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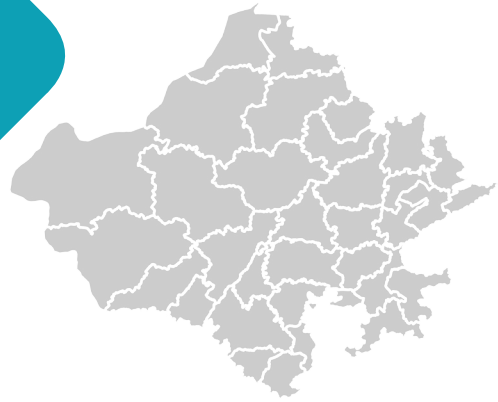
Government of Rajasthan



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# GUIDELINES

## Faecal Sludge & Septage Management



Public Health



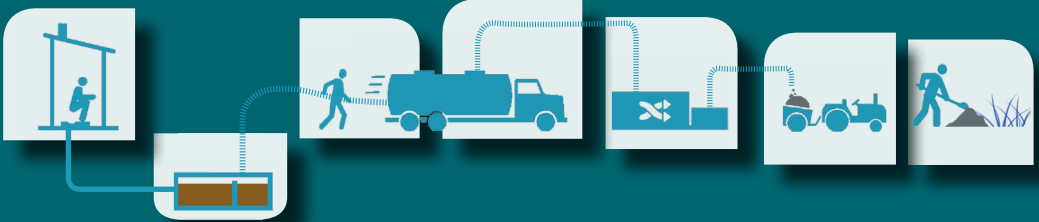
Partnership Building



Environment



Urban Local Governance



2018

Local Self Government Department

Government of Rajasthan



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# Faecal Sludge & Septage Management Guidelines for Urban Rajasthan



सत्यमेव जयते

Government of Rajasthan

## Shanti Dhariwal

Minister

UDH & LSGD

Government of Rajasthan



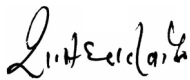
The State of Rajasthan has witnessed numerous remarkable changes in Urban Development Paradigm with the implementation of Swachh Bharat Mission (SBM). The SBM scheme invigorated and bolstered the State's determination and initiatives towards improving its sanitation and hygiene conditions, further paving way for a historic journey and a movement to providing safe sanitation to all citizens.

The concerted efforts of Department of Local Self-Government and Urban Local Bodies (ULBs) of the State resulted in the elimination of the undignified and unhealthy practice of open defecation from all urban areas of the State by March 2018. Considering numerous challenges of geography, spatial extent ; this accomplishment and the successful implementation of Swachh Bharat Mission (SBM) is definitely a moment to celebrate.

First of all, I would like to congratulate all Urban Local Bodies who were the front runners of this movement. Without their pro-activeness, it would not have been possible. The ULBs under SBM have not only built the capacity to improve the city-wide sanitation but developed new modalities, innovative solutions, and processes which have contributed to the ongoing endeavours towards safe sanitation. With that notion, I also want to convey that attaining the open defecation-free status is just a milestone in the existing expedition of the State towards safe sanitation, the vision of sanitised city is still far to achieve. Not only the construction of new toilets helped in achieving the status of open defecation free but simultaneously created new challenges of managing the waste produced from these toilets that depends on On-site sanitation facilities such as Septic Tanks, Kui, Pits, etc.

Sanitising the city and providing safe sanitation to the individuals cannot be accomplished without addressing the safe management of faecal sludge and septage generated in Septic tanks, Kui, and Pits. This will be the biggest upcoming challenge of sanitation for the ULBs which may adversely impact the public health and the environment, if not managed timely. Faecal Sludge and Septage Management (FSSM) can address this issue in a timely and affordable manner. Urban Local Bodies need to take a proactive role in implementing FSSM to address the faecal sludge and septage on an urgent basis.

I am sure the FSSM guideline will go long way in accomplishing the vision of safe sanitation, better public health, and protection of the environment. I am optimistic that the guidelines will be a valuable document for the State and ULBs to address the sanitation needs pertaining to the safe management of the waste produced by on-site sanitation systems.

  
(Shanti Dhariwal)



Government of Rajasthan

**Devendra Bhushan Gupta**  
Chief Secretary  
Government of Rajasthan



The Government of Rajasthan has been continuously driving its cities towards a better quality of life. Over the years the urban development of Rajasthan State is moving towards the course of enhancing the liveability and prosperity. Today, results of state-level efforts are evident at the local level and have resulted into cities of Rajasthan becoming role models.

Urban Local bodies are being facilitated and encouraged by the State through capacity-building and engaging in a dialogue with them at various workshops and discussions. This has enabled the local leadership in shouldering the responsibility to achieve the targets and have responded phenomenally by constructing nearly 4 lakhs toilets under SBM.

The leadership and capacity formulated during the Swachh Bharat were not only bound to the sanitation but also expanded the horizon of the ULBs to manage all municipal services. Examples of such efforts are the ongoing expedition of the ULBs to manage faecal sludge and septage generated and collected in underground containments such as Septic Tanks, Kui, Pits etc. The ULBs are moving from just providing toilets to the next step of managing the waste produced from these containment units. The GoR through the grant support from BMGF is developing a pilot project in ULBs such as Phulera, Lalsot, and Khandela to build some of the very 1st FSTP in Rajasthan. Such a success story is also going to be expanded in other suitable small and medium town for achieving the vision of 100% sanitation coverage, safe disposal, and re-use in all urban local bodies of Rajasthan.

It is in this backdrop that the Department of Local Self Government has developed guidelines on “Faecal Sludge and Septage Management” clearly defining the steps and responsibility for the State and town level interventions to implement FSSM solutions. This will help the ULBs in managing faecal sludge and septage in urban areas which are not served by the sewer network. The septage management is cost-effective, easy to implement, and can leverage existing resources such as internalising the unorganised private desludging operators, who are the lifeline in septage management in every city.

The implementation of guidelines would help in the safe management of faecal sludge and septage, and will help to establish robust institutional and regulatory mechanism at the State and ULB level to bridge the existing value chain gap.

  
(Devendra Bhushan Gupta)



सत्यमेव जयते

Government of Rajasthan

## Sidharth Mahajan

Secretary

Local Self Government Department

Government of Rajasthan



The Guidelines for State Faecal Sludge and Septage Management will help the ULBs to streamline the FSSM-based sanitation value chain. The urban areas whether it's a large city or a small town the FSSM value chain exists in some or other form. These guidelines will provide a roadmap to every city irrespective of its size or geography for addressing the sanitation needs pertaining to faecal sludge and septage.

Rajasthan's endeavour for providing safe sanitation can be understood with the fact that a total of 37 STPs are operational and 100 STPs are under construction. The total sewerage treatment capacity is expected to become 1260 MLD by 2021 indeed that can only serve less than 60% of the total urban population of the State. Nearly, 40% of the urban population will depend on the On-site sanitation facilities which require management of the waste produced, through proper and safe system of emptying, transportation, treatment and disposal.

Also, sewerage is always seen as the only option to manage the wastewater produced in cities, whereas most of the households depend on on-site sanitation system that can be economically and efficiently catered by FSSM. The sewerage system can be a non-feasible solution to water-scarce towns where there are high chances of either nullified built infrastructure or result in expensive operation and management. Particularly, small towns with limited financial capacity will not be able to accommodate the O & M cost linked to the sewerage network. The FSSM interventions are the effective solutions to these challenges.

Further, the strategy for Swachh Bharat Mission followed by the State of Rajasthan was not merely a construction activity, but it was complemented with the mechanism of promoting the use of toilets, eliminating open defecation practices, and managing wastewater generated in these toilets. The central idea was to improve public health and liveability in all urban areas.

The Department of Local Self Government along with ULBs has already been working towards addressing the issues of faecal sludge and septage. These FSSM guidelines provide insights into planning and management of faecal sludge and septage to Urban Local bodies for implementing the FSSM. Our effort was to produce a comprehensive document that is user-friendly for all concerned stakeholders.

(Sidharth Mahajan)

# Acknowledgement

Rajasthan Urban Infrastructure Development Project (RUIDP) under the guidance of Local Self Governance Department has prepared “Faecal Sludge and Septage Management (FSSM)” Guidelines for operationalizing the FSSM in all towns of the State. These guidelines prepared under the project “Capacity Building Support for Innovative Sanitation Solution in Rajasthan” supported by the Asian Development Bank and funded by Bill and Melinda Gate Foundation (BMGF) are in line with the National FSSM Policy and the Draft State FSSM Policy. I am gratified to ADB and BMGF for supporting the exploration of innovative sanitation solutions in Rajasthan.

I would like to present my sincere gratitude to Mr. P.K. Goyal, Additional Chief Secretary, UDH & LSGD and Mr. Naveen Mahajan, former Secretary LSGD for their humble guidance in formalize these guidelines. This document prepared for operationalizing the FSSM, can be considered as one of the valuable documents in leveraging safe sanitation practices to all Urban Households.

