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# VISAKHAPATNAM, INDIA, SANITATION ASSESSMENT FINAL REPORT



**JUNE 2015**

This publication was produced for review by the United States Agency for International Development. It was prepared by Tetra Tech.

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This assessment was undertaken by Tetra Tech through the Quick Response Technical Assistance Task Order, Contract No. 01/AID-OAA-TO-10-00021, under the Water II Indefinite Quantity Contract (Water II IQC), Contract No. EPP-I-00-04-00019-00.

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COVER PHOTO: Sewage treatment plant in Visakhapatnam (courtesy of Juan Carlos Rodriguez).

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**DISCLAIMER**

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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# ACRONYMS AND ABBREVIATIONS

AP	Andhra Pradesh
AP-PCB	Andhra Pradesh Pollution Control Board
CapManEx	Capital Maintenance Expenditure
CBO	Community-based Organization
CBUD	Capacity Building for Urban Development Project
CSP	City Sanitation Plan
DMAUD	Department of Municipal Administration and Urban Development
FFD	Fecal Flow Diagram
GDL	Global Development Lab
GOI	Government of India
GVMC	Greater Visakhapatnam Municipal Corporation
IAS	Indian Administrative Service
INGO	International Nongovernmental Organization
INR	Indian Rupee
IT	Information Technology
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
JMP	Joint Monitoring Program
Km	Kilometer
MLD	Million Liters per Day
MOU	Memorandum of Understanding
MoUD	Ministry of Urban Development
NGO	Nongovernmental Organization
NUSP	National Urban Sanitation Plan
O&M	Operation and Maintenance
OD	Open Defecation
OpEx	Operational Expenditure

RAY	<i>Rajiv Awas Yojana</i>
RWA	Resident Welfare Association
SBM	<i>Swachh Bharat Mission</i>
STP	Sewage Treatment Plant
SVC	Sanitation Value Chain
SWOT	Strengths, Weaknesses, Opportunities, Threats
UGD	Underground Drainage
ULB	Urban Local Body
USAID	U.S. Agency for International Development
USG	United States Government
VUDA	Vishakhapatnam Urban Development Authority
WSP	World Bank Water and Sanitation Program
WSUP	Water and Sanitation for the Urban Poor

# INTRODUCTION

This sanitation assessment was conducted on behalf of the U.S. Agency for International Development (USAID) to capture the current state of the sanitation service sector in the municipality of Visakhapatnam in Andhra Pradesh State (AP), in south east India. The assessment was undertaken in response to the signing of a Memorandum of Understanding (MOU) between the U.S. Government (USG) and the Government of India's (GOI) Ministry of Urban Development (MoUD) to advance the *Swachh Bharat* (Clean India) Mission (SBM), launched by the GOI in October 2014.

This assessment focuses on USAID's core commitments contained within the MOU as they apply to the city of Visakhapatnam: understanding the current status of open defecation (OD) and toilet use at household and community levels; the existing infrastructure and processes for safely containing, transporting, treating, and disposing of human waste; and opportunities and barriers to providing universal sanitation solutions sustainably across the municipality.

Visakhapatnam, with an estimated population of 2,091,000, was chosen for this assessment because it is one of three cities selected in partnership between the USG and the GOI through the Smart Cities Initiative. This initiative will support a range of water and sanitation investments as part of a multifaceted approach for sustainable and inclusive urban development.

The findings and recommendations in this report were generated by a multi-disciplinary team of international and national consultants after an intensive two-week scoping visit to Visakhapatnam in April 2015. The assessment team conducted a series of interviews with workers from the Greater Visakhapatnam Municipal Corporation (GVMC) and nongovernmental sanitation stakeholders. The team also visited several sites throughout the city to evaluate the current condition of sanitation facilities and service provision. These included notified and non-notified slum colonies<sup>1</sup>, community toilet complexes, new electronic toilet (eToilet) facilities, wastewater pumping stations, two existing sewage treatment plants (STPs), and a mega-STP construction site.

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<sup>1</sup> Per the 2011 Census, a "notified" slum is an area officially designated as a 'Slum' by State, Union Territory Administration or Local Government. A "non-notified" slum may fall into two categories: "recognized" or "identified". The former being similar to a notified area without the formality of notification and the latter being a compact area of at least 60-70 households of poorly built tenements living in an unhygienic environment usually with inadequate infrastructure and lacking proper sanitary and drinking water facilities.



# 1.0 BACKGROUND

## 1.1 USAID COMMITMENT TO SANITATION IN INDIA

India is one of the fastest growing countries in the world, with over 1.25 billion people and a rapid growth rate. It is expected to surpass China in total population by 2028. According to the 2011 India National Census, 31.2 percent of the total population, or approximately 390 million people, live in urban areas. Many urban dwellers are exposed to poor environmental health conditions. The World Health Organization (WHO)/UNICEF Joint Monitoring Program for Water and Sanitation report that only 63 percent of India's urban population has access to improved sanitation and 10 percent practice open defecation. Investment to improve sanitation services in urban areas across India will translate into tangible economic gains by reducing the estimated US\$53 billion in annual sanitation-related productivity losses absorbed by the national economy.

The GOI is committed to addressing the urban sanitation crisis. The National Urban Sanitation Policy of 2008 (NUSP) seeks to ensure that “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 SBM was launched in October 2014 to expedite the pace of NUSP implementation and bring definitive change to the country's sanitation scenario. The MoUD is responsible for implementing the SBM in urban areas through principles and approaches that are broadly based on the NUSP. The SBM's specific objectives are to: eliminate OD; eradicate manual scavenging; provide modern and scientific municipal solid waste management; effect behavioral change regarding healthy sanitation practices; generate awareness about sanitation and its linkage with public health; augment capacity for urban local bodies (ULBs); and create an enabling environment for private sector participation.

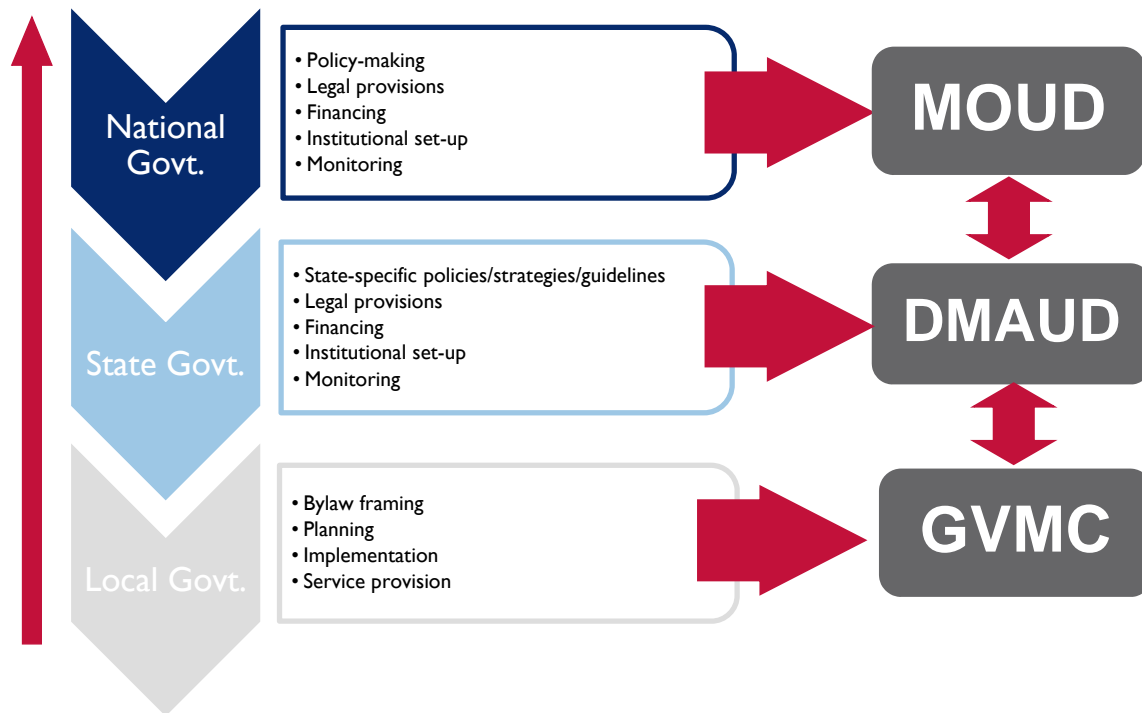
The USG's support to the SBM is in line with the Smart Cities Initiative and a recently signed MOU with the GOI. The USG will support the objectives of the Smart Cities Initiative in the cities of Allahabad, Ajmer, and Visakhapatnam. As part of the MoU, USAID is establishing a knowledge partnership with the MoUD to identify and scale best practices, build technical capacity, and advance public-private partnership focused on sanitation. USAID has previously made investments in Visakhapatnam's urban development and provided the GVMC with financial and technical support in the aftermath of the 2014 Hud-Hud cyclone. USAID's prior experience working in the municipality makes it an ideal location from which to launch the Smart Cities Initiative focused on providing solutions for improved sustainable sanitation services across the city.

## 1.2 INDIA'S SANITATION INSTITUTIONAL FRAMEWORK

The three tiers of India's governance system (national, state, and local) collectively form the institutional framework for policy-making, legal provisions, financing, planning, implementation, monitoring, and management of the sanitation program in India. Figure 1.1 depicts the institutions responsible for sanitation provision at each of the three levels of government, along with the key roles played by each.



**FIGURE I.1: THREE-TIERED INSTITUTIONAL FRAMEWORK FOR SANITATION IN INDIA**



At the **national level**, the MoUD is the nodal agency responsible for urban sanitation. The GOI, through the MoUD, shapes national policies and programs, allocates resources to state governments through various centrally sponsored schemes, provides funding through national financial institutions, and supports various external assistance programs for urban development.

Water supply and sanitation are state responsibilities under the Indian constitution. Governments at the **state level** are therefore mandated to enact and enforce laws and standards consistent with national policies and programs while adopting implementation strategies unique to their contexts. State governments are mandated to finance, provide technical support, create institutional establishments, and make all other provisions to enable cities to plan and implement different schemes and programs.

