri K. Jaya Bharath Reddy	Dy. Executive Engineer
4	Sri M.Md. Shakeer Hussain	Dy. Executive Engineer
5	Sri P. Ifthquar Ahmed	Dy. Executive Engineer (Environmental)
6	Sri G. Sreenivasulu Reddy	Mpl. Asst. Eng.
7	Sri D.P.. Peeru Saheb	Mpl. Asst. Eng.
8	Sri P.Subba Ramaiah	Mpl. Asst. Eng.
9	Sri M.Govinda Reddy	Sanitary Inspector
10	Sri M.Rangaiah	Sanitary Inspector
11	Sri Narasimha Rao	Sanitary Inspector
12	Sri Srinivasulu	Asst. Statistical Officer
13	Sri K.Nagaraju	Town Planning Officer
14	Kum.Sreelatha	Sr. Accountant
15	Sri Venkata Praveen Kumar	Jr. Accountant
16	Kum. Sudeera	Jr. Accountant
17	Sri S.Silar Saheb	Revenue Officer
18	Sri S.Rama Krishna	Town Planning Building Overseer
19	Smt.D.Ranamma	Town Planning Building Overseer
20	Smt. M.Abida Begum	Senior Asst,
21	Smt. Silpa	Senior Asst,
22	Sri A.S.Jaffer Hussain	Senior Asst,
23	Sri A.Swamy Day	Senior Asst, (Under Suspension)
24	Sri K.Parameswara Reddy	U.D. R.I
25	Smt Vijaya Kumari	Jr. Asst.
26	Sri Balarama Chandrudu	Jr. Asst.
27	Sri Anil Sagar	Jr. Asst.
28	Smt Indira Karneelamma	Jr. Asst.
29	Sri Venkata Subbarayudu	Jr. Asst.
30	Sri Rama Krishna	Jr. Asst.
31	Sri Vikram	Jr. Asst.
32	Sri Jeelan Basha	Jr. Asst.
33	Sri Rangamuni	Jr. Asst.
34	Sri Lakshmi Narayana	Jr. Asst. (under Suspension)
35	Sri G.Tirupalaiah	Jr. Asst. (under Suspension)
36	Kum.Anitha	Jr. Asst.
37	Smt. Gnana Prasunabba	Jr. Asst.
38	Sri Sreenivasulu	Bill Collector
39	Sri Srinivasulu	Bill Collector
40	Sri Yesurathnam	Bill Collector
41	Sri Fazulur Rahiman	Bill Collector (under Suspension)
42	Sri Ameer Ali Gaig	Bill Collector (under Suspension)
43	Sri Venkata Rama Subbaiah	Bill Collector (under Suspension)
44	Sri Prabhakar	Bill Collector (under Suspension)
45	Sri Rasool	Bill Collector (under Suspension)
46	Sri Mallikarjuna	Bill Collector (under Suspension)
47	Sri Ramesh Babu	Attender

48	Sri Sutla Sekhar	Attender
49	Sri Dastagiri	Attender
50	Sri Maddilety	Attender(Under Suspension)
51	Smt.Padmavathamma	Attender
53	Sri Mohiddin Basha	Attender
54	Sri Abdul Sattar	Attender
55	Sri Lakshman Rao	Attender
56	Sri Yahoshuva	Attender
57	Sri Indiramma	Attender
58	Smt Pedda Obulamma	Ayah
59	Sri Venkateswarulu	Town Planning Chainmen
60	Sri Venkata Ramana Murthy	Town Planning Chainmen
61	Sri Nagapullaiah	Cleaner Cum Attender
62	Sri Bhaskar	Cleaner Cum Attender
63	Sri Mohan Rao	Driver
64	Sri Yohan	Driver
65	Sri Sudhakar	Driver
66	Sri Madavaiah	Driver
67	Sri Vijaya Bhaskar	Driver
68	Sri Srinivasulu	Driver
69	Smt Lakshmi Devamma	Female Nursing Order
70	Sri N. Venkata Ramana	Meter Reader
71	Smt.Jayamma	Midwife
72	Smt.Manemma	Midwife
73	Smt.Kalavathy	Midwife
74	Sri Iqbal Basha	Pharmacist
75	Smt Shantha Kumari	Health Visitor
76	Smt Sujathamma	Health Assistant
77	Sri K.Siva Prasad Reddy	Health Assistant
78	Sri Rama Krishnudu	Cleaner
79	Sri Pamanna	Cleaner
80	Sri Jamal Vali	Cleaner
81	Sri Mahaboob Basha	Cleaner
82	Sri Sandhya Naik	Cleaner
83	Sri Mahaboob Saheb	Cleaner
84	Sri Maddileti	Cleaner
85	Sri Sathya Narayana	Cleaner
86	Sri Nagaraju	Cleaner
87	Sri Subbarayudu	Cleaner
88	Sri Dastagiri	Cleaner
89	Sri Prathap	Cleaner
90	Sri Amarnath Rao	Cleaner
91	Sri Lakshmi Kanthamma	Cleaner
92	Sri Suresh	Cleaner
93	Sri Jayamma	Cleaner
94	Sri Channaiah	Cleaner
95	Sri Mahammed Rafi	Cleaner
96	Sri Divakar	Cleaner
97	Sri Srikanth	Cleaner
98	Sri Srinivasa Rao	Electrician
99	Sri Prasad	Electrician
100	Sri Raj Kumar	Electrician