The FSSM requires a new and participatory approach for planning and implementation which is altogether a different and a challenging endeavour. I would like to congratulate key persons Mr. G.S. Hada (Addl. Project Director, RUIDP), Mr. Hemant Sharma (ACE, RUDISCO), Mr. Suresh Gupta (Dy. Project Director (T), RUIDP) and Dr. D.R. Jangid (SE-WW, RUIDP) along with whole RUIDP team for supporting the overall FSSM initiatives and successful delivery of guidelines.

The FSSM guidelines hold a great value as it has been prepared in collaboration of various state agencies whose past experiences are well internalized. The guidelines reflect the experience and efforts of Rajasthan Urban Drinking Water Sewerage & Infrastructure Corporation Limited (RUDSICO), Directorate of Local Body (DLB), Public Health Engineering Department (PHED), Jaipur Municipal Corporation (JMC) and several other ULBs.

The formative journey of the preparation of these guidelines stretches from past one year, which included numerous engagements and informative consultations with many ULBs. However, I would like to mention the name of four ULBs which took initiatives and extended these guidelines into the reality and displayed the courage and willingness towards accepting new innovations in terms of septage management, namely: Nagar Palika of Phulera, Sambhar, Lalsot, and Khandela.

I would also take the opportunity to extend my regards to IPE Global Limited and its team for playing a leading role in delivering the Guidelines within the stringent timelines without compromising on the quality. IPE Global Limited has invariably included its valuable experiences from the pilot towns where they are currently working in partnership with ULBs to showcase the end-to-end FSSM approach under the guidance of Rajasthan Government.

  
(Dr. Preetam B. Yashvant, IAS)  
Project Director, RUIDP



# Abbreviations

AMRUT	Atal Mission for Rejuvenation and Urban Transformation
BIS	Bureau of Indian Standards
BOD	Biochemical Oxygen Demand
CBO	Community Based Organization
CPHEEO	Central Public Health and Environmental Engineering Organization
CPCB	Central Pollution Control Board
CSR	Corporate Social Responsibility
DEWATS™	Decentralized Wastewater Treatment System
DLB	Directorate of Local Bodies
DPR	Detailed Project Report
DAY-NULM	Deendayal Antyodaya Yojana National Urban Livelihood Mission
FSSM	Faecal Sludge and Septage Management
FSTP	Faecal Sludge Treatment Plant
GIS	Geographical Information System
GoI	Government of India
GoR	Government of Rajasthan
IEC	Information Education Communication
lpcd	Litres per capita per day
IS	Indian Standard
LSG	Local Self Government
MIS	Management Information System
MoHUA	Ministry of Housing and Urban Affairs
MoU	Memorandum of Understanding
NGO	Non-Government Organization
O&M	Operation & Maintenance
OSSF	On-site Sanitation Facility
PPP	Public Private Partnership
RSPCB	Rajasthan State Pollution Control Board
RUIDP	Rajasthan Urban Infrastructure Development Project
RUDSICO	Rajasthan Urban Drinking Water, Sewerage and Infrastructure Corporation
SBM	Swachh Bharat Mission
SHG	Self Help Group
SS	Suspended Solids
STP	Sewage Treatment Plant
UDH	Urban Development & Housing Department
ULB	Urban Local Body
USEPA	United States Environmental Protection Agency
VGf	Viability Gap Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WWTP	Wastewater Treatment Plant



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01

## **Introduction**

# 1

## Background

The Swachh Bharat Mission was launched on 2nd October 2014 to eradicate open defecation from both, rural and urban India. The focus of this mission was majorly on toilet construction and provide complete access to toilets for the general public. This mission also aims at promoting cleanliness and hygiene, with better management of solid and liquid waste produce along with in eliminating the unhealthy practice of open defecation. In conjunction to this, the Ministry of Housing and Urban affairs (MoHUA), Government of India formulated “National Faecal Sludge and Septage Management Policy” in 2017 with an overarching goal of making ‘All Indian cities and towns become totally sanitized, healthy and liveable and ensure sustenance of good sanitation practices with improved Onsite Sanitation Services together with faecal sludge and septage management to achieve optimum public health status and maintain clean environment with special focus on the poor’.

The National FSSM Policy recommends safe collection, transportation, and disposal of septage, and installation of appropriate operation and maintenance (O&M) systems for the upkeep of infrastructure and equipments. The National FSSM Policy also advises the Governments at the Centre, all States/UTs and even the towns and cities to create FSSM Guidelines that are tailored according to their context and requirements. To bolster the preparation of FSSM Guidelines, it is imperative to stress on the existing codes of practice, such as the National Building Code, 2005, IS - 2470 brought out by the Bureau of Indian Standards (BIS), National advisory on Septage Management in Urban India, and the Manual on Sewerage and Sewage Treatment prepared by the CPHEEO. These documents aggregate as the major sources of standards and guidelines for enabling Faecal Sludge and Septage Management in India.

# 2

## Current Scenario & Need of FSSM in Rajasthan

After successful implementation of the mission to construct toilets in various towns under Swachh Bharat Mission (SBM); Rajasthan State has now total 2.73 million toilets<sup>1</sup>, out of which 70 % of urban households are dependent on underground containment system such as Kui, Pits, Septic tanks etc. The Government of Rajasthan (GoR) is now also looking at Faecal Sludge Management as an imperative step to tackle the increasing amount of faecal sludge that will be accumulated in containment systems owing to the increase in the number of toilets. Many other efforts have been put forward for FSSM during last one year (2017). The GoR through grants support from Bill & Melinda Gates Foundation (BMGF) is developing pilot project in ULBs like Phulera, Lalsot and Khandela to build some of very 1st Faecal Sludge Treatment Plant (FSTP) of State and to facilitate the adoption of town-specific FSSM regulations. The determination of the State towards the environmental safety and public health encouraged it to undertake a rapid assessment of strategically selected 100 small and medium towns with less than one lakh (100,000) population in the State of Rajasthan. These selected towns do not have an underground sewerage system where citywide FSSM can be easily implemented. Further, through the Sanitation Capacity Building Platform (SCBP), a group of experts and organisations committed to the goal of sanitation has structured a program on sensitisation, capacity-building, and technical support in Rajasthan. This platform is supporting and facilitating numerous incremental changes and capacity building for establishing FSSM in pilot project towns in Rajasthan. The Government of Rajasthan has sought to provide its own services for emptying and transporting faecal sludge by commissioning vacuum trucks in most of the 191 ULBs in the State. These vacuum trucks will function along with those owned by private service providers. This increment in the number of vacuum trucks is a welcome initiative, as it would introduce a

<sup>1</sup> Including 0.33 Million toilet built under Urban SBM and achieving the target of ODF on march 2018

mechanical desludging and eliminating manual scavenging. Numerous other attempts are ongoing, being implemented by the State Government, ULBs, NGOs, and various other agencies regarding FSSM to ensure incremental efforts towards the vision of achieving complete sanitation in Rajasthan.

According to the proposal established in the State's Sewerage and Waste Water Policy, 2016, sewerage networks would be expanded in the forthcoming years. Considering various on-going and proposed programs of the GoR, through AMRUT Mission and RUIDSCO; it is expected to have a total 1260 MLD treatment facility by the year 2021 in Rajasthan. This would serve close to 60% of the state's urban population whereas rest 40% of the population would be dependent on on-site containment units. The existing treatment facility (STPs) is very limitedly available in 27 ULBs, which accounts for only 14% of total ULBs. The proposed investments will be able to build treatment facility in 84 ULBs out of 191, that leaves 107 towns where immediate attention is needed.

Many towns in Rajasthan have limited source of funding apart from SBM to improve their overall sanitation conditions. These towns equipped with covered or uncovered storm water drains only, require technical and financial assistance to improve their environmental conditions and establishing and maintaining basic public health and sanitation, especially in the towns declared in the dark zones<sup>2</sup>.

In order to move up the environmental sanitation ladder resulting in improved environmental conditions (clean ground and surface water bodies and soil) and public health, FSSM is the next incremental step. For defining the FSSM strategy and its implementation in the selected towns, it is essential to have a set of operative Guidelines that will formalise the entire sanitation value chain. These Guidelines propose the recognition of good practices in the disposal and treatment of septage/faecal sludge and efficient regulation of the sanitation value chain where necessary.

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<sup>2</sup> 140 of the 249 blocks in Rajasthan have been declared as the overexploited or dark zone towns and 50 of them are critical according to Central Ground Water Board of Ministry of Water Resources in India ( Accessed at [http://cgwb.gov.in/gw\\_profiles/st\\_Rajasthan.htm](http://cgwb.gov.in/gw_profiles/st_Rajasthan.htm) on 5.5.2017; List of blocks notified as critical and over exploited [http://www.cgwb.gov.in/CGWA/documents/Notice\\_Societies.pdf](http://www.cgwb.gov.in/CGWA/documents/Notice_Societies.pdf) )

# 3

## Faecal Sludge and Septage Management Guidelines for Rajasthan

These operative Guidelines are formulated by the GoR, drawing from the provisions and specifications for Faecal Sludge and Septage Management from the National Faecal Sludge and Septage Management Policy, 2017; Rajasthan Wastewater and Sewerage Policy, 2016, Primer on Faecal Sludge and Septage Management, 2016; National Building Code, 2005; revised CPHEEO Manual on Sewage and Sewerage Treatment 2012; Advisory Note on Faecal Sludge and Septage Management in Urban India, 2013; and National Urban Sanitation Policy, 2008.