In Andhra Pradesh, the Department of Municipal Administration and Urban Development (DMAUD) handles planning and development of sanitation services in urban areas. The main functions of the DMAUD are to:

- Assist local governments in planning matters;
- Coordinate with various departments involved in development such as the AP Housing Board, AP State Housing and Urban Development Corporations, AP Industrial and Infrastructure Corporation, and the AP Industries Department;
- Offer technical recommendations to municipal and local governments in matters such as change of land use proposals, alienation of lands, and relaxation of rules;
- Suggest and implement layouts and regulate the development of industries and other buildings as per suggested norms; and
- Suggest and implement various environmental improvement, remunerative, and road-widening schemes.

The AP state government currently manages a Municipal Development Project (MDP) with support from the World Bank. Urban services targeted by the MDP will be chosen and implemented by eligible ULBs in a demand-driven manner based on predefined access criteria. The project is expected to support financial, technical, and management improvements in all AP ULBs (including in Visakhapatnam) through technical assistance (apart from infrastructure financing).

At the **local level**, the GVMC is the institution mandated by law to provide sanitation and related facilities and services to its citizens. The GVMC may draft its own bylaws to ensure that national and state-level policies are adopted to suit local needs and requirements. The municipal corporation is responsible for the planning, implementation, management, and monitoring of sanitation services. To effectively deliver services to its citizens, the GVMC is expected to communicate with and seek support from broad categories of stakeholders.

The GVMC is headed by a commissioner with ten departments that deliver different social services. The departments of Public Health and Engineering are responsible for sanitation provision (including wastewater management). Other departments, such as City Planning, Information Technology (IT) and E-Governance, Human Resource Development, Revenue and Accounts, and General Administration, play crucial supporting roles in ensuring the sanitation system functions properly.

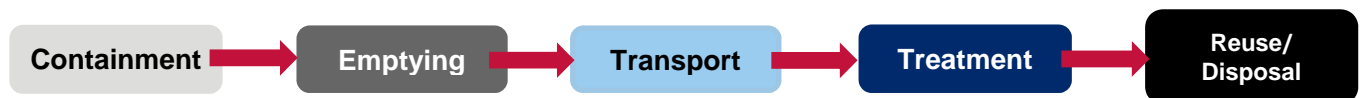
Through the NUSP, each state must develop a State Sanitation Strategy and cities are tasked to create a City Sanitation Plan (CSP). The Visakhapatnam CSP is currently under development, with support from the Capacity Building for Urban Development Project, a joint program of the MoUD, GOI, and World Bank. The initial work plan was delayed after the 2014 Hud-Hud cyclone, and it is uncertain at this time when a draft CSP will be completed.

## 2.0 METHODOLOGY

USAID is committed to improving sanitation through the agency-wide *Water and Development Strategy 2013–2018* and acknowledges the transformational role that improved sanitation services has on the wellbeing and livelihoods of city dwellers. The service delivery approach requires investment and commitment beyond simple access to individual toilets. For services to be sustainable, sanitation improvements must consider containment, collection, transportation, treatment, and reuse/disposal of human waste. By improving services at each step, collectively called the sanitation value chain (SVC), health risks can be isolated and minimized within both the localized residential and broader natural environments.

The SVC served as the assessment team’s guiding framework with which to examine the sanitation services provided by the GVMC in Visakhapatnam (Figure 2.1). The team gathered information on each link in the value chain through stakeholder and local systems analysis to understand the entire landscape of interests that contribute to and benefit from these services. Individual and small group interviews were conducted with key public sector informants from the GVMC and the departments of Engineering, Public Health, City Planning, and Revenue and Accounts. Additional individual and small group interviews were conducted with the AP Pollution Control Board (AP-PCB) and the regulatory authority for sanitation. The assessment team also held a series of meetings and interviews with nongovernmental stakeholders that culminated in a Sanitation Town Hall consultation, at which over 45 civil society participants discussed the state of sanitation in the city.

**FIGURE 2.1: SANITATION VALUE CHAIN**



The assessment team used the information gathered to construct a Fecal Flow Diagram (FFD) for the city. An FFD is a policy tool developed by the World Bank’s Water and Sanitation Program (WSP) to model the diffusion and fate of human fecal waste within complex urban settings. Fecal matter can travel through multiple pathways across the SVC, depending on sewerage connections, septic tank usage, or other decentralized emptying, transport, and treatment services. Data to generate the FFD for Visakhapatnam was collected from and calculated using the sources, assumptions, and methods described in Table 2.1.

The FFD for Visakhapatnam highlights the current sanitation infrastructure layout and challenges within the city, including sewer connections through underground drainage (UGD), septic tanks and other on-site sanitation facilities, and OD. The assessment team used the FFD to evaluate gaps across the Visakhapatnam SVC. Section 3 of the report discusses the findings of the FFD analysis.

**TABLE 2.1: SANITATION DATA SOURCES, ASSUMPTIONS, AND CALCULATION METHODS**

<b>SVC Step</b>	<b>Data Sources</b>	<b>Assumptions and Methods</b>
<b>Containment</b>	<ul style="list-style-type: none"> <li>• GVMC Department of Engineering</li> <li>• GVMC Department of Public Health</li> </ul>	<ul style="list-style-type: none"> <li>• The GVMC has identified 25,000 households in notified slums that do not have individual toilets. RAY data has identified an additional 8,500 households in non-notified slums without household toilets. The combined slum households result in an estimation of 8% (assuming 5 people per household) of the total population. Disaggregated data does not exist for households outside of the slum areas without individual toilets, so this figure is likely an underestimation.</li> <li>• The GVMC estimates that 32% of households have a connection to the UGD network, as compared to 23% at the time of the 2011 census.</li> <li>• The remaining 60% of households either have on-site facilities (septic tanks and pit latrines) or use illegal connections to open channels. Data do not exist to disaggregate these households further.</li> <li>• 127 public toilet facilities are maintained through service contracts by GVMC, as well as institutional toilets in schools, government buildings, and other facilities. However, these facilities are not included in the total sewerage calculations for the city.</li> </ul>
<b>Emptying</b>	<ul style="list-style-type: none"> <li>• GVMC Department of Engineering</li> <li>• Septic Tank Emptying Association</li> </ul>	<ul style="list-style-type: none"> <li>• According to the GVMC, manual scavenging has been eradicated from the city and there are no known cases of ongoing manual scavenging businesses. Independent data are not available to substantiate these claims.</li> <li>• On-site facilities are emptied and serviced by a local septic tank emptying association, however the association (or its members) does not maintain records of houses serviced, number or size of tanks emptied, or any other service data. Data do not exist to differentiate between facilities that are safely emptied versus those left to overflow.</li> <li>• It is assumed that all fecal waste that enters into the UGD is safely flushed directly from households.</li> </ul>
<b>Transport</b>	<ul style="list-style-type: none"> <li>• GVMC Department of Engineering</li> <li>• Septic Tank Emptying Association</li> </ul>	<ul style="list-style-type: none"> <li>• Fecal sludge collected by waste exhausters is transported in 20,000L capacity trucks. The waste exhausters are not regulated by the GVMC or AP-PCB. For this assessment, it was assumed that waste is safely transported using the exhauster trucks to the disposal sites, as quantitative evidence is not present to suggest otherwise and the field team did not observe any significant deficiencies upon an informal inspection of the vehicles.</li> <li>• It is assumed that all fecal waste that enters into the UGD is safely transported to the STPs for treatment. It is likely that some leakage occurs along the system; however, data do not exist to capture these leakages.</li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>• GVMC Department of Engineering</li> <li>• AP-PCB</li> </ul>	<ul style="list-style-type: none"> <li>• Current STPs have a maximum capacity of 76 million liters per day (MLD) for treatment, but operate only at 35 MLD capacity due to infrastructure failure and maintenance issues.</li> <li>• It is assumed that STPs safely treat 35 MLD, based upon inflow and effluent testing results by the AP-PCB.</li> <li>• Fecal sludge collected by waste exhausters is not currently treated.</li> </ul>
<b>Reuse/ Disposal</b>	<ul style="list-style-type: none"> <li>• GVMC Department of Engineering</li> <li>• Septic Tank Emptying Association</li> <li>• AP-PCB</li> </ul>	<ul style="list-style-type: none"> <li>• Treated effluent from the STPs is disposed of directly into the receiving waters and is regulated by the AP-PCB.</li> <li>• Some treated effluent is sold as grey water to local golf courses.</li> <li>• Deactivated fecal by-products are either disposed of in fields surrounding STPs or are sold as agricultural products; however, exact amounts disposed of for each method are unknown.</li> <li>• Fecal sludge collected by waste exhausters is unsafely disposed of in open drains, farmer fields, or other convenient locations across the city.</li> </ul>

In addition to the FFD, the assessment team conducted a stakeholder analysis of the Visakhapatnam sanitation sector using a variety of complementary methods and approaches. These included personal interviews with key sector players, field visits to selected locations in the city, focus group discussions with selected communities/groups, and a stakeholder consultation workshop.

Personal interviews were limited to officials in charge of sanitation and water supply services from the GVMC, officers from the AP-PCB, and other key stakeholders who influence or play key roles in the sanitation services delivery chain. A list of all persons consulted is provided in Annex 1.

Toward the end of the assignment, an “all systems in a room” stakeholder consultation workshop was organized with a diverse group of players in the sanitation space to understand their roles and responsibilities, levels of involvement, communication patterns with other stakeholders, and concerns and understanding related to urban sanitation. A list of all participants in the stakeholder consultation workshop can be found in Annex 3. During the meeting, participants engaged in two collaborative activities to map their roles in the service delivery chain:

- **Network Mapping:** Stakeholders were asked to map their interactions with other groups within the sanitation sector to identify existing communication networks. Responses were used to generate a node-network analysis to map communication pathways between critical stakeholders within the Visakhapatnam sanitation sector (see Figure 4.1).
- **Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis:** Stakeholders were grouped by common roles (e.g., generators or STP operators) into five teams and conducted a SWOT analysis for an assigned topic (see Table 2.2).