101	Sri Karimulla	Fitter
102	Sri Vijay	Gang Mazdoor
103	Sri Krishna	Gang Mazdoor
104	Smt Naga Lakshmi	Gang Mazdoor
105	Smt Yelleswari	Gang Mazdoor
106	Smt Lalithamma	Gang Mazdoor
107	Sri Pullaiah	Gang Mazdoor
108	Sri Srinivasulu	Gang Mazdoor
109	Sri Sudhakar	Gang Mazdoor
110	Sri Kalyan Kumar	Gang Mazdoor
111	Sri Bala Kullayappa	Gang Mazdoor
112	Sri Siddaiah	Gang Mazdoor
113	Sri K.Yohan	Non-Public health worker
114	Sri Mahesh Goud	Filter bed Operator
115	Smt. Padmavathi	Park Mazdoor
116	Smt. Jubeda Bee	Park Mazdoor
117	Smt. Parvathamma	Park Mazdoor
118	Sri Dastgiri	Park Mazdoor
119	Samuel	PH Mastri
120	Venkata Ramana	PH Mastri
121	Sateesh Kumar	PH Mastri
122	Venkata Ramaiah	PH Mastri
123	Devadanam	PH Mastri
124	Yesudas	PH Mastri
125	Prasad	PH Mastri
126	Sri Subbarayudu	Record Assistant
127	Sri Sreenivasulu	Record Assistant
128	Sri Brahma	Record Assistant
129	Sri Anjaneya Vara Prasad	Record Assistant
130	Sri Sivaramudu	Record Assistant
131	Sri Prasada	Record Assistant
132	Sri Khader Basha	Sweeper
133	Smt. Marthamma	Sweeper
134	Smt. Venkatamma	Sweeper
135	Smt.Sri Devi	Sweeper Women
136	Smt.Mallamma	Sweeper Women
137	Sri Vijaya Kumar	Switch Board Operator
138	Sri Brahmaiah	Switch Board Operator
139	Sri Sabareesh	Town Planning Tracer
140	Sri Ramakrishna	Turn Cock
141	Sri Mahaboob Vali	Turn Cock
142	Sri Maddileti	Turn Cock
143	Smt Malleswaramma	Watchmen
144	Sri Hussaini	Watchmen
145	Sri Mabu Saheb	Watchmen
146	Sri Ravi Kumar	Watchmen
147	Smt.Ashabee	Water Carrier
148	Smt. Subbamma	Water Carrier
149	Sri Rasheed Ahammed	Work Inspector
150	Kasim Bi	Public Health Worker
151	Bala Chennamma	Public Health Worker
152	Kishore Kumar	Public Health Worker

153	Chennamma	Public Health Worker
154	Praveen Kumar	Public Health Worker
155	Daveed	Public Health Worker
156	Bala Krishnamma	Public Health Worker
157	Kumar	Public Health Worker
158	Thirupalamma	Public Health Worker
159	Subbamma	Public Health Worker
160	Devasashyam	Public Health Worker
161	Sudhakar	Public Health Worker
162	Kumaramma	Public Health Worker
163	Mangamma	Public Health Worker
164	Lakshmi Devi	Public Health Worker
165	Visranthamma	Public Health Worker
166	Suseelamma	Public Health Worker
167	Jojamma	Public Health Worker
168	Jeevamma	Public Health Worker
169	Anandam	Public Health Worker
170	Narasaiah	Public Health Worker
171	Narasimhulu	Public Health Worker
172	Yesteramma	Public Health Worker
173	Gress Manoharamma	Public Health Worker
174	Govardhan	Public Health Worker
175	Adisheshamma	Public Health Worker
176	Chennaiah	Public Health Worker
177	Jimbo	Public Health Worker
178	Lakshmamamma	Public Health Worker
179	Yesurathnam	Public Health Worker
180	Marriyamma	Public Health Worker
181	Akbar Basha	Public Health Worker
182	Chennamma	Public Health Worker
183	Kumaramma	Public Health Worker
184	Hussain Basha	Public Health Worker
185	Vasanthamma	Public Health Worker
186	Sumalatha	Public Health Worker
187	Suseelamma	Public Health Worker
188	Amruta Raju	Public Health Worker
189	Shanthamma	Public Health Worker
190	Vijayudu	Public Health Worker
191	Madhurvali	Public Health Worker
192	Venkata Ramudu	Public Health Worker
193	Obuleashu	Public Health Worker
194	Sudhakar	Public Health Worker
195	Subba Rayudu	Public Health Worker
196	Ramamurrhy	Public Health Worker
197	Suvarthamma	Public Health Worker
198	Rajamma	Public Health Worker
199	Vijayalakshmi	Public Health Worker
200	Sujanamma	Public Health Worker
201	Indiramma	Public Health Worker
202	Saralamma	Public Health Worker
203	Kodamma	Public Health Worker
204	Bhaskar	Public Health Worker