The objective of these Guidelines is to promote a comprehensive and integrated approach to Faecal Sludge and Septage Management covering the attributes of the collection, storage, desludging, transportation, treatment, disposal and reuse, and ensure the compliance with various national-level guidelines and regulations. These Guidelines intends:

- To be facilitators for all relevant stakeholders for their individual roles and responsibility;
- To establish a robust institutional and regulatory mechanism at the State and ULB-level to bridge the existing gaps in FSSM value chain;
- To provide clarity on selections of towns and intervention approaches to kick-start implementation;
- To provide necessary guidance for planning and implementing FSSM interventions at a town and city-level;
- To facilitate the adherence to proper design, collection, treatment, disposal and reuse standards in managing faecal sludge/septage with the existing infrastructural capabilities of the ULBs;
- To further strengthen the framework focused on implementing the provisions of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013.





# 04

## **Key Elements of FSSM State Chapter**

# 4

## Key Elements of FSSM State Chapter

1. Approach and Selection Criteria for FSSM Interventions
2. Cluster Based Intervention Approach
3. Roles and Responsibilities of State Level Departments & Agencies
4. Constituting State FSSM Committee and Cell
5. Partnership Building

#### 4.1 Approach and Selection Criteria for FSSM Interventions

- Cities where investment are limited for a sewerage solution, population growth restricted to address economic feasibility and further Insufficient water supply for ensuring smooth operations of a sewer network; septage management can be adopted as an intermediate or long-term solution. However, it would require incremental augmentation of grey water management to serve and supplement as a medium of wastewater management similar to a sewerage system.
- In order to reach the goal of providing safe and clean sanitation to all citizens, FSSM interventions are needed in most of the towns in one or other form as an immediate action in compliance to providing safe sanitation solution. To achieve the goal of expanding sanitation coverage to all households in urban areas; three broad intervention approaches were identified, namely: Full-scale, Partial and Gap-filling solution.
- Full-scale FSSM solutions are more suitable for a population base of less than 50,000 residents, whereas the Partial and Gap-filling solutions may be applicable to a city of any scale (Large, Medium and Small) based on its requirement. Even the towns with less than 50,000 residents with functional STPs can opt for the Partial or Gap-filling sanitation solutions.

**Table 4.1: Town Selection Matrix for FSSM Interventions**

SN	Parameters	Intervention Approach			Remarks
		Category - I	Category – II	Category - III	
		Full Scale <sup>1</sup>	Partial Scale <sup>2</sup>	GAP Filling <sup>3</sup>	
1	Population	Less than 50,000 (Class III & IV) (except Distt. Headquarter)	Applicable in zones	Applicable in pockets	Partial-Scale and Gap-filling solutions are applicable to all cities irrespective of their population level.
2	Water Ponding	75 % of town geography permits gravity disposal of grey water	-	Low-lying pockets and areas having poor accessibility for desludging vehicle.	FSSM should be avoided in cities with high incidences of water ponding. Incidence of water ponding will create challenges for safe disposal of greywater.

<sup>1</sup> Partial scale – Left-out population can be served through desludging operations and disposal can be done at the existing STP locations.

<sup>2</sup> Zones are part of urban area and left out from existing municipal coverage of sewerage network

<sup>3</sup> Pockets can be any small habitation of municipal area where both laying down the sewerage network and undertaking desludging services (accessibility constrain) are not feasible.

SN	Parameters	Intervention Approach				Remarks
		Category - I	Category - II	Category - III		
		Full Scale <sup>1</sup>	Partial Scale <sup>2</sup>	GAP Filling <sup>3</sup>		
3	Topography	-	-	Low-lying pockets and areas having poor accessibility	Small pockets in low-lying areas with limited scope of desludging are suitable for on-site sanitation solutions	
4	Soil Type	Pervious Soil	-	-	Presence of pervious soil increases the safe percolation of greywater and reduces the situation of water logging/ponding.	
5	Water Supply	Less than 70 LPCD	-	-	Towns with inadequate water supply should not opt for a sewerage system.	
6	Existing sewerage coverage with availability of STP	-	Co-treatment in existing STP	-	STP can be upgraded with a co-treatment unit for handling sludge disposal and sludge management.	
7	Population Density	-	Less than 40 persons/ hectare	-	It would be an expensive task to install a sewerage network in low-density settlements.*	
8	Water Table	>6m	-	-	As double story basement (B2) is allowed in the state. Higher water table increase susceptibility of ground water contamination	
9	Isolated & Scattered settlements	-	Yes	Yes	Scattered settlements needs high cost to connect with sewerage .	

\* Planned development such as new townships and colony of housing board, UIT Schemes etc. will needs to be exempted from this standard.

- ➔ The towns which fulfil most of the parameters in category-I shall opt a full-scale FSSM as an immediate and long-term solution. This can be incrementally supplemented with greywater management. The towns with less than 50,000 populations and different to most of the listed parameters of category I, may opt for FSSM as an ad-hoc or interim solution.
- ➔ The Partial-scale approach would be applicable to the towns where STPs are functional and can be upgraded with a co-treatment facility. These solutions would serve pockets either where it is not possible to provide a sewerage network or it is an expensive task to lay down a network. The ULBs may assess the cost-benefit of desludging and disposal of septage to the existing STP versus setting-up a dedicated FSTP unit. The process and parameters required for the provision of co-treatment are enclosed in the Annexure 11. The Gap-filling solutions would be applicable in the cities with an adequate sewer network, but unable to serve the pockets in difficult terrains or/and poor road accessibility. In such case, a decentralised and on-site treatment unit could be set-up with an improved discharge of the effluent.
- ➔ The implementation of FSSM solutions can also be adopted in the cities where the sewerage network is very old and dysfunctional, also in urban areas where sewerage network would be expensive to lay due to the rocky strata or with other topographical disadvantages. The ULBs with a small and medium population (preferably of Class III & IV) and with a limited financial capacity for O&M of the sewerage system should necessarily opt for FSSM as an incremental approach towards an improved management of generated wastewater.


# TOWN SELECTION CRITERIA FOR FSSM INTERVENTIONS



	Less than 50,000 (Class III & IV) (except DHQ)	Sewerage is financially not viable for small town.
	75 % of town geography permits gravity disposal of grey water	Cities with low incidences of water ponding.
	Pervious Soil	Increase the safe percolation of grey water.
	Less than 70 LPCD	Sewerage system does not work in water scarcity
	> 6m	Low WT reduces ground water contamination

**FULL SCALE FSSM**

category **1**

<p><b>PARTIAL SCALE FSSM</b></p>	Applicable to all cities irrespective of Population.	Applicable in zones	
	STP can be upgraded with co-treatment unit.	Co-treatment in existing STP	
	Expensive to install sewerage in low density	Less than 40 persons/ hectare	
	High cost to connect with sewerage	Applicable	

category **2**

	Applicable in pockets	Applicable to all cities irrespective of Population
	Low lying pockets having poor accessibility	Low lying pockets with limited scope of desludging
	Applicable	High cost to connect with sewerage

**GAP FILLING SOLUTION**

category **3**

## 4.2 Cluster Based Intervention Approach

Clustering of adjacent Urban Areas (preferably with the radius of 20 Km) can reduce the requirement of a dedicated treatment facility (FSTP/STP), and upcoming treatment units could be shared to a large beneficiary group. This will also help in reducing the financial burden on the ULBs and increase the functionality of the plant operations. A GIS-based proximity analysis of all 191 ULBs of Rajasthan suggests the possibility of 24 clusters formulations where, either co-treatment or sharing of FSTP can be institutionalised. The analysis showed that 107 out of 191 ULBs do not have treatment facility of any sort, and such clustering would provide an immediate solution to 26 ULBs out of 107 ULBs by the provision of a co-treatment facility with an existing or upcoming STP or FSTP. The ULBs and other agencies responsible for the operation of STPs or FSTPs may prepare a formal agreement supported by a financial mechanism with the cities/Towns willing to treat the sludge in their facility. The future proposal of dedicated FSTPs may also explore the possibility of such clustering while increasing the beneficiary coverage of treatment facility.