**TABLE 2.2: STAKEHOLDER CONSULTATION SWOT TOPICS**

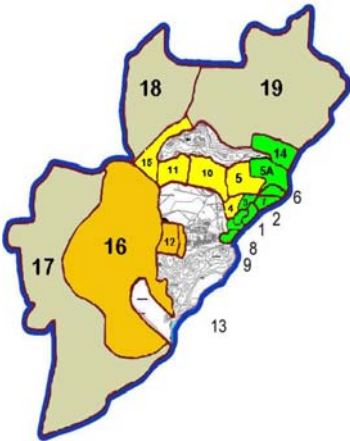
SWOT TOPICS	
Group 1: STPs	Group 4: Sanitation in Slums
Group 2: Sanitation Facility Operation and Maintenance (O&M)	Group 5: Corporate Social Responsibility (CSR) and the Private Sector
Group 3: Access and Connectivity	

# 3.0 SANITATION VALUE CHAIN IN VISAKHAPATNAM

The Municipality of Visakhapatnam has a population of approximately 2,091,000 people, occupying 681.96 square kilometers. The municipality was established in 1858 to fulfill residents’ basic infrastructure needs, and it was converted to a municipal corporation in 1979. The city is home to several private and state-owned industries and is one of India’s largest seaports, containing the country’s oldest shipyard. Visakhapatnam’s population growth rate is high due to in-migration, owing to the multitude of economic opportunities found there. Population growth has further increased in recent years due to the bifurcation of AP, with a new capital city located in nearby Amaravati and a surge in tourism. The population of Visakhapatnam is expected to exceed four million by 2030.

Sewerage remains the “gold standard” of sanitation services in Visakhapatnam despite major shortfalls in coverage and underutilization of existing capacity. The city is divided into 20 sewerage blocks including 32 merged villages (excluding Bheemili and Anakapalli). GVMC models for future population growth indicate a potential demand for 620 MLD of sewage treatment by 2044. With this in mind, GVMC is focused on expanding the sewerage system in a phased manner. Figure 3.1 shows the current status of completed and ongoing sewerage networks in various blocks.

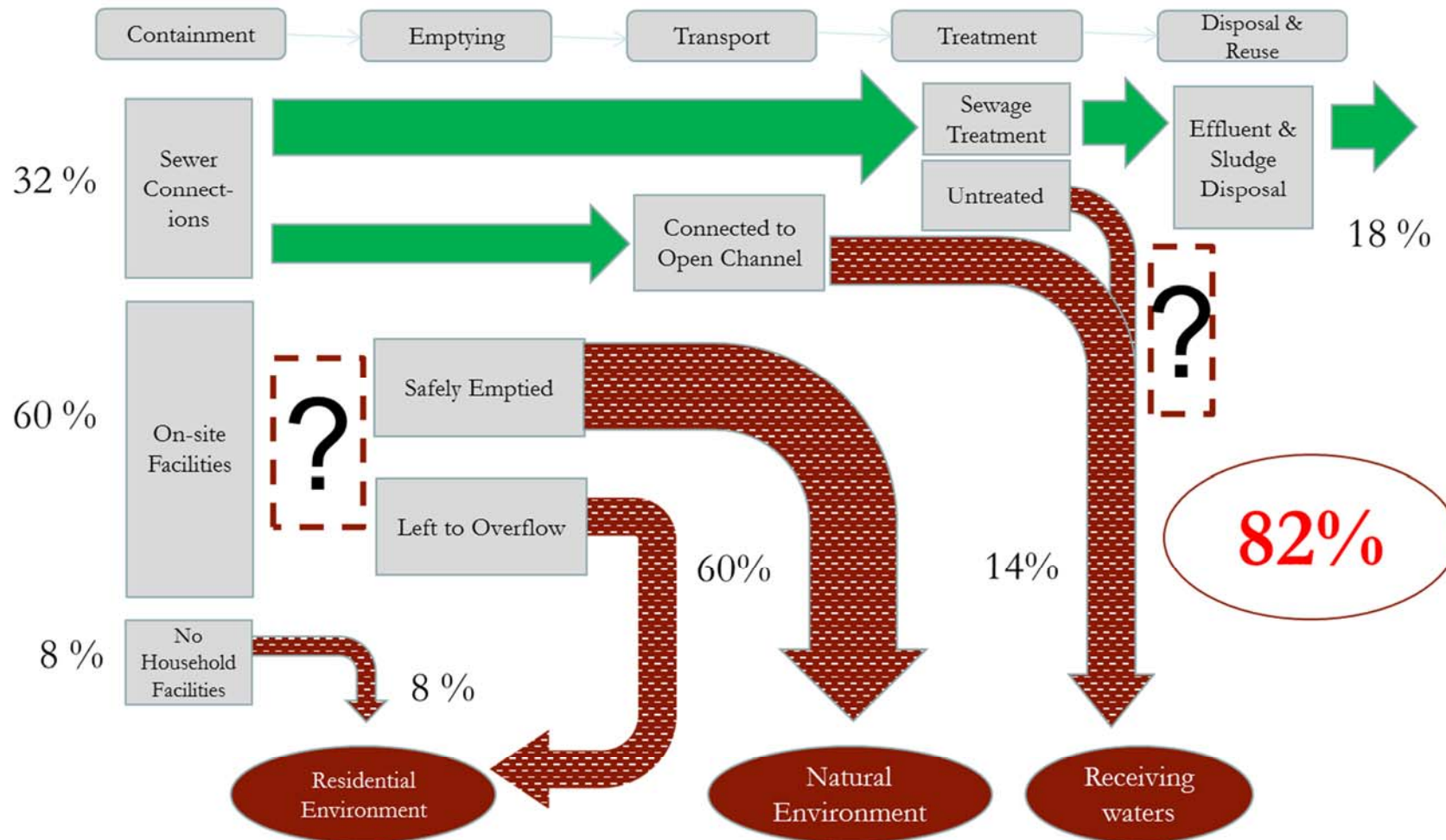
**FIGURE 3.1: VISAKHAPATNAM SANITATION BLOCKS**



Legend	Status	Sanitation Blocks Covered
<span style="background-color: #00FF00; border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span>	Completed	1, 2, 3, 5A, 6, 7, 8, 9, 14
<span style="background-color: #FFFF00; border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span>	In progress under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM)	4, 5, 10, 11, 15
<span style="background-color: #FFA500; border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span>	Designs submitted	12, 13, 16
<span style="background-color: #C8E6C9; border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span>	Designs under preparation	17, 18, 19

The assessment team made field visits to selected sites to assess sanitation services in the city, understand involvement and roles of the different stakeholders, and carry out interviews with community members (e.g., septic tank emptying association and community toilet facility users). Annex 2 contains a list of all sites visited by the team. The findings of the field visits and resulting data are summarized in the FFD on the following page (Figure 3.2).

**FIGURE 3.2. FECAL FLOW DIAGRAM FOR VISAKHAPATNAM, INDIA**



\*Data Sources: GVMC & India Census 2011



### 3.1 CONTAINMENT

Visakhapatnam’s residents use a combination of sanitation facilities: individual household toilets, institutional facilities, and community toilets. Household toilets are connected to the UGD, to septic tanks, or illegally discharge to the open drainage network. In rare cases, household latrines empty directly into a pit.

The GVMC estimates that 25,000 households within notified slums, currently do not own an individual toilet. RAY data, from GVMC, estimates another 8,500 households within non-notified slums do not have individual toilets. Combined, these values indicate that nearly eight percent of the total population does not have individual household toilets. This estimate does not include households outside of slum areas that do not own individual toilets, as this data was unavailable. The total number of households without individual toilets is likely to be higher. The 2011 census reported 14 percent of the population in Visakhapatnam was without a household toilet and that the majority of these households practiced OD.

**FIGURE 3.3: HOUSEHOLDS WITHOUT INDIVIDUAL TOILETS**

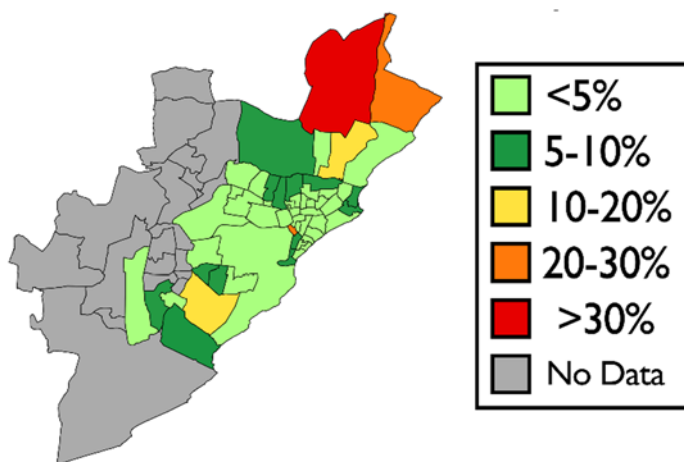


Figure 3.3 highlights the distribution of slum households without individual toilets across each ward, based upon household data received from GVMC. The large areas in the western reaches of the municipality reporting no data on toilet availability suggest a potential significant underestimation of households without toilets.

The 2011 census revealed that Visakhapatnam has the highest proportion of slum households to total urban households in India, at 44.1 percent. The magnitude of the sanitation problem in the Visakhapatnam slums is difficult to quantify. According to *Rajiv Awas Yojana (RAY)*, or “a slum free India,” there are 711 slums, both notified and non-notified, in the city. In Visakhapatnam, 25 percent of slum dwellers do not have access to a toilet on their premises, which is lower than the 34 percent national average. Over 7,000 households in the slum areas do not have access to individual toilets and report practicing open defecation.

The GVMC Department of Engineering reports that 32 percent of the population has a direct connection to the UGD network. Other than the open defecators, the remaining inhabitants use either on-site sanitation facilities, such as septic tanks, or illegally dispose of waste into open channels. However, no current and accurate data reflect the disaggregation of households with on-site sanitation or illegal connections.

Sanitation facilities at public institutions appear to generally be in a poor state of repair. The assessment team conducted a field visit to the government-run Visakhapatnam Women’s College and found that only nine toilets were present for over 1,000 students, well below the national standard for student-to-toilet ratio. Female students frequently dispose of used sanitary pads in nonfunctional toilet water storage tanks. Although a paid attendant periodically cleans the toilets, the condition of the facilities is very poor. Discussions with the faculty revealed no funding exists for maintenance, and it is a constant

challenge to provide adequate safe water and sanitation to the students. Similar scenarios are likely commonplace at government institutions (e.g., schools and health facilities) across the city.