205	Kondaiah	Public Health Worker
206	Marthama	Public Health Worker
207	Mariyamma	Public Health Worker
208	Chennamma	Public Health Worker
209	Sujanamma	Public Health Worker
210	Suresh Babu	Public Health Worker
211	Danamma	Public Health Worker
212	Obulesu	Public Health Worker
213	Charles	Public Health Worker
214	Sarojamma	Public Health Worker
215	Raajamma	Public Health Worker
216	Mariyamma	Public Health Worker
217	Veerappa	Public Health Worker
218	Mohan	Public Health Worker
219	John	Public Health Worker
220	Sarojamma	Public Health Worker
221	Chinna Shantamma	Public Health Worker
222	Kotaiah	Public Health Worker
223	Eliya	Public Health Worker
224	Chennamma	Public Health Worker
225	Yekshibha	Public Health Worker
226	Sujatha	Public Health Worker
227	Chittemma	Public Health Worker
228	Yesepu	Public Health Worker
229	Bala Sundaram	Public Health Worker
230	Pullaiah	Public Health Worker
231	Nagamma	Public Health Worker
232	Rupamma	Public Health Worker
233	G.L. Pushpavathi	Public Health Worker
234	Ramaiah	Public Health Worker
235	Lakshmi Devi	Public Health Worker
236	Adi Narayana	Public Health Worker
237	Pushpamma	Public Health Worker
238	Vijayamma	Public Health Worker
239	Subbamma	Public Health Worker
240	Penchalaiah	Public Health Worker
241	Thipupalu	Public Health Worker
242	Devamma	Public Health Worker
243	Thirupamma	Public Health Worker
244	Jayamma	Public Health Worker
245	Yasodamma	Public Health Worker
246	Venkata Seshamma	Public Health Worker
247	Obulamma	Public Health Worker
248	Sujathamma	Public Health Worker
249	Danamma	Public Health Worker
250	Srinivasulu	Public Health Worker
251	Nagar	Public Health Worker
252	Metilamma	Public Health Worker
253	Venkatamma	Public Health Worker
254	Kristianamma	Public Health Worker
255	Anasuyamma	Public Health Worker
256	Venkata Subbamma	Public Health Worker

257	Sujanamma	Public Health Worker
258	Ravanamma	Public Health Worker
259	Srinu	Public Health Worker
260	Prakashamma	Public Health Worker
261	Naga Mallaiah	Public Health Worker
262	Marthamma	Public Health Worker
263	Narayana	Public Health Worker
264	Balaji	Public Health Worker
265	Rahamath Bi	Public Health Worker
266	Bashkar	Public Health Worker
267	Yugandhar	Public Health Worker
268	Pullaiah	Public Health Worker
269	Ademma	Public Health Worker
270	Hymavathi	Public Health Worker
271	John Babu	Public Health Worker
272	Srinivasulu	Public Health Worker
273	Annamma	Public Health Worker
274	Suvarna	Public Health Worker
275	Rajasekhar	Public Health Worker
276	Gouse	Public Health Worker
277	Narasamma	Public Health Worker
278	Dasarathudu	Public Health Worker
279	Kamal	Public Health Worker
280	Varun Kumar	Public Health Worker
281	Siva	Public Health Worker
282	Sudhakar	Public Health Worker
283	Lalithamma	Public Health Worker
284	Padmavathi	Public Health Worker
285	Essak	Public Health Worker
286	Ramanamma	Public Health Worker
287	Suseela	Public Health Worker

Source: Nandyal Municpality (2016)