Based on the population of a town, the land availability for setting-up a treatment facility, the existing financial capacity, physical location etc.; The ULBs may opt to be a part of a clustering set-up. Town(s) which fall under the cluster of a neighbouring town may opt for large desludging vehicles in a form of a mobile transfer station to efficiently reduce the cost on long-distance transport. For example, a Small-capacity trucks, preferably of 3000 Litres, may serve the towns in needs for desludging operations and transfer the collected sludge to a mobile desludging truck, preferably of 9000 Litres for transporting the sludge to a remote plant location.

The following suggestions can be considered for executing sludge transfer operations:

- Designating a location where large desludging vehicles would be parked/stationed and sludge transfer operations may take place.
- Usage of safety gears such as face masks, gloves, glasses, and other safety equipment is a must for all workers while performing the operations.
- The Large-capacity desludging truck should securely off-load the stored sludge at the designed treatment unit within 3 days of the collection. This can be very depending on technology adopted.
- Option for Pooling of large desludging trucks to address the sludge transfer needs of neighbouring towns/settlements can be also explored to further reduce the operational cost.

A Detailed Options Analysis and GIS-based clustering illustration for all 191 ULBs of Rajasthan are present in Annexure – 7.

# Clustering Strategy

why?

**27** Towns have existing treatment facility.

**57** Towns have proposed/ under construction treatment facility.

**107** Towns don't have treatment facility.

when?



settlements within 20 km buffer of treatment facility will form clusters to meet the demand.

benefits



**larger coverage**  
to nearby treatment facility



**cost saving**  
infrastructural setup



**affordable**  
to operator by ULB

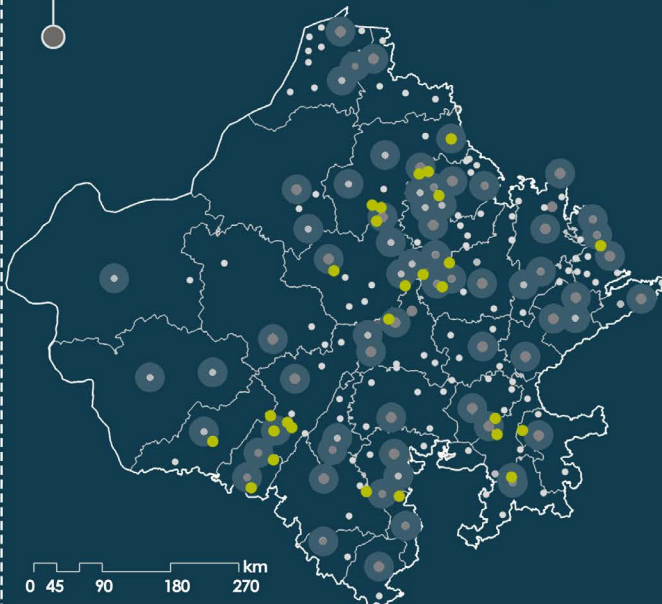


**time saving**  
to operationalize



**easy to start**  
the process

## illustrations of clustering



0 45 90 180 270 km

- without treatment facility (not covered under clusters)
- without treatment facility (covered under potential clusters)
- with Treatment Facility (proposed/ existing) - 20km coverage buffer
- State Boundary
- District Boundary

### scenario 1 TREATMENT WITH EXISTING STPs IN NEARBY TOWNS



### scenario 2 BASED ON FSTP/ STP



### scenario 3 CLUSTERING WITH NEARBY VILLAGES





### 4.3 Roles and Responsibilities of State Level Departments & Agencies

The roles of the State Government departments and agencies which would be engaged in FSSM have been clearly defined in the table below for eliminating any ambiguities and overlapping of their functions.

*Table 4.2: Roles and Responsibilities of State Level Departments & Agencies*

Agency/ Department	Roles and Responsibilities
Local Self Government Department (LSGD), GoR	Overall supervision of FSSM operations in Rajasthan.
	Coordinate with the State government on matters pertaining to FSSM, including the financial grant for Capital and O&M expenses.
	Channelise funds from various Central, State, bilateral/ multilateral and other sources to a dedicated State Sanitation Fund and ensure the dissemination to all the ULBs
	Set-up of a State FSSM Committee for inter-department coordination and related decisions.
	Any other responsibility as deemed fit by the State Government.
Directorate of Local Bodies (DLB)	Nodal agency for supervising and managing the planning and implementation of FSSM operations across all the ULBs in Rajasthan.
	Set-up of a State FSSM Cell for closely working & performance monitoring of respective ULBs.
	Setting-up Urban State Sanitation Fund.
	Establish a framework and platform to encourage an innovative funding mechanism such as CSR, PPP, Guarantee Funds, Crowdfunding, Social and Development Impact Bonds, ULB Incentive Fund, UPIF, etc.
	Arrange for and manage funds, allocate annual budget, disseminate grants/aids, VGF for the provision of FSSM infrastructure at local-level and expenses for IEC & capacity-building programmes, etc.
	Coordinating networking among various key stakeholders, responsible for building partnerships and further connecting to the ULBs based on their requirement. The ULBs may engage with the professionals through an empanelment to provide technical assistance to ULBs for the realisation of FSSM operations.

Agency/ Department	Roles and Responsibilities
Directorate of Local Bodies (DLB)	Formulate a uniform structure for planning, designing, project preparation, appraisal, sanction, and implementation across all the ULBs.
	Formulating, notifying, and ensure the implementation of the important documents, such as the State FSSM Guideline, Policy, Action Plan, Strategy, Standard Operative Procedure, Amendments in the Model Building Byelaws related to sanitation, etc.
	Assisting and guiding the ULBs for the preparation of containment unit user database, City FSSM Plan and Strategy, setting service-level benchmarks, selection of an appropriate treatment technology, preparation of DPRs, and carrying out other responsibilities related to FSSM.
	Coordinate with various other State government departments and local-level authorities to ensure convergence of FSSM Plans and Strategy with other ongoing and proposed projects.
	Inviting public and private agencies to be involved in FSSM operations at various levels of sanitation value chain and build partnerships.
	Coordinate with City Sanitation Committees for annual financial audits against the budget and targets.
	Conduct the social impact assessment of sanitation-related initiatives across the State and develop goals and actions for further improvement.
	Formulate a monitoring and evaluation mechanism to conduct annual reviews of the FSSM progress and associated gaps across all the ULBs.
	Prepare a Training Calendar to conduct training and workshops across the State, customised to the targets of various stakeholders such as ULB officials, service providers, NGOs, CBOs, Corporates and Public.
	Undertake IEC activities/public awareness campaigns at the State-level and also facilitate for IEC material to the ULBs.
	Developing and Managing the State-wide MIS System on Sanitation for all Urban Areas. Furthermore, prepare annual progress status reports.

Agency/ Department	Roles and Responsibilities
Rajasthan State Pollution Control Board	Ensure the compliance of FSSM operations through inspections, environmental monitoring, etc.
	Address grievance related to the environmental hazards due to FSSM operations.
	Assist in the formulation of relevant advisories, guidelines, manuals, etc. to ensure the environmental compliance of FSSM operations.
Rajasthan Urban Drinking Water, Sewerage & Infrastructure Corporation	Ensure coverage of all non-sewer pockets and areas in their project towns through appropriate FSSM interventions .
	Capacity-Building and Awareness of ULBs, Service Providers and other stakeholders for the implementation of FSSM in their project towns
Other State Government Departments	Sufficiently incorporating the provision of this Guideline in their projects, schemes, programs, plans, guidelines, activities, etc.
	Provide necessary sectoral inputs towards the State FSSM strategy, roadmaps, plans, etc.
Private Sector	Active participation in the service delivery of FSSM at the State and City-level
Financial Institutions	Providing financial assistance to desludging operators for purchasing new vehicles or upgrading existing equipment.
	Extending low-interest loans to the households for construction, repair of toilets and septic tanks.
	Facilitate identification of possible financial resources for the creation of community or city-level assets – community toilets, treatment plants, transfer stations, etc.

Agency/ Department	Roles and Responsibilities
Academic, Research, Non-Government and Civil Society Organizations	Include the module of FSSM as part of school curriculum and introduce a dedicated course on FSSM to incorporate this in the mainstream education and produce more skilled/trained human resource in the long run.
	Undertake primary researches on safe and sustainable FSSM.
	Develop models for safe and sustainable delivery of FSSM services to all.
	Support the implementation of FSSM activities at ground level.
	Raise the awareness and sensitisation on the importance of FSSM amongst the general public.
	Provide monitoring support to the ULBs on any unsafe practices that could impact an effective FSSM.
	Set up regular interactions with the ULBs to discuss operational issues and play a crucial role in imparting other potential and possible solutions.
Media Agency	Active participation in spreading the awareness, and provide relevant information to residents and other relevant stakeholder groups.
	Highlighting the emerging issues and showcasing good examples during project implementations.

## 4.4 Constituting State FSSM Committee and Cell

A dedicated State FSSM Committee & Cell shall be set-up to manage FSSM-related initiatives such as projects, annual targets and performance monitoring of ULBs, awareness campaigns, building partnerships, etc. The State FSSM committee would be responsible for the overall supervision, coordination with various State departments, and request the GoR for relevant funding assistance.