Community toilets are an important public sanitation service in Visakhapatnam. The GVMC maintains 198 community toilets, with O&M responsibilities contracted to a private service provider, Sulabh International. Despite using a delegated management model, Sulabh reports to GVMC show that most of the toilets are not maintained properly and are in need of major repairs. Anecdotal evidence from field visits and comments during the Sanitation Town Hall suggests a many people choose OD over paying the one or two Indian rupees (INR, or US\$0.03) to use a public toilet. The contracts with Sulabh are not performance-based, and the poor performance for O&M has not resulted in any meaningful action. Recently, the GVMC invested in new technologies for community toilets, including bio-digesters and eToilets in high-traffic areas, with capital expenditures for each toilet of about INR 500,000 (US\$7,800). Anecdotal evidence from GVMC workers indicates that these facilities are not widely used.

### **OPEN DEFECACTION IN VISAKHAPATNAM**

GVMC reported that about 6 percent of the population (25,000 households) do not have access to individual toilets; however, this accounts only for the notified slum population and the assessment team believes there is a much higher prevalence of OD in the city. The team witnessed evidence of widespread OD practices during visits to public toilets and spotted multiple people defecating in the streets, in open sewers, and on the beach over the course of the field visits. Participants at the Sanitation Town Hall reported significant gender and socio-economic disparities in use of sanitation facilities. Local newspapers, without citing data sources, claim the OD rates are at least 20%. According to RAY reports, almost 30,000 households within slums practice open defecation.

## **3.2 EMPTYING**

India has a history of manual scavenging and unsafe emptying of toilets and the elimination of these practices is a pillar of the SBM. According to the 2011 National Census, very few households in Visakhapatnam practiced manual scavenging for emptying fecal waste, and the GVMC believes that this practice has been effectively eradicated, with no reports on or known businesses of manual scavengers currently operating in the city. Stakeholder participants in the Sanitation Town Hall confirmed that manual scavenging is no longer practiced and none of these types of businesses (or individuals) were inadvertently excluded from the node-network analysis. While this is a huge success, households not connected to the UGD still face many challenges to safely empty their on-site sanitation facilities.

No data currently exist regarding the number of households with illegal connections to open storm drains, but the GVMC readily acknowledges that this is a rampant problem. A visual inspection of open channels in any part of the city shows clogging from solid waste (trash) and existence of contaminated wastewater. It is a common practice to connect household sewer lines to open channels instead of UGD trunk lines, mainly due to the ease of construction and reduced cost burden. Such practices are not regulated or enforced. Given the one-time fee for households to connect to the UGD and subsequent monthly sewerage charges, there is minimal incentive for poor households to connect to the network in the absence of an enforcement mechanism.

Visakhapatnam has a private association of septic tank emptiers who service households and institutions in need of emptying on-site sanitation facilities. This group of 18 truck operators, utilizing 20,000L-capacity waste-hauling trucks, is loosely bound together and maintain an association primarily to facilitate equal work opportunities for each operator. The operators and their teams acknowledge the benefits of healthy emptying practices and strive to perform their work safely; however, their work

remains unregulated. The association does not keep records on emptying activities, financial transactions, or any other administrative performance records. Field interviews and comments offered by septic tank emptiers during the Sanitation Town Hall yielded contradictory reports on practices, household visits per truck per day, tariffs charged for services, and the profitability of offering the commercial service. Even operating at full capacity, the number of septic tank emptiers at work is grossly insufficient to de-sludge and transport the volume of waste generated from non-sewered toilets across the city.

### **3.3 TRANSPORTATION**

The UGD network currently consists of 317 kilometers (km) of mainline pipes and 250 km of household service connections. The GVMC provided the assessment team with an AutoCAD drawing of the UGD network; however, it was not geo-located and it does not align with known georeferenced landmarks (e.g., pump houses and the beach road). The GVMC is responsible for maintaining sewage lines and owns a small fleet of jetting equipment. Field engineers report that the UGD maintains a two percent slope for adequate drainage.

During the Sanitation Town Hall, drain cleaners and members of the private sector engaged in Corporate Social Responsibility (CSR) expressed concerns about the UGD's ability to handle the current load of sewage being transported. While these concerns were not backed with concrete evidence, anecdotal accounts of improper construction by unqualified engineers should be investigated. These accusations suggest serious technical issues with the UGD, including ineffective slope of pipelines for gravity flow, improper pipe sizes for connections from households to trunk lines, and poorly designed hydraulic systems for pumping sewage to the STPs.

In addition to the UGD, over 220 km of open storm water drains serve as an alternative method for households to illegally evacuate their fecal waste. Storm drains are commonly filled with rubbish leading to blockage and flooding during the monsoon season. Due to the rapid urbanization and unprecedented growth of the city in the past two decades, many storm water drains have been encroached upon by rapidly forming slum communities, causing "narrowing" of the original channel. Further, most of the slum-dwellers and people of lower castes occupy the banks of the drains, causing further obstructions to the free flow of storm water.

Fecal sludge waste is transported by exhauster trucks to illicit disposal sites throughout the city. The functionality, performance, and process of transporting fecal sludge by the septic tank emptiers is not regulated and no data exist on their activities. Further investigation should be considered to evaluate emptiers' handling and transportation practices.

### **3.4 TREATMENT**

Across these different pathways of the FFD, the GVMC estimates that 192 million liters (or 192,000 cubic meters) of sewage and fecal waste are generated daily within their jurisdiction by approximately 2.1 million citizens. Three STPs operate in Visakhapatnam, with a total capacity of 76 MLD. The current STPs are not efficiently maintained or operated and only perform at 46 percent of their total capacity (35 MLD operational capacity out of 76 MLD design capacity). Seven pumping stations are in operation for the three large STPs.

The GVMC is currently working to improve the treatment capacity for the UGD, with multiple new pump stations and a new mega-STP (108 MLD capacity) under construction, targeted to be operational by 2016. Further investment plans are under review to expand the UGD and invest in additional STPs.

For on-site sanitation users, no viable treatment options exist. The GVMC is in negotiations with the septic tank emptying association to provide access at the STPs as a strategy to reduce fuel costs, and curtail the raising number community complaints towards them for illegal dumping in residential areas. However, it is unclear to what extent STP facilities will be able to co-treat fecal sludge and sewerage wastewater (the characteristics of which are somewhat different). It is difficult to estimate the total amount of waste that would be deposited into the STPs by the vacuum trucks should this option be made available.

### **3.5 DISPOSAL AND REUSE**

The consultant team estimates that only 18 percent of the fecal waste generated by citizens of Visakhapatnam is treated properly, with the remainder having a large negative impact on the environmental and public health of the city, both in residential and natural environments. Current practices for disposing of raw fecal waste from septic tanks are a major public health hazard.

Some effluent from the STPs is sold to a local golf course for gray water agricultural use, however GVMC did not provide quantities of water sold to the assessment team. Treated solid fecal waste is not reused and is disposed of into fields surrounding the STPs. Some farmers have noted interest in acquiring the waste for fertilizer, but are unwilling to pay for it nor do they have the means to collect and transport it.

The GVMC does not have accurate data on the volume of fecal sludge, sewerage, or storm water that is currently deposited directly into the sea (see Figure 3.4). Limited data exist on the environmental impact of septic tank overflow or improper fecal sludge management on residential environments around the city. The AP-PCB is aware of possible contamination and likely negative environmental impacts of raw sewage entering the local water bodies, as well as potential aquifer contamination; however, they were unable to produce any reports or data on these issues during the assessment.

The current practice of septic tank emptiers is to dispose of fecal sludge directly into the ocean, open sewers, the natural environment, or farmers' fields. Due to complaints from local citizens on these practices, the issue of regulation has been escalated to such an extent that it is now being addressed by the GVMC commissioner. During the Sanitation Town Hall, the septic tank emptiers in attendance expressed their desire to dispose of fecal waste in a safer manner and were eager to receive a letter of permission granting them access to the STPs.



**FIGURE 3.4: DRAINAGE OUTLETS INTO THE RECEIVING WATERS IN VISAKHAPATNAM**



*Photo credit: Ben Mann, Tetra Tech*

# 4.0 SANITATION STAKEHOLDERS IN VISAKHAPATNAM

The GVMC is the institution mandated by law to provide sanitation services to the citizens of Visakhapatnam and assure the operation of related facilities (e.g., STP). In this role, the municipal corporation has the authority to draft bylaws to ensure that national and state-level policies are adapted to suit local needs and requirements. The GVMC has the mandate to plan, implement, manage, and monitor sanitation services for the entirety of the municipality. In case of the GVMC, the majority of sanitation service tasks are contracted out, but the municipal corporation retains the authority to regulate and manage the quality of the services provided.

The GVMC seeks support from broad categories of stakeholders to effectively deliver on its mandate. Important stakeholder categories include: government bodies (national, state); implementing partners; donor agencies; nongovernmental organizations (NGOs); residents; service providers; and private users of treated wastewater. A comprehensive list of stakeholders that directly and indirectly support the GVMC's sanitation mandate is provided in Annex 4.

A description of the barriers and opportunities facing each stakeholder group in the provision of sustainable sanitation services as identified by the Sanitation Town Hall SWOT analyses is presented in Annex 5. The SWOT analysis identified notable financial concerns from the nongovernmental stakeholders in the sector. Concerns were raised on misappropriation, wasting, or general corruption with finances. Additional concerns were raised on technical skills and capabilities of the GVMC, with specific issues related to project management and contract oversight.