The composition of the Committee and Cell shall have an adequate representation of women. Various external agencies and line department can be engaged for different initiatives and functions.

### 4.4.1 Constitution of State FSSM Committee at LSG

The State FSSM Committee shall comprise of 12 members. The committee shall meet quarterly, i.e., once in three months. The Minutes would be managed for each meeting, signed by the Chairman and the Member Secretary. All decisions made in the meeting need to be agreed upon and should be signed by both, the Chairman and the Member Secretary. A Separate committee under the LSG Secretary Chairman has already been formed for the implementation of the State Sewerage and Water Policy. The Office Order for the same can be seen in Annexure - 13. The same Committee can be given a mandate for overall review

and progress monitoring for FSSM as well as, further committee can guide to resolve any pertinent issue of inter-department and establish convergence to ongoing projects of other departments with the FSSM. However, there would also be a need to ensure women participation within the Committee, and the Committee may include members from research and academic institutes for providing an independent voice during relevant discussions.

The State FSSM Committee would include of the following members:

1.	Principal Secretary, LSG, GOR	Chairman
2.	Principal Secretary/Secretary, PHED, GOR	Member
3.	Managing Director, RIICO or his/her representative, not below the rank of the Joint Secretary or equivalent	Member
4.	Principal Secretary, Agriculture RIICO or his/her representative, not below the rank of the Joint Secretary or equivalent	Member
5.	Member Secretary, Rajasthan State Pollution Control Board RIICO or his/her representative not below the rank of the Joint Secretary or equivalent	Member
6.	Joint Secretary, Finance	Member
7.	Director, Local Bodies	Member
8.	Executive Director, RUDSICO	Member Secretary
9.	Representative from research institutions/universities	Member
10.	3 Nominees recommended by the Chairman (From Wash-Water, Sanitation, and Hygiene with adequate women representation)	Member

#### Responsibilities of State FSSM Committee :

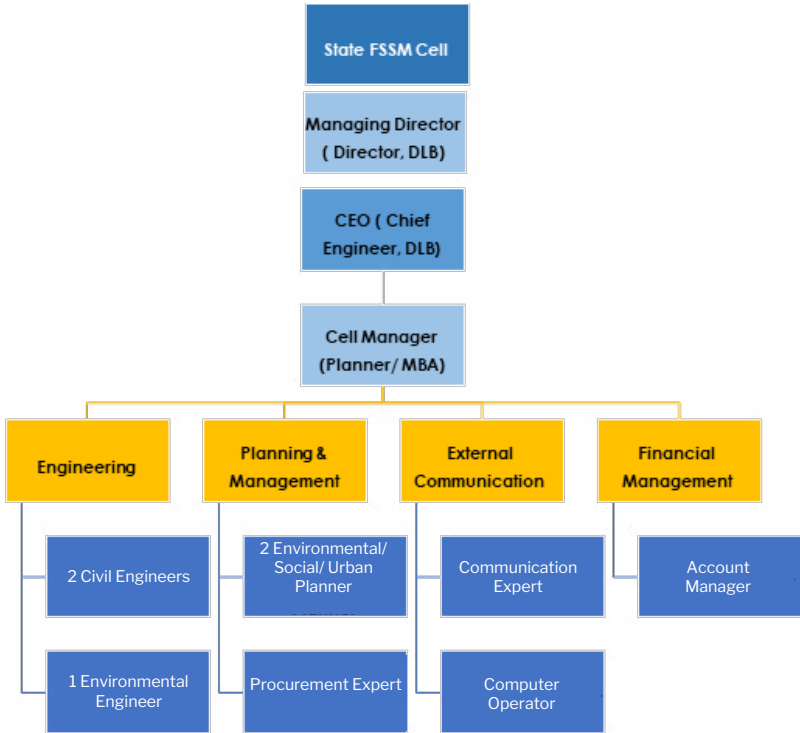
- To monitor the implementation of the State FSSM Policy and Guidelines.
- Establishing inter-departmental coordination on the matters pertaining to FSSM.
- Responsible for building partnerships.
- Request the GoR for the assistance regarding funding support for the implementation of complete coverage of FSSM by the year 2025.
- Review work performance of the FSSM Cell at the end of each year to assess various accomplishments, shortcomings, and provide suggestions and inputs for the perspective year to bridge the gaps.

#### 4.4.2 Constitution of State FSSM Cell at DLB

The State FSSM Cell shall comprise of 12 members. The State FSSM Cell would be the Nodal agency for supervising and managing the planning and implementation of the FSSM operations across all the ULBs in Rajasthan. The major responsibility of the Cell would be to formulate an approach for the realisation of the State Urban FSSM Policy and Guidelines at the local level. The Cell would be involved in the day-to-day operations for resolving all the issues pertaining to the management of the overall FSSM in close coordination with other line departments, key stakeholders, and ULBs. The organisational structure of the State

FSSM Cell is depicted in following figure.

Figure 4.1: Organizational Structure of FSSM Cell



### Responsibilities of State FSSM Cell:

1. Support & provide the technical guidance to ULBs on the matters pertaining to FSSM.
2. Assist ULBs in the preparation of annual service-level targets of FSSM in line with the service-level benchmarks, and propose structure of incentives in accordance with the performance
3. Empanelment of consultants/contractors/service providers/other qualified professionals for providing support and services to ULBs for realising an adequate FSSM coverage in all towns.
4. Monitoring of fund disbursement and expenditures of ULBs, and dispense necessary support for the same. A State Sanitation Fund could be set-up that would consolidate funds and resources from these aforementioned sources, in addition to the Central Government schemes and programmes, 14th Finance Commission, State funds, etc.
5. Coordinate with various State Government departments and Local-level authorities to ensure the convergence of FSSM Plans and Strategy with other ongoing and proposed projects.
6. Identify various stakeholders and coordinate with them to ensure active and inclusive participation.
7. Invite public and private agencies to get involved in FSSM operations at various levels of sanitation value chain and build partnerships.

8. Establish a framework and platform to encourage an innovative funding mechanism such as CSR, PPP, Guarantee Funds, Crowdsourcing, Crowdfunding, Social and Development Impact Bonds, ULB Incentive fund, UPIF, etc.
9. In coordination with other line departments, convergence would be ensured between the funds and goals of various Central Government programmes such as AMRUT, SBM, Smart Cities, DAY-NULM, etc., and State Government programmes such as RUSDP Phase-III, etc.
10. Coordinate with State Sanitation Committees for establishing interdepartmental coordination and facilitate and organise for annual work progress review meetings.
11. Conduct the social impact assessment of sanitation-related initiatives across the State, and develop goals and actions for further improvement.
12. Monitoring performances and arranging for performance-linked incentives through Service-level Benchmark assessment.
13. Organise workshops, conference, events, and exposure visit in close coordination with partners, relevant officials of the line department, and other key stakeholders.

**Table 4.3: Work function of various wing of FSSM Cell**

Sl No.	Sub-Division/ Wing of FSSM Cell	Work Function
1	Engineering	Technical assistance to all ULBs.
		Technical scrutiny/review of all submitted FSSM DPRs by ULBs.
		Organise technical capacity-building workshops for ULBs.
		Pilot demonstration for planning and implementation of the infrastructure component of FSSM.
		Close coordination with the empanelled technical partner of DLB.
2	Planning and Management	Annual performance review of ULBs against the set FSSM targets and the service-level benchmarks.
		Organise all workshops, events, conference, exposure visits in coordination with the empanelled capacity-building partner.
		Review the cost recovery and financial sustainability of submitted projects of ULBs.
		Pilot demonstration for planning and implementation of planning and management component of FSSM.
		Preparation of model contract document for FSSM on PPP, EPC, etc.
		Explore various FSSM modules suitable to run on PPP model.

Sl No.	Sub-Division/ Wing of FSSM Cell	Work Function
2	Planning and Management	Prepare a Training Calendar (in coordination with the empanelled capacity-building partner) to conduct training and workshops across the State, and which is customised to the targets of other stakeholders such as of ULB officials, service providers, NGOs, CBOs, Corporates and Public.
		Coordinate with the ULBs and engage with professionals to provide training on FSSM.
3	Communication	Responsible for building partnerships and single point contact for all external communication for networking and building relationships.
		Preparation of minutes for all important meetings, press notes, and record keeping.
		Review and providing inputs on all project communication materials in close coordination with the empanelled partner media and awareness campaign agency.
		Releasing annual newsletter of the FSSM Cell.
4	Financial Management	Management of all financial grants, loans, and other funds received from various government support of any form, including grants from the multilateral and bi-lateral agency, and CSR support from the Corporate Sector.
		Record-keeping of all transactions involved for approved activity/project by the CEO of the Cell.
		Support in annual audits and writing proposals on grant/loan/other funding requests.
5	Cell Manager	Responsible for filling the vacancies within the Cell.
		Day-to-day coordination with all officials of the Cell for making work action plan and closely work on the progress review of team members.
		Report to the CEO and hold regular interactions with all members of the Cell.
		Coordinate with respective wings and assist with all required support, and if required, escalate the matters to the CEO/DLB Director.
		Prepare monthly progress reports on the work progress of Cell.
		Prepare monthly task matrices for all team members.
		Responsible for exploring new and Innovative modalities for financing FSSM.



Sl No.	Sub-Division/ Wing of FSSM Cell	Work Function
6	CEO (Chief Engineer, DLB)	Signatory authority for all approvals involving financial implications.
		Heading the FSSM Cell.
		Overall supervision and close coordination with the Cell Manager for updates on work progress.
		Review monthly progress reports and monthly task matrices.
		The release of all communication material.
		Networking with various research agencies, academic institute, donors, and potential CSR for funding assistance towards the State Urban Sanitation Fund.
		Represent the DLB at various FSSM-based conferences, meetings, and other similar events.

## 4.5 Partnership Building

A strong network of partners in various sectors and of varied backgrounds would be established, including renowned specialists or experts, corporates, research/academic institutions, civil society groups/CBOs/NGOs/SHGs/women collectives, private service providers, donor agencies, bilateral/multilateral agencies, etc. for bolstering capacities and expanding knowledge base in the sanitation sector. Other necessary platforms shall be established such as periodic conferences, workshops, summits, meetings, events, formal groups/associations, and others for regular interaction amongst various stakeholders and partners for knowledge sharing, peer-learning, progress review, information dissemination, etc.

Agreements (such as MoUs) may be drawn as to be signed with prominent partners outlining a common agenda for the development and provision of FSSM services in Rajasthan. Other various agencies can be designated with the specific charge for providing their inputs, such as 'Knowledge Partner', 'Sanitation Technology Partner', 'Media Partner', 'Campaign Partner', 'Capacity Building Partner', etc. The State-Level Action Plan for partnership building will include:

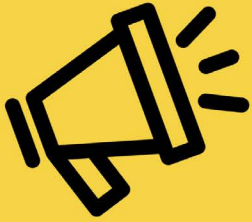
1. EOI for the engagement of strategy partners (technical, media, etc.) - either combined (with other sectors), or stand-alone for Sanitation/FSSM.
2. RFP for empanelment of service providers - Consultants, Contractors, Operators, etc.
3. Preparing Investment Portfolio/Information Memorandums (for potential investments), and organising a State-wide Investor's Meet for inviting private sector funding - CSR, For-profit businesses, Donors, etc.
4. Preparing the Calendar of events for partners - Events, Workshops, milestones, etc.
5. Allotment of different partners and service providers to different circles/clusters within the state to assist ULBs in implementing the FSSM.

# PARTNERSHIP BUILDING

Update on latest technology for de-sludging vehicle, **innovative containment options**, etc.  
Options on **Faecal Sludge Treatment technologies**.



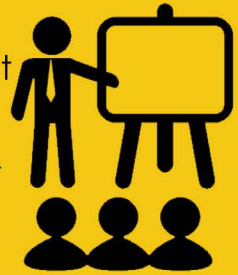
## TECHNOLOGY PARTNER



Devising FSSM **campaign strategy** for key areas .  
Accountable for all **IEC activities** to be held.  
Organizing **local level events** in close coordination with  
NGOs

## CAMPAIGN PARTNER

Design **annual training calendars** .  
Organizing **customized training programmes** for target  
audience.  
Lead in organizing **workshops, seminars, conferences,**  
**events**, etc



## CAPACITY BUILDING PARTNER



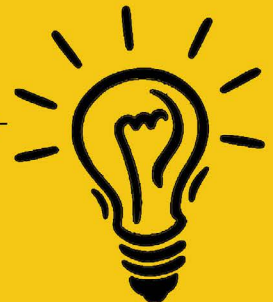
**pre-event branding & branding** of best practices.  
**Information dissemination** of all activities to larger  
groups.  
Building new **relationships** and growing **awareness**.

## MEDIA PARTNER

Tie-up with research **institutions & universities**.  
**Knowledge sharing** on recent **innovation &**  
market developments. with peer learning, informa-  
tion dissemination.

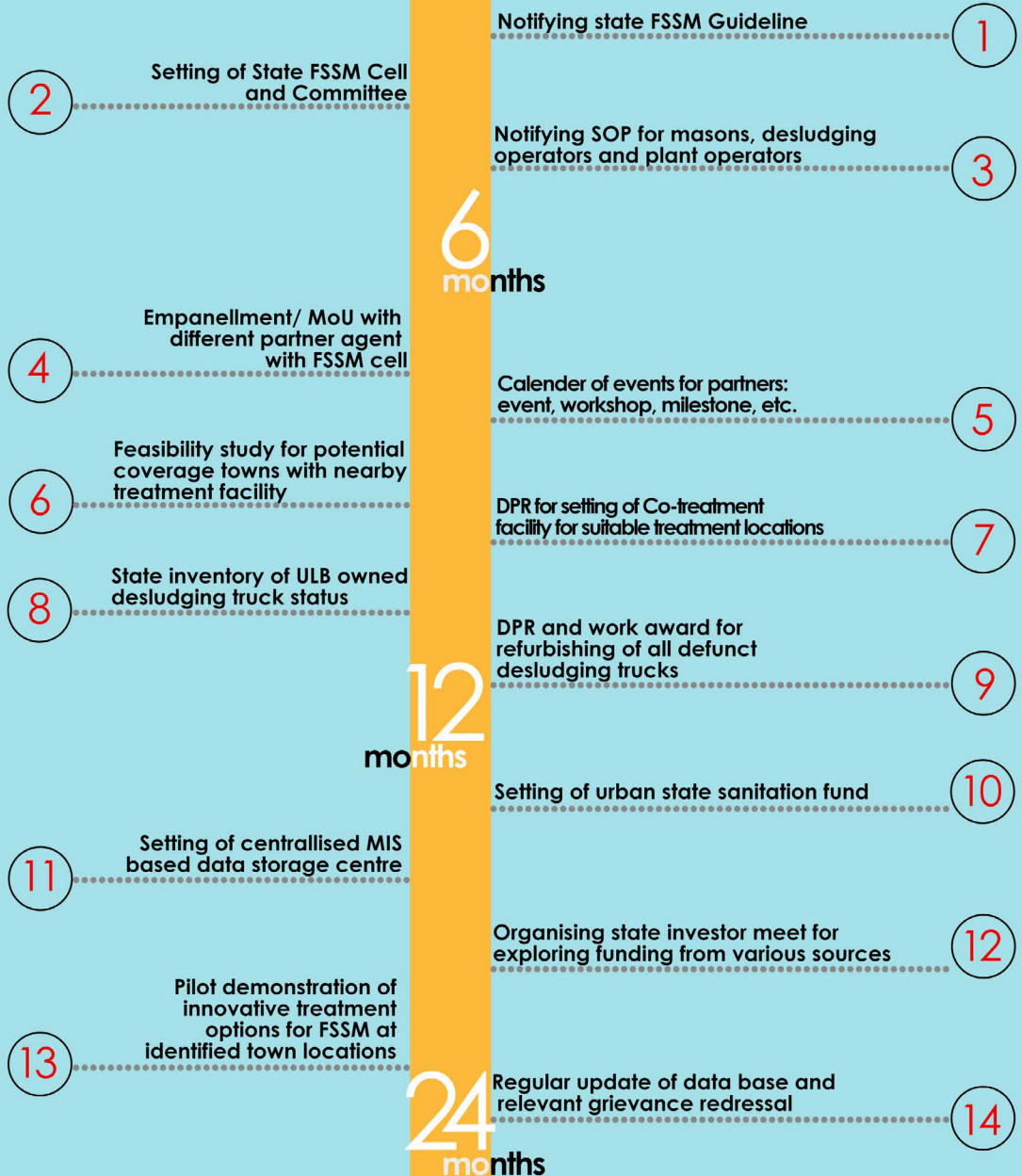
Support in organizing **periodic conferences, work-**

## KNOWLEDGE PARTNER



# Steps for FSSM Guidelines Implementation:

## State Level





# 05

## **Key Elements of FSSM Town Chapter**

# 5

## Key Elements of FSSM Town Chapter

At the town level, these guidelines cover the following key elements of Faecal Sludge and Septage Management.

1. City Level Resolutions for the implementation of FSSM
2. Constitution of City Sanitation Committee and City Sanitation Cell
3. Roles and Responsibilities of Stakeholders
4. Design and Construction of OSSF
5. On-Site Sanitation Facilities Cleaning - Scheduled and On-call
6. User Charges
7. Septage Transport and Disposal
8. Licensing of De-sludging Operators
9. Septage Treatment and Reuse
10. Penalties for Non-Compliance
11. Database, Reporting and Record Keeping
12. Public Awareness and Stakeholder Engagement
13. Capacity Building and Training
14. Helpline and Grievance Redressal
15. Service Level Benchmarks

The guidelines for each of these key elements are as follows.