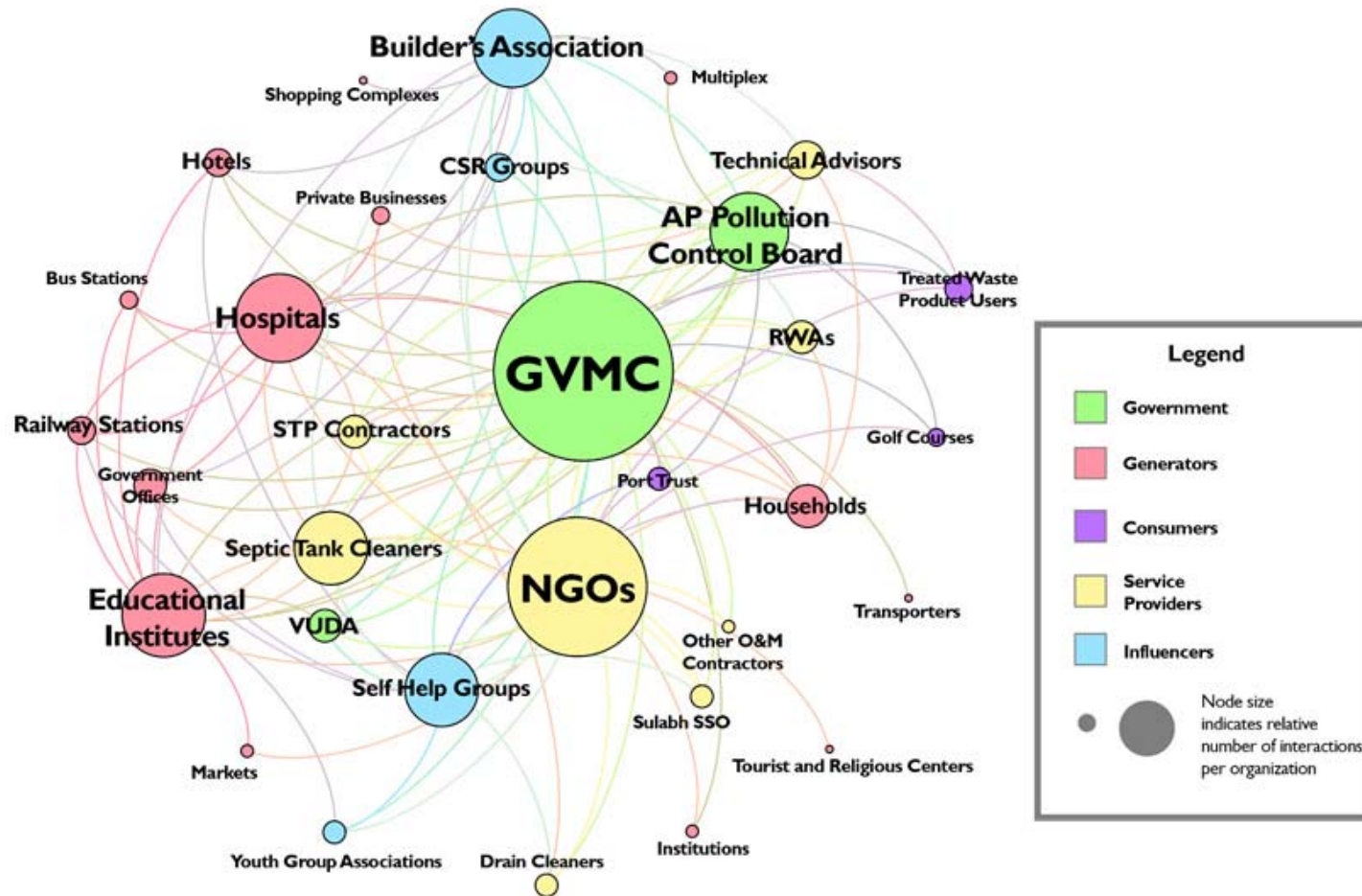
The node-network analysis conducted by the assessment team (see Figure 4.1) captures interactions and communication pathways between the prominent stakeholders in Visakhapatnam's sanitation sector. Node sizes correspond to the number of interactions each entity has with the other stakeholders in the network; stakeholders are color-coded by entity type. As expected, the GVMC is the biggest player, as most of the other stakeholders communicate with it for a variety of purposes. Other critical stakeholders include NGOs, educational institutions, hospitals, septic tank emptiers, and the AP-PCB. The findings from the node-network analysis reveal gaps in how the GVMC prioritizes interactions within the sanitation sector. For instance, during the field assessment and interviews, GVMC personnel reported little interaction with NGOs, suggesting that these organizations had an insignificant role in sanitation services. However, consultations with other stakeholders identified numerous NGOs working in the sector. As seen in Figure 4.1, NGOs appear to be the second most influential stakeholder, in terms of number of interactions. This result indicates the need for better coordination, consultation, and communication across public and civil society organizations working on sanitation issues in Visakhapatnam.

Furthermore, the analysis identified other notable communication gaps within the sector. Sulabh International which provides a majority of O&M services for GVMC's public and institutional latrines, has little interaction with the other service providers, waste product consumers, or waste generators. Septic tanks have been identified as a critical element of the sanitation infrastructure in Visakhapatnam,

yet the septic tank emptiers (septic tank cleaners in the diagram) do not interact with numerous entities that are in need of these services. Future research and analysis could be conducted to examine barriers that prevent certain groups from communicating with each other and/or identify options for streamlining communications.



**FIGURE 4.1: NODE-NETWORK OF VISAKHAPATNAM SANITATION STAKEHOLDERS**



# 5.0 CONCLUSIONS

## 5.1 SUPPORTIVE ELEMENTS AND OPPORTUNITIES

Despite the city's many challenges, the current sanitation infrastructure, political will, and financial commitments to sanitation by the Greater Visakhapatnam Municipal Corporation provide the underpinnings of a supportive enabling environment in which to bring significant improvements to the sanitation sector over the next decade. The assessment team has identified the following supportive elements and opportunities that can catalyze future sanitation successes:

- **Strong political will exists to accelerate sanitation improvements.** The current Municipal Commissioner of the GVMC, Mr. Pravin Kumar, IAS, is a champion of sanitation and the Smart City Initiative. He participated in the 2015 International Fecal Sludge Management 3 Conference in Hanoi, Vietnam, and has an impressive technical understanding of the city's current sanitation needs. During meetings with the assessment team, Mr. Kumar confirmed our initial findings and provided additional insights into numerous areas of improvement needed along the SVC. His commitment to improving sanitation was echoed by the cooperation of multiple department heads within the GVMC and the impressive understanding of their existing service needs and successes.
- **Sanitation sector stakeholders are eager to engage with the GVMC and improve sanitation services.** The assessment team conducted individual and small group interviews with over 40 professionals with a role in the sanitation sector of Visakhapatnam. During the Sanitation Town Hall, these stakeholders were given a platform to voice strengths, weaknesses, opportunities, and threats to achieving universal sanitation in Visakhapatnam. The consultation facilitated discussions on critical concerns and topics such as STPs and increasing access to household toilets; a participatory mapping exercise captured the network interactions across the different stakeholder groups. Workshop participants came away with a better understanding of the multitude of actors working in the sector. Communication channels between civil society organizations and the GVMC should be formalized. Accountability could be strengthened across all stakeholders, but particularly around private service providers (community toilets) and the members of the vacuum truck association.

The Town Hall SWOT revealed general consensus that a solid foundation exists in the city for the provision of sanitation services. The treatment capacity at the existing STPs and proposed extension of sanitation services demonstrate the GVMC's commitment to providing city-wide coverage. Additionally, the high turnout for the event reflected strong commitment from nongovernmental stakeholders to improving services. Numerous opportunities for quick wins to improve sanitation services were identified and discussed, with significant emphasis on improving household access to toilets and increasing the use and functionality of community toilets.

**Opportunity:** Building off the momentum from town hall meeting, the GVMC could organize and chair a regular meeting with civil society and the private sector to discuss sanitation.

- **Better coordination within the GVMC is needed to improve knowledge and data sharing.** The GVMC has a wealth of information and technical expertise for sanitation service

provision, yet the assessment team found that this knowledge and data on sanitation schemes were located in different pockets within the municipal corporation.

**Opportunity:** While investment should be made in long-term data management systems, the current arrangements for the sanitation working group related to the CSP (in development) can be better leveraged for coordination across departments, including Engineering, Health, Urban Community Development, City Planning, and Revenue and Accounts, to move the CSP forward. Joint efforts should also be increased to improve systems and investment across the SVC. The GVMC could improve data sharing and coordination through improved IT solutions, such as network or cloud-based storage and awareness-raising activities between different units working in the sanitation sector.

- **Myopic focus on expanding sewerage does not consider decentralized fecal sludge management.** The GVMC's ambitious agenda to expand coverage of UGD sewerage along with a rapid expansion of STP capacity is laudable. However, policy makers should be reminded that sewerage is only one option in a suite of alternatives for increasing sanitation services in urban areas. As witnessed by the GVMC's current under performance, sewerage is difficult to maintain and services at this level are likely to remain out of the reach of hundreds of thousands of residents in slum areas for the foreseeable future.

**Opportunity:** The GVMC should consider a range of fecal sludge treatment options including decentralized treatment processes, condominal sewers, digesters, wetlands, and pond systems to complement the UGD network. Such technologies are urgently needed given the current practice of dumping waste directly into the environment. Per capita investments in fecal sludge management may prove to be more cost effective than the STP, with immediate results for low-income residents. Investing in a pilot project to install digesters in neighborhoods with a high ratio of septic tanks (i.e., highly frequented by vacuum trucks) would provide a tangible alternative to illegal dumping in the near term.

## 5.2 BARRIERS AND OPPORTUNITIES

Analysis of the FFD reveals multiple failure points that are resulting in significant environmental and public health risks to Visakhapatnam. Across the SVC, technical infrastructure challenges are only one bottleneck in the treatment and disposal of sanitary waste system. To solve many of these infrastructure challenges, the GVMC and implementing partners must address broader sustainability issues, such as the regulatory environment, social equality, and financial planning (not discussed in the body of this report, but mentioned in the annexes). The following summary notes capture both the barriers and opportunities within Visakhapatnam to improve the sustainability of sanitation services being provided:

- **The regulatory environment is weak.** Overall, STP operators are the only regulated service providers in the city. The AP-PCB regularly monitors wastewater entering the STPs and the quality of the treated effluent, as does the contractor charged with operating the STP on behalf of the GVMC. If effluent does not meet regulated standards, the AP-PCB notifies the GVMC, but no penalty or corrective action is enforced in practice. This lack of enforcement extends across violations taking place throughout the SVC, the most egregious example being the unregulated dumping of raw fecal sludge by the septic tank emptiers.

**Opportunity:** At a minimum, the GVMC should require members of the association of septic tank emptiers to keep basic records on their clients, the volume of sludge extracted, and locations of the tipped sludge. This data is critical to better quantify the scope of the dumping dilemma and design options for decentralized fecal sludge management models mentioned above.

Additional policies and regulations exist on the provision of independent sanitation facilities for public transportation facilities, large commercial properties, hospitals, and industrial facilities, as outlined in the *Code of Basic Requirements for Water Supply, Drainage, and Sanitation* by the Bureau of Indian Standards. The GVMC and AP-PCB acknowledge that these standards exist and some locations comply with them (e.g., the Four Points Sheraton Hotel maintains its own mini-STP). However, these facilities are not regulated or inspected by the GVMC or the AP-PCB, and no comprehensive data set exists on the compliance of these facilities.

- **Gender and socio-economic bias remains a significant hurdle to achieving universal sanitation services.** Data provided by the GVMC for community toilet facilities show a disproportionate number of facilities for men, including the new eToilets that are exclusively for males. Stakeholder interviews revealed that women do not regularly use community toilets, except to deposit used menstrual hygiene products, because of safety concerns or lack of cleanliness. Women also expressed equity issues with individual toilet use in their homes, as it is common for household toilets to be solely used by the men and for women to practice OD. This culturally sensitive practice contradicts the assertion that only residents of households without toilets defecate in the open, as a potentially large number of women living in households with toilets do not use them regularly. In these instances, the disposal of infant and children's stools, often a female responsibility, is also likely not being performed in a safe and hygienic manner.

**Opportunity:** Further research is needed to understand the full impact that gender plays in sanitation practices, particularly open defecation, in Visakhapatnam.

The assessment team also observed inequities in toilet access for the extreme poor. Sanitation in slums areas, both notified and non-notified, are a perennial challenge due to land tenure issues related to encroachment on vacant areas without permission. An estimated 195,000 households inhabit 711 notified slums in Visakhapatnam, many are in need of individual toilets. At least 33,500 households do not have individual toilets, with almost 30,000 households reporting some practice of open defecation. Field visits to the Indiranagar slum revealed that although the GVMC built houses for the poor, they have not provided individual toilets. Most of the households complained of lack of space to build the new toilets while many said that they cannot afford to build their own.

**Opportunity:** The majority of OD in Visakhapatnam is believed to occur in slums. The city has the highest rate of slum dwellers of any municipality in India, so tracking sanitation practices in these areas should be among the highest priorities for the GVMC. A comprehensive study is needed to determine the actual OD rates within Visakhapatnam and to identify the primary drivers that support this practice.

- **Financial investments are focused on new capital investments but ignore other life-cycle costs.** The GVMC's annual sanitation-related budget allocations and expenditures reflect the political focus on investing in large infrastructure. Funding comes from a number of different sources, including the JNNURM, RAY, and minor contributions from the Thirteenth Finance Commission. For 2015, the GVMC has budgeted INR 8.62 billion (US\$135 million) for investment in sewerage and sanitation, yet the Department of Engineering estimates needing an additional INR 16 billion (US\$251 million) to complete ongoing sewage treatment activities. In addition to a total disregard to low-tech fecal sludge management approaches, the O&M budget reveals hardly any money spent on repairing the sewerage drains (only INR 96,400 [US\$1,500] in 2013) or clearing storm water drains and other such maintenance activities.

Significant investments are needed to repair and renovate STPs and community toilets. Field observations noted that STP and community toilet O&M contractors were dissatisfied and frustrated with the funding allocated from the GVMC for operational expenditure (OpEx) and

capital maintenance expenditure (CapManEx). OpEx is typically covered by lump-sum service contracts that do not accurately account for all daily expenditures for contractors (e.g., cleaning supplies for toilet facilities and fuel for generators at STPs). CapManEx funding, for items like replacement urinal doors or agitators for STP mixing chambers, is often delayed due to bureaucratic red tape and can take months to be dispersed, often delaying major repairs and taking vital systems offline that in turn reduce the level of services provided.

Despite these challenges, the assessment team believes that gaps in sustainable sanitation services are not insurmountable. The core infrastructure, policies, and agencies are in place for improving sanitation and the enabling environment is appropriate for USAID assistance. With targeted investments by the GVMC and supporting entities like USAID and the private sector, in capacity building, civil society and private sector engagement, technical skills building, and improved coordination, the sanitation services in Visakhapatnam are highly likely to improve and the amount of fecal matter that is properly disposed of will greatly increase.

## 6.0 REFERENCES

- Brief Note on Underground Drainage System in GVMC.* GVMC Department of Engineering. 2014.
- Circular Instructions of the Commissioner, GVMC on Septage Management and New UGD Connections.* Office of the Commissioner, GVMC. 2015.
- Cleaning Human Waste: “Manual Scavenging,” Caste, and Discrimination in India.* Human Rights Watch. 2014.
- Code of Basic Requirements for Water Supply, Drainage, and Sanitation.* Bureau of Indian Standards. Fourth Reprint. 2010.
- Critical Monitoring of Progress of Project Components to Achieve Targets as Committed.* APUFIDC-JNNURM-Urban Infrastructure and Governance/Urban Infrastructure Development Scheme for Small and Medium Towns. 2014.
- Hazard Risk and Vulnerability Analysis (HRVA) City of Visakhapatnam, Andhra Pradesh, Final Report.* United Nations Development Programme. 2014.
- National Urban Sanitation Policy,* Ministry of Urban Development, Government of India. 2008.
- Population Census 2011.* Population Census India, 2010; [www.census2011.co.in](http://www.census2011.co.in).
- Progress on Sanitation and Drinking Water, 2015 Update and MDG Assessment,* UNICEF and World Health Organization. 2015. Available from: <http://www.wssinfo.org/>
- Report on Categorization for Shortlisting of Slums in Eastwhile GVMC.* RAY Cell, GVMC. 2014.
- Schedule, List of Projects or Activities Requiring Prior Environmental Clearance.* AP-PCB. 2010.
- Sewerage Sector, STP Wise Details, GVMC.* GVMC Department of Engineering. 2014.
- The Economic Impacts of Inadequate Sanitation in India,* Water and Sanitation Program (WSP) of the World Bank. 2010. (<https://www.wsp.org/sites/wsp.org/files/publications/wsp-esi-india.pdf>)
- USAID Water and Development Strategy 2013–2018,* United States Agency for International Development. 2013.
- The Missing Link in Sanitation Service Delivery: A Review of Fecal Sludge Management in 12 Cities.* Water and Sanitation Program (WSP) of the World Bank, Research Brief. 2014.

# ANNEX I: LIST OF KEY STAKEHOLDER INTERVIEWED

1. Mr. Pravin Kumar, IAS, Commissioner, GVMC
2. Mr. Surendra, PA to Commissioner, GVMC
3. Dr. M.S. Raju, Chief Medical and Health Officer, in charge of sanitation
4. Mr. Venkateswara Rao, Chief Engineer, in charge of sewerage and underground drainage system
5. Dr. Sastry, King George Hospital
6. Mr. Srinivas, Executive Engineer, Underground Drainage Department, GVMC
7. Mr. Shekar, Assistant Engineer, Underground Drainage Department, GVMC
8. Mr. Narendra Kishor, Andhra University
9. Mr. R. Laxmi Narayana, Executive Engineer, AP-PCB
10. Visakhapatnam Town Planning and GIS Office
11. Mr. Laxminarayana, AP-PCB
12. Mr. Laxman Rao, in charge of the Hotel Four Point Sewage Treatment Plant
13. Mr. Prasad, Sanitary Inspector, GVMC
14. Mr. Narendra, Sewage Treatment Plant Water Quality Analyst
15. P. Hari Krishna, Sai Krishna Contractors, Sewage Treatment Plant Maintenance
16. Dr. Ramakrishna Rao, Geetam University
17. Members, Visakhapatnam Septic Truck Owners Association
18. Mr. S. Bhaskar Rao, President, Visakhapatnam Septic Truck Owners Association
19. Members of Scavenger Community



# ANNEX 2: LIST OF SITES VISITED DURING STAKEHOLDER ANALYSIS

1. Kobbarthotta Slum, Ward No 29 V – I (Chappal Market)
2. Muchhi Mamba Colony, Dayanand nagar Ward 43
3. Community toilet complex near Indiranagar slum
4. eToilet in city center
5. Visakhapatnam Women's College
6. Sewage treatment plant at Mudasarlova – 13 MLD
7. Sewage treatment plant at Appughar – 27 MLD
8. Sewage treatment plant at Narava – 108 MLD (under construction)
9. Affluent neighborhood with better infrastructure facilities (along Visakhapatnam beachfront)
10. Large part of the city to study drainage pattern
11. Sewage pumping station
12. Open outlet point along beach

# ANNEX 3: LIST OF PARTICIPANTS DURING STAKEHOLDER CONSULTATION AT VISAKHAPATNAM

No.	Name	Organization	Types of Organization
1	G. Sasibhushan Rao	NUHM, GVMC	Government
2	Mr. S.A. Rahman	Andhra University	Research/Education
3	Prof. Ramakrishana Rao	People Env. Protection Society (PEPS)	NGO
4	M.S. Jolly	Rotary Club VHAG South	NGO
5	Mr. Bonu Bhooiw	Sri. Roomaj Noogojr Soomooj	Self-help group
6	Mr. P. SunKayya	Septic Tank Emptier	Private
7	Mr. P. Jeev Ratnam	Septic Tank Emptier	Private
8	Mr. B. Sai Shankar Rao	GVMC (Contractor)	Private
9	Mr. S. Ratnam	GVMC, Department of Public Health	Private
10	Mr. N. Aruna	SRI PA DMAVALEI(s)	Community-based organization (CBO)
11	Mr. Polipalli Jhansi	Andhra University	Andhra University
12	Mr. G. Komal Raj	Andhra University	Andhra University
13	Mr. Chanwa laxmi Kanjham		Private
14	Ms. Viddi Shrinivas Rao		Government
15	Mr. Appa Rao	25 MLD STP maintenance, contractor	Private
16	Mr. Palakonda Madhu	India Youth for Society	NGO
17	Mr. Pravin Kumar	World Vision India	NGO
18	Mr. P.S. Chandrashekara Rao	BREDS	NGO
19	Mr. Rama Krishna Rao Sawaram	Resident Welfare Association, MVP Sector XI	CBO
20	Mr. Y. Appala Reddy	India Youth for Society	NGO
21	Mr. PLK MVR Thy	Rotary Club	NGO
22	Mr. P. Pawan	Krystal Integrated Services Pvt. Ltd	Corporate
23	Dr. Kslgsastry	King George Hospital Gov.	Corporate
24	Mr. R. Laxmi Narayana, EE	AP-PCB	Government
25	M. Durga Prasad	Kirlalampudi Resident Welfare Association	CBO
26	M. Jagdish Kumar	India Youth for Society (P4)	NGO