## 5.1 City Level Resolutions for the implementation of FSSM

The first step towards FSSM reforms intended at the city-level will initiate by the adoption of a set of relevant resolutions by the Town Municipal Board. The resolutions are mentioned as follows:

- Disposal of Faecal Sludge from the desludging of On-site sanitation facilities at a proposed treatment facility.
- Licensing of septic tank cleaning operators.
- Scheduled septic tank cleaning and periodic user charges.
- Amendment in the existing building byelaws
- Constituting the City Sanitation Cell and Committee.

However, two out of these five resolutions i.e. the amendment in the existing building byelaws for the inclusion of toilet design and septic tank location along with the building plan and the disposal of sludge at a designated treatment plant should be mandatory for every urban local body. This should be officially communicated by the DLB to all the ULBs of the State. It is further suggested that the resolutions on building byelaws should be expanded to all building permissions including any extensions or any augmentation. Resolutions which are not mandatory can be discussed at the respective Municipal Board and based on mutual consensus (with or without modification) can be approved by the Municipal Board. Annexure -1 has enclosed a model document of all five resolutions to be adopted at the ULB level.

## 5.2 Constitution of the City Sanitation Committee and City Sanitation Cell

A City Sanitation Committee and City Sanitation Cell shall be constituted within the ULBs to oversee all Faecal Sludge and Septage Management Operations in the city. Furthermore, a dedicated helpline would be set-up for receiving Septic Tank/Pit Latrine/Kui cleaning requests along with public grievances/complaints.

The City Sanitation Committee shall comprise of following members:

1. Executive Officer – ex-officio
2. Chairman – ex-officio
3. Junior Engineer/Town Planner/any other technical officer – ex-officio
4. Sanitary Inspector – ex-officio
5. Ward Councillors – (total members divided by 5) to be changed every year on a rotation basis with an adequate representation of Women.

The Committee shall be the decision-making body for all Faecal Sludge and Septage Management related matters within the ULB. The Technical Officer and Sanitary Inspector will represent the executive wing of the ULB, while the Ward Councillors will represent the interests of the people. Minutes would be kept for each meeting, signed by the Executive Officer and the Chairman. All decisions made in the meetings need to be agreed upon and signed by both, the Executive Officer and the Chairman. The Committee shall meet at least once a month to review finances, septic tank cleaning records, public grievances, issues, FSTP related matters, compliance by operators, etc. The Committee may also take up any unresolved issues at the town Municipal Board for the final say on any suggested mandate.

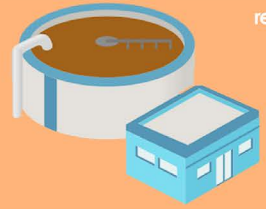


# RESOLUTIONS

adopted at town level

## Sludge Dumping at Designated Treatment site

all faecal sludge from on-site sanitation systems within ULB cleaned by de-sludging operators, should be safely transported and disposed at the Designated Treatment site.



resolution

1

resolution

2



## Licensing of Septic Tank Cleaning Operators

all private operators working within ULB, shall be provided license and no operator would be allowed to function without a valid license.

## Scheduled Septic tank cleaning & periodic user charges

periodic cleaning services every 3 to 5 years based on size of on-site containment unit, with a maximum period of 5 years. There are different options proposed for collection of user charges.



resolution

3

resolution

4



## Amendment in the building byelaws

submission of building applications have to include provision for a suitable sanitary toilet containment unit in line with the model drawings as part of the application.

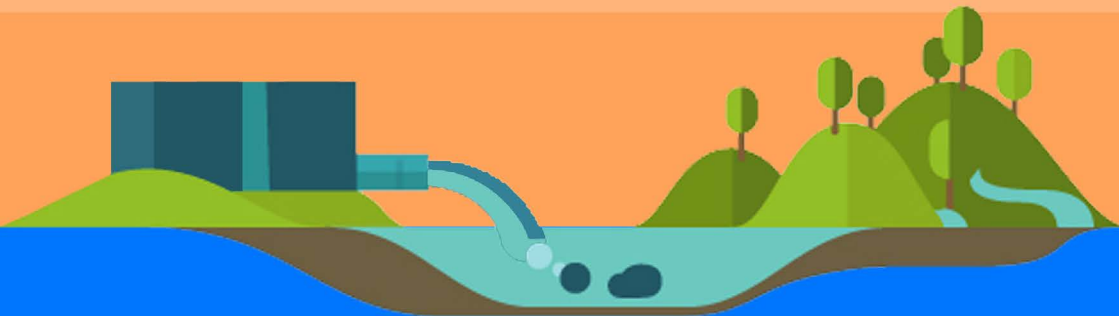
## Constituting the City Sanitation Committee and Cell

City Sanitation Committee and City Sanitation Cell shall be constituted to oversee all FSSM Operations in the city. Furthermore, a dedicated helpline would be set-up for receiving cleaning requests along with public grievances/complaints.



resolution

5



**NOTE: Resolutions marked in bold are mandatory.**

The Sanitation Cell within the ULBs shall be the implementation wing for overseeing day-to-day operations of Faecal Sludge and Septage Management in the Municipality area.

The City Sanitation Cell shall comprise of four members: -

1. Sanitary Inspector/Health Inspector
2. Member (designated by city sanitation committee)
3. Computer Operator
4. Assistant/ Helper

**The Cell shall be responsible for:**

- Providing licenses to desludging operators.
- Creating a detailed MIS based sanitation database of the city with the support of the State FSSM Cell.
- Managing scheduled desludging operations, only if a ULB opts for a scheduled desludging system.
- Ensure compliance with Faecal Sludge and Septage Management Guidelines and FSSM Plan provisions.
- Impose penalties on non-compliant operators and households.
- Undertake public awareness campaigns.
- Grievance redressal.
- Overseeing FSTP operation and maintenance.
- Any other activity assigned by the EO and Municipal Board.

The Sanitation Cell shall present regular reports on monthly/weekly/annual basis to the Committee on the progress of FSSM services in the ULB. The Sanitary Inspector, as a member of both, the Committee and Cell shall be the common link between the policy/ decision-making and operational aspects of Faecal Sludge and Septage Management. It is suggested that both, the Cell and Committee members should undergo a week long training programme and exposure visit for a better understanding of implementation approach pertaining to FSSM.

### 5.3 Roles and Responsibilities of Stakeholders

*Table 5.1: Roles and Responsibilities of Stakeholders*

Stakeholder	Roles and Responsibility
ULB	Planning, Implementation, Managing, and Monitoring all Faecal Sludge and Septage Management operations in the city, along with establishing the coordination with all other stakeholders.
City Sanitation Committee	Formulating, notifying, and modifying important city-level documents, such as the City FSSM Plan and Strategy, changes in the Building Byelaws related to sanitation, model septic tank/soak-pit design, etc.
	Approving and commissioning the construction of new public toilets and community toilets.
	If required/applicable, coordinate with the PHED with regards to the revision of the monthly sanitation fee/user charge collected through the water bill.



Stakeholder	Roles and Responsibility
City Sanitation Committee	Formulating an annual action plan/strategy every year for Faecal Sludge and Septage Management including setting performance targets, setting priority goals, increasing the coverage of sanitary latrines, monitoring plans, etc. for the perspective year. The annual action plan/strategy would be reviewed at the end of the perspective year to assess the performance – achievements, and shortcomings.
	Manage funds for Faecal Sludge and Septage Management Operations, including making decisions on the payment to operators/related staff, fixing and collecting user charges (monthly and one-time), expenses and revenue from FSTP, expenses for training/capacity-building/public awareness, allocation of annual and monthly budget for FSSM, and arrangement of finances for O&M of Faecal Sludge and Septage Management System.
	Coordinate with the State government on matters pertaining to FSSM including the financial grant for Capital and O&M expenses, assistance for planning/design/O&M of FSSM infrastructure, capacity-building & training assistance, etc.
	Review of Periodic Progress – performance against targets for scheduled desludging, amount of septage disposed and treated at the FSTP, public grievances, instances of non-compliance, etc.
	Procurement of equipment, safety gears, land for FSTP, etc. Also, contracting of operators, advertising media, etc.
	Convergence of FSSM activities with the State and Central government campaigns for IEC and generating awareness for safe and clean sanitation with related schemes and programs such as SBM, AMRUT, NULM, local WASH programs, etc.
City Sanitation Cell	Providing licenses to desludging operators.
	Creating a detailed sanitation database of the city and receive regular updates with the help of ward councillors
	Managing scheduled desludging operations and the helpline service.
	Ensure the compliance with Faecal Sludge and Septage Management Guideline and FSSM Plan provisions.
	Impose penalties on non-compliant operators and households.
	Undertake public awareness campaigns.
	Redressal of grievances.
	Overseeing the FSTP operation & maintenance.
City Sanitation Cell – Member 1 - Sanitary Inspector	Issuing and renewing licenses of Desludging operators.
	Redressal of grievances
	Issuing daily/weekly cleaning schedule to the cleaning operators.
	Collecting and scrutinising Job Cards from operators and FSTP records.