No.	Name	Organization	Types of Organization
27	Rtn. R.V. Rajshekhar	Rotary Club, Visakhapatnam South (23310)	NGO
28	Dr. Pandu Ranga Prasad	Rotary Club	NGO
29	M. Narendra Kishor	GVMC (AV)	Private
30	Mr. R.V Rao	ENRCON	Private Consultant
31	Mr. Tabetha Francis	World Vision India	NGO
32	Mr. B. Srinivasan Rao	CREDAI	Builders Association
33	Mr. Kolli Simha Chalam	Sri Padmavatei (p)	CBO
34	Mr. SK. Ismail	VGSSP (SADHANA)	NGO

# ANNEX 4: LIST OF STAKEHOLDER ORGANIZATIONS

Stakeholder Category	Stakeholders
1. National Government	<ul style="list-style-type: none"> <li>• Ministry of Urban Development, GOI</li> <li>• Ministry of Environment, Forest, and Climate Change</li> <li>• Department of Economic Affairs</li> <li>• Ministry of Housing and Urban Poverty Alleviation</li> </ul>
2. State Government, Andhra Pradesh	<ul style="list-style-type: none"> <li>• Urban Development Department</li> <li>• Finance Department</li> <li>• Vishakhapatnam Urban Development Authority</li> <li>• AP-PCB</li> </ul>
3. Donor Agencies	<ul style="list-style-type: none"> <li>• USAID</li> <li>• The World Bank</li> <li>• Asian Development Bank</li> <li>• GIZ</li> </ul>
4. INGOs	<ul style="list-style-type: none"> <li>• CARE</li> <li>• WaterAid</li> <li>• Plan</li> <li>• Save the Children</li> </ul>
5. Generators	<ul style="list-style-type: none"> <li>• Households</li> <li>• Institutions               <ul style="list-style-type: none"> <li>– Educational</li> <li>– Government offices</li> <li>– Hospitals</li> <li>– Hotels</li> <li>– Commercial buildings</li> <li>– Markets</li> <li>– Shopping complexes</li> <li>– Multiplexes</li> </ul> </li> <li>• Transporters               <ul style="list-style-type: none"> <li>– Bus stand</li> <li>– Railway station</li> </ul> </li> <li>• Tourist and religious centers</li> <li>• Parks, gardens, and other public amenities</li> </ul>
6. Service Providers	<ul style="list-style-type: none"> <li>• Technical advisors/consultants</li> <li>• Andhra University</li> </ul>

Stakeholder Category	Stakeholders
	<ul style="list-style-type: none"> <li>• O&amp;M providers <ul style="list-style-type: none"> <li>– Sulabh SSO</li> <li>– STP contractor</li> <li>– Septic tank emptiers</li> <li>– Drain cleaners</li> </ul> </li> <li>• NGOs</li> <li>• CBOS <ul style="list-style-type: none"> <li>a. Resident Welfare Association (RWA)</li> <li>b. Self-help Groups</li> </ul> </li> </ul>
<b>7. Others</b>	<ul style="list-style-type: none"> <li>• Builders Association</li> <li>• Youth Group/association</li> <li>• CSR groups</li> </ul>
<b>8. Consumers</b>	<ul style="list-style-type: none"> <li>• Treated waste product users <ul style="list-style-type: none"> <li>a. Golf course</li> <li>b. Hotel</li> <li>c. Port Trust</li> <li>d. Gardens and parks</li> </ul> </li> </ul>

# ANNEX 5: BARRIERS AND OPPORTUNITIES FOR STAKEHOLDERS

## NATIONAL GOVERNMENT

Stakeholder Category/Stakeholders	Barriers	Opportunities
1. Ministry of Urban Development	<ul style="list-style-type: none"> <li>Weak convergence of schemes and programs and low coordination with other ministries and departments</li> <li>No effective management and monitoring of sanitation related works done under different ministries</li> </ul>	<ul style="list-style-type: none"> <li>An inter-ministerial/ interdepartmental coordination committee may be established at national, state, and city level</li> <li>City-level management and monitoring system to track progress and work undertaken by different departments</li> </ul>
2. Ministry of Environment, Forest and Climate Change		
3. Department of Economic Affairs (Finance Ministry)		
4. Ministry of Housing and Urban Poverty Alleviation		

## GOVERNMENT OF ANDHRA PRADESH

Stakeholder Category/Stakeholders	Barriers	Opportunities
1. Municipal Administration and Urban Development Department	<ul style="list-style-type: none"> <li>Weak convergence of schemes and programs and low coordination with other ministries and departments</li> <li>No effective management and monitoring of sanitation related works done under different ministries</li> </ul>	<ul style="list-style-type: none"> <li>An inter-ministerial/ interdepartmental coordination committee may be established at national, state and city level</li> <li>City-level management and monitoring system to track progress and work undertaken by different departments</li> <li>Provide overarching support in terms of cross learning from other cities/states.</li> <li>Training and capacity building programs</li> <li>Support VUDA in futuristic planning keeping city expansion</li> </ul>
2. Finance Department	<ul style="list-style-type: none"> <li>Weak mechanism to track linkage between financial and physical progress made by different departments in sanitation</li> </ul>	<ul style="list-style-type: none"> <li>Establish a system that can track sectoral progress funded under different schemes/program and departments</li> </ul>

Stakeholder Category/Stakeholders	Barriers	Opportunities
3. <b>Vishakhapatnam Urban Development Authority (VUDA)</b>	<ul style="list-style-type: none"> <li>Being a parastatal agency, may face conflict in role playing; particularly post 74<sup>th</sup> Constitutional Amendment</li> </ul>	<ul style="list-style-type: none"> <li>Provide overarching support in terms of cross learning from other cities/states.</li> <li>Training and capacity building programs</li> <li>Support in futuristic planning keeping city expansion</li> </ul>
4. <b>AP Pollution Control Board</b>	<ul style="list-style-type: none"> <li>Role limited as a regulatory agency.</li> </ul>	<ul style="list-style-type: none"> <li>Can be a key partner not just in regulating pollution levels but also should provide recommendations to improve system performance</li> </ul>

### DONOR AGENCIES

Stakeholder Category/Stakeholders	Barriers	Opportunities
1. <b>USAID</b>	<ul style="list-style-type: none"> <li>Multiple agencies playing similar roles sometimes confusing the donor group as well as the client</li> </ul>	<ul style="list-style-type: none"> <li>A mechanism to track and define roles of different donor groups at state and city level</li> </ul>
2. <b>The World Bank</b>		
3. <b>Asian Development Bank</b>		
4. <b>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH</b>		

### NGOS

Stakeholder Category/Stakeholders	Barriers	Opportunities
1. <b>CARE</b>	<p>Strengths of these organizations in terms of experience in field demonstrations, advocacy, documentation, particularly in poor settlements not tapped</p>	<p>Each NGO (or an alliance formed collectively at the city level) may be requested to provide issue specific support</p>
2. <b>WaterAid</b>		
3. <b>Plan</b>		
4. <b>Save the Children</b>		
5. <b>World Vision India</b>		

### GENERATORS

Stakeholder Category/Stakeholders	Barriers	Opportunities
1. <b>Households (Citizens)</b>	<ul style="list-style-type: none"> <li>All households do not have access to individual level toilets</li> <li>Community toilets/public toilets serving the slums and poor settlements are in bad shape, therefore many households still defecate in the open</li> </ul>	<ul style="list-style-type: none"> <li>All households can be empowered to own their individual toilets</li> <li>All community toilets/public toilets can be revamped/ remodeled to suit current needs and requirements. As communities own individual household level toilet, facilities</li> </ul>



Stakeholder Category/Stakeholders	Barriers	Opportunities
	<ul style="list-style-type: none"> <li>• Effluent and sewage waste from households flowing in open drains</li> <li>• Not all households (even after having access to sewer network) connected to sewer</li> <li>• Emptying of septic tanks is not regular – no system, no regulation for emptying</li> <li>• RWA non-functional in most localities</li> </ul>	<p>the public toilets can redesigned for public use</p> <ul style="list-style-type: none"> <li>• Connect all households to the sewer system – connections may be incentivized</li> <li>• Revisit roles of the RWAs and make the proactive and more empowered</li> </ul>
2. <b>Institutions: such as</b> a. <b>Educational</b> b. <b>Gov. offices</b> c. <b>Hospitals</b> d. <b>Hotels</b> e. <b>Commercial buildings</b> f. <b>Markets</b> g. <b>Shopping complex</b> h. <b>Multiplexes</b>	<ul style="list-style-type: none"> <li>• No clear guidance and technical support on establishing institutional level treatments facilities</li> <li>• No enforcement and no regulation of sanitation facilities (their adequacy and standards as per norms) existing within the institutions</li> <li>• Low understanding about possible options in sanitation promotion</li> <li>• Low knowledge about technology and approaches</li> <li>• Low awareness about sanitation and health linkages</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare an advisory report containing technical, economic, environmental, and social aspects related to sanitation</li> <li>• Educate (training, capacity bundling, awareness generation, active involvement) all these institutions</li> <li>• Monitor, regulate, enforce, and penalize against ineffective upkeep of sanitation facilities in all institutions</li> <li>• Cross learning between institutions to expose them to good practices, e.g., STP at the Four Point Hotel, proposed plan of King George Hospital, and septic management system</li> </ul>
3. <b>Transporters</b> a. <b>Bus stand</b> b. <b>Railway station</b>		
4. <b>Tourist and religious centers</b>		
5. <b>Parks, gardens, and other public amenities</b>		

## SERVICE PROVIDERS

Stakeholder Category/Stakeholders	Barriers	Opportunities
1. <b>Technical advisors /consultants</b> <b>E.g. ENRCON</b>	There seem to be less competition universities are underplaying to their capacities	Role of universities and other competing players such as consulting agencies can be more vibrant and in improving overall sanitation system
2. <b>Andhra University</b>		
3. <b>O&amp;M providers</b> a. <b>Sulabh SSO</b>	<ul style="list-style-type: none"> <li>• Seem to be working in “not so good” working environment</li> <li>• Income level not sustainable in some facilities</li> <li>• Facilities are in depilated conditions</li> <li>• No provision for disposal of sanitary napkins in women section</li> </ul>	<ul style="list-style-type: none"> <li>• GVMC may support in improving and upgrading facilities</li> <li>• GVMC may support in making the facilities sustainable by strategic investment</li> <li>• Redesign all the existing sanitation complexes to include additional facilities such as sanitary disposal units</li> </ul>

Stakeholder Category/Stakeholders	Barriers	Opportunities
b. <b>STP Contractor</b>	<ul style="list-style-type: none"> <li>• Delay in repairs in case of breakages</li> </ul>	<ul style="list-style-type: none"> <li>• Revisit procurement norms and conditions to make them more system friendly</li> </ul>
c. <b>Septic tank Cleaners</b>	<ul style="list-style-type: none"> <li>• Inadequate in number</li> <li>• In spite of being Inadequate in number they don't get enough business</li> <li>• Low knowledge on disposal practices and options</li> </ul>	<ul style="list-style-type: none"> <li>• Enforce mandatory periodic emptying of septic tanks</li> <li>• Framing bye laws defining the need and system for septage management</li> <li>• Training and capacity building of septic tank cleaners</li> </ul>
d. <b>Drain Cleaners</b>	<ul style="list-style-type: none"> <li>• Cleansers are not equipped with protective aprons</li> <li>• Lot of municipal solid waste goes into open drains</li> </ul>	<ul style="list-style-type: none"> <li>• Drain cleaners may be provided with protective aprons and provided with adequate training and social protection</li> <li>• All open drains may be covered and disposal of solid waste into the drains may be banned</li> <li>• Mechanization and modernization of drain clearing may be explored</li> </ul>
4. <b>NGOs</b> a. <b>People Environmental Protection Society (PEPS)</b> b. <b>BREDS</b> c. <b>India Youth for Society</b> d. <b>Rotary Club</b> e. <b>VGSSP (SADHANA)</b>	<ul style="list-style-type: none"> <li>• Not many good NGOs existing</li> <li>• NGOs are considered as outsiders on many instances</li> <li>• Capacity of local NGOs in Urban Sanitation are limited</li> </ul>	<ul style="list-style-type: none"> <li>• Importance of involvement of the NGOs should be recognized and they may be provided more proactive and empowering role where suitable</li> <li>• Smaller NGOs may be nurtured and larger ones may be strengthened based on need and long-term program planning</li> </ul>
5. <b>CBOS</b> a. <b>Resident Welfare Association (RWA)</b> <b>Example: RWA, MVP Sector XI</b>	<ul style="list-style-type: none"> <li>• Most RWAs are non-functional</li> <li>• RWAs and local elected representative (Corporators) do not find it easy to promote each other</li> </ul>	<ul style="list-style-type: none"> <li>• Roles and responsibility of RWA may be tuned with that of the local Corporator</li> <li>• Local Corporator or his nominee may be made integral part of RWAs</li> </ul>
b. <b>Self-help groups (SHGs)</b>	<ul style="list-style-type: none"> <li>• Low capacity</li> <li>• No lucrative income source</li> <li>• No recognition to the role they can play at local level</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity development</li> <li>• Role may be clearly defined where feasible and adequate provision of their income may be made so as to function them more effectively</li> </ul>

## OTHERS

Stakeholder Category/Stakeholders	Barriers	Opportunities
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<b>1. Builders Association</b> <b>Example: CREDAI</b>	<ul style="list-style-type: none"> <li>• Roles in better sanitation promotion not clear and not defined</li> <li>• No proactive involvement</li> </ul>	<ul style="list-style-type: none"> <li>• Clear role may be defined and more active participation may be encouraged</li> <li>• All facilities constructed through them may be mandated to follow minimum expected norms and standards as defined (or may be defined)</li> </ul>
<b>2. Youth Group/Association</b>	<ul style="list-style-type: none"> <li>• No encouraging involvement and incentives</li> </ul>	<ul style="list-style-type: none"> <li>• Clear role may be defined and participation may be incentivized</li> </ul>
<b>3. CSR Groups</b> <b>Example: 1) CREDAI</b> <b>Example: 2) King George Hospital Gov.</b>	<ul style="list-style-type: none"> <li>• Low knowledge among CSR groups about the possibility to invest in urban sanitation</li> </ul>	<ul style="list-style-type: none"> <li>• Huge scope of involvement of CSR groups in effective sanitation promotion particularly at institutional level (particularly public facilities), in community mobilization, provisions in low income areas, etc.</li> </ul>
<b>4. Private</b> <b>Example: Krystal Integrated services Pvt. Ltd</b>	<ul style="list-style-type: none"> <li>• Not many players existing</li> <li>• Scope for private sector involvement particularly in management, operation and maintenance still not institutionalized</li> </ul>	<ul style="list-style-type: none"> <li>• Role of private players in providing specific services related to operation maintenance, management and monitoring may be institutionalized</li> <li>• Performance based incentives may be considered</li> </ul>

## CONSUMERS

Stakeholder Category/Stakeholders	Barrier	Opportunities
<b>I. Treated waste product Users</b> <ol style="list-style-type: none"> <li><b>Golf Course</b></li> <li><b>Hotel</b></li> <li><b>Port Trust</b></li> <li><b>Gardens &amp; parks</b></li> </ol>	<ul style="list-style-type: none"> <li>• The sector and the practice is relatively new</li> <li>• Potential consumers have not been tapped</li> <li>• No studies and data on overall potential versus possibilities</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholders may be empowered with knowledge and information, usefulness, economics, etc.</li> <li>• Undertake studies to explore the issue further so that constructive actions and activities may be taken up</li> </ul>

# ANNEX 6: STAKEHOLDER SWOT ANALYSIS

Each stakeholder group produced a SWOT analysis during the consultation, identifying critical elements for improving sanitation. Their findings are presented in the following tables:

## GROUP 1 SWOT ANALYSIS – STPS

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Constructed STPs with huge investments</li> <li>New STPs will meet higher demands of households</li> </ul>	<ul style="list-style-type: none"> <li>Funds are constrained for the operation of STPs and not for maintenance or capital repairs</li> <li>Limited household connections to STPs</li> <li>Lacking enough skilled operators</li> <li>Lacking a responsible and skilled officer from GVMC for daily oversight</li> <li>Solid waste is not properly disposed of by groups and clogs STPs</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>O&amp;M contracts should be given to experienced persons or organizations who have experience in operating STPs</li> <li>Tertiary treatment shall be provided for the reuse of sewage for industrial use, which can reduce the use of fresh water for industrial purposes.</li> </ul>	<ul style="list-style-type: none"> <li>Untreated sewage is letting out into the sea and may cause damage to the environment (ocean and groundwater)</li> <li>STPs that are too close to residential areas may become an odor nuisance</li> </ul>

## GROUP 2 SWOT ANALYSIS – SANITATION O&M

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Community facilities are located in strategic areas where the slum areas are prevalent and amidst residential areas</li> <li>New eToilets in community zones</li> </ul>	<ul style="list-style-type: none"> <li>O&amp;M is dependent on the daily presence of the keeper of the toilet. Sometimes it may be locked due to their absence.</li> <li>Public toilets often suffer with absence of supply of water by the GVMC.</li> <li>Since the monetary collection for public toilets is by an individual, corruption exists through overcharging (sometimes double the displayed cost).</li> <li>The awareness for using toilets is limited amongst citizens. Display boards with prices</li> </ul>

	<p>and educational material are not written in local languages.</p> <ul style="list-style-type: none"> <li>Some public toilets are in remote locations that cannot be connected to the UGD and are not properly emptied.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Technical committees should be formed to oversee GVMC investments in public toilets to ensure that their efforts are most beneficial to the community.</li> <li>The subsidy given to construct septic tanks in the slum communities should be extended to connect their sewerage to the UGD.</li> </ul>	<ul style="list-style-type: none"> <li>During the rainy season, the septic tanks get filled with storm water and contaminate the water resources.</li> <li>The improper cleaning and O&amp;M of community toilets proliferates diseases in the locality.</li> <li>The vents of septic tanks are not covered with mesh and often breed mosquitoes.</li> </ul>

### GROUP 3 SWOT ANALYSIS – ACCESS & CONNECTIVITY

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Availability of sanitation schemes in the GVMC are growing</li> <li>UGD pipelines and STPs are in place</li> <li>Systems and operational mechanisms are in place</li> </ul>	<ul style="list-style-type: none"> <li>Lack of space at the household level for construction of toilets.</li> <li>Lack of sufficient quantity of water</li> <li>Implementation and monitoring mechanisms need to improve</li> <li>STPs are underperforming and in disrepair</li> <li>Misuse and mismanagement of funds by GVMC for household toilet construction</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Community toilets/Sulabh complexes could be improved</li> <li>Utilization of government schemes and programs to fund toilet construction</li> <li>Exploring synergies with corporate and other donors</li> <li>Scope for civil society organizations to contribute to service provision</li> </ul>	<ul style="list-style-type: none"> <li>There is a lack of space for feedback and service providers to coordinate</li> <li>People's general attitude and mindset towards sanitation is not a priority</li> <li>Corruption</li> <li>Use and disposal of non-biodegradable materials obstruct the flow of drains</li> </ul>

### GROUP 4 SWOT ANALYSIS – SANITATION IN SLUMS

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• The GVMC has over 25,000 households identified for toilet investment</li> <li>• If we implement the program in slums, household health systems will improve</li> </ul>	<ul style="list-style-type: none"> <li>• Slums are not able to construct toilets due to lack of awareness to programs and schemes</li> <li>• Unable to motivate slum federations in adopting the programs to improve sanitation</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• The GVMC has numerous donor opportunities to improve slum conditions</li> <li>• The builder’s association can change the construction focus to support more toilets</li> </ul>	<ul style="list-style-type: none"> <li>• Misuse of funds and underutilization of programs</li> <li>• Number of colonies in need of improvement</li> <li>• Public health risks due to large areas without toilets</li> </ul>

### GROUP 5 SWOT ANALYSIS – CSR & PRIVATE SECTOR ENGAGEMENT

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• It is very good to use CSR funds for sanitation</li> <li>• We have good number of PSUs and large industries in Visakhapatnam</li> <li>• Most of the people in need are within GVMC limits so PSUs should have no objection or resistance to investment</li> </ul>	<ul style="list-style-type: none"> <li>• There are other activities through CSRs competing for funds.</li> <li>• No proper planning or coordination for further maintenance after CSR grants are given.</li> <li>• Bio-toilets are installed but not maintained</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• We can involve the unemployed and use them for sanitation service positions</li> <li>• Support advocacy for increasing public toilet use</li> </ul>	<ul style="list-style-type: none"> <li>• Corruption and misappropriation of funds</li> <li>• Delay in implementation results in increase in cost of project, resulting in wastage of money and incomplete projects.</li> </ul>

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