Stakeholder	Roles and Responsibility
City Sanitation Cell – Member 1 - Sanitary Inspector	Monthly inspection of Cleaned households by applying sample survey method.
	Imposing penalties on non-complying cleaning operators.
	Coordinate with the FSTP operators regarding day-to-day operations, septage input, the performance of treatment plant, and other operational aspects.
City Sanitation Cell – Member 2	Assist households with the construction of on-site containment units, such as septic tanks, soak-pits, pit latrines, etc. under SBM by providing model designs (booklets/ drawings), trained masons, financial assistance, etc.
	Responsible for O&M of public and community toilets.
	Facilitate Public outreach and awareness with the help of ward councillors
City Sanitation Cell – Member 3 - Computer Operator	Maintaining sanitation database of the city including household data, submitted Job Cards, overall cleaning records, instances of non-compliance/ penalties, data on licensed operators, etc.
	Creating Daily/Weekly/Monthly schedule and submitting the same to Sanitary Inspector and Fireman
	Submitting weekly/monthly progress reports to the Sanitary inspector for the perusal by the Committee.
	Maintain the helpline service.
City Sanitation Cell – Member 4 - Assistant/ Helper	Telephonic and Field verification of Job Cards submitted by Cleaning Operators.
	Assisting in field surveys for creating sanitation database of the city.
	Helping Computer Operators, Fireman and Sanitary Inspector in their tasks.
Ward Councillors	Disseminate information regarding benefits of periodic desludging, proper septic tank designs, user charges, etc. in their respective wards.
	Assist in the household survey within their constituencies for compiling citywide sanitation database, especially households without toilets or on-site sanitary containment units.
	Encouraging households without on-site containment units to construct the same, including assisting with SBM applications, proper design, and construction by trained and professional masons.
Desludging Operators	Timely application and renewal of license while fulfilling all of the eligibility criteria.
	To carry the license every time when at service.
	Follow all provisions prescribed in the Operator’s Manual.
	Keep up-to-date records of all cleaning services and regularly submit completed Job Cards to the respective ULB.

Stakeholder	Roles and Responsibility
FSTP Operator	Operation and Maintenance of the Faecal Sludge Treatment Plant.
	Periodic maintenance of the FSTP.
	Keep up-to-date records of daily activities, septage input, effluent status, etc.
	Verify and maintain records of all Job Cards from Desludging Operators.
Household	Construct Septic Tanks/Pit latrines as per the prescribed design.
	Extend full cooperation for household surveys and in the scheduled desludging services.
	Timely payment of user charges.
	Remain vigilant and report incidences of non-compliance by nearby residents and desludging operators.
Masons/ Plumbers	Participate in training programs .
	Construction and repair of on-site containment units as per prescribed techniques.

## 5.4 Design and Construction of Septic Tanks and other On-Site Sanitation Facilities (OSSFs)

The households are to be encouraged to adopt designs of septic tanks as prescribed by the BIS code 2470 and CPHEEO manual. Model drawings have been included as part of Annexure 3. These Septic Tanks should be designed on the basis of a desludging period of 3 to 5-years considering the number of users in the household and space availability within the dwelling unit.

For households that do not have sufficient space for a Septic Tank, Leach Pits (including twin pit pour flush latrines and single leach pits) may be installed. Guidelines and model drawings for Leach Pits have been included as part of Annexure 3.

Other On-Site sanitary containment and treatment options include modified septic tanks (Anaerobic Baffled Reactors, Anaerobic Filters, Bio-Tanks, etc.) and Decentralised Wastewater Treatment System (DEWATs) which are suitable for institutional and bulk consumers, such as universities, industries, hotels, etc.

ULBs need to develop local models for managing community septic tanks and other larger containment units. ULBs may take the responsibility of such OSSF provided this has the economic viability through an appropriate user charge.

ULBs shall adopt regulations on septic tank designs and construction methods as a part of building plan regulations through suitable additions in the 'Sthaniy Nikay Bhawan Viniyam 2009'. These include:

1. In section 8.6, Table 7, the inclusion of minimum dimensions for Septic Tank/Pit latrines.
2. The dimensions for Septic Tank/Pit latrines shall be applicable for all buildings, including plots less than 100sq.m in size.

3. In section 12.5 (A), septic tank/pit latrine location and size (as per Annexure 3) shall be submitted to the authorised personnel in the respective ULB as a part of the building plan. The ULB staff should assist applicants in fulfilling this requirement.
4. Addition of Section 8.15, detailed design, drawing and configuration of Septic Tanks and Pit toilets as per Annexure 3.

It would be required to provide necessary training to local masons and the respective engineers inspecting these septic tanks as per the construction standards. Such training could be organised at periodic intervals and necessary support from capacity-building partners from DLBs could also be extended.

Illustrated booklets shall be designed and disseminated to relevant stakeholders highlighting the importance of proper on-site sanitary containment units, such as Septic Tanks and Pit latrines, along with their proper designs, construction, and maintenance guidelines.

The responsible Engineer/Town Planning Official/any other designated official who is technically qualified shall ensure that the designs of septic tanks conform to the guidelines at the time of submission (for plots less than 500sq.m) and approval (for plots with area 500 sq.m or more) of building plans.

The responsible Engineer/Town Planner/any other designated official who is technically qualified, with the help of the Sanitary Inspector/other designated official and assistant staff shall inspect the septic tanks during their construction to ensure that households are complying with the submitted/approved designs.

The designated officials shall mobilise the workforce for a survey to compile a household level database of sanitation facilities in the city, especially for the identification of insanitary latrines and improperly constructed septic tanks.

All households with insanitary latrines shall be given notices to convert them into septic tanks, twin pits or lined single pits as per the provisions of the Manual Scavenging Act, 2013. Households with improper septic tanks shall be educated to retrofit them as per the approved designs. Refer Annexure 3.

## **5.5 On-Site Sanitation Facilities Cleaning - Scheduled and On-call**

The households, institutions, commercial entities, etc., shall undertake proper desludging of the septic tanks and pits from a licensed operator once in every 3 to 5 years as per the decision of the respective Municipal Board or whenever the tanks get filled-up, whichever is earlier. Even though the NBC guidelines and CPHEEO manual suggest a desludging frequency of 2 - 3 years, a relaxation has been given on account of the prevailing site conditions depending upon large septic tank or pit sizes in Rajasthan, and easing the increased financial burden on households in getting them cleaned in shorter durations.

ULBs may choose to adopt either a scheduled desludging service or an on-call service. For ULBs adopting an on-call service, the only requirement shall be of licensing of operators. For ULBs adopting a scheduled desludging service, besides licensing of operators, suggestive regulations have been stipulated in section 5.5.1.

The desludging operators shall obtain licenses for collection and transport operations as per the formats provided in Annexures 2 . The licenses shall be valid for a period of two years from the date of issue and shall be revised as per the due process.

The eligibility criteria for licensing have been provided in Annexure 9.

### **5.5.1 Regulations for Scheduled Cleaning**

In ULBs that adopt scheduled cleaning services, all households will be eligible to avail scheduled desludging services provided by the respective ULB through licensed desludging operators as per a fixed schedule ranging from 3 to 5 years based on the household surveys.

After a preliminary schedule is prepared, each household shall be notified in advance i.e. at the start of the month and two days before their turn and would be requested to be present and oversee the cleaning operation of their Septic Tanks/Kui/Pit Latrines on the scheduled day.

Cleaning services may be provided on request for the first two instances but will be completely paid afterward if the deviation with the fixed schedule is more than 12 months, irrespective of the monthly user charges.

The households can reschedule their cleaning service in case an adult member is not present at home on the scheduled day or time, but will be requested to inform the respective ULB in advance i.e. one or two days before the scheduled date.

The households may also reschedule their cleaning service under other circumstances where the cleaning services are not possible. These circumstances may occur due to some family functions, special occasions, and other similar events or celebrations. Households would be asked to provide an alternative date and time for rescheduling the cleaning operation within the next 30 days. A household may reschedule the cleaning service for a maximum of two times, after which the scheduled cleaning services would become void for the current service cycle. The household will have to pay additional charges to avail these services within the current service cycle.

Any Licensed Private Desludging Operators interested in operating scheduled cleaning service can directly obtain the cleaning schedule and corresponding Job Cards from the respective ULBs.

The cleaning schedule can be given on a daily/weekly basis. An operator would be paid for successful cleaning operation on the basis of the completed Job Cards submitted to the ULB with the signature of the household member and the treatment plant operator. It would be necessary that all fields in the Job Card should be completed.

The ULB would verify each Job Card the through phone calls, arranging visits to the households and random inspections or sample surveys. The operators would be penalised if any discrepancies are found as stated in the Section 5.10.

## 5.6 User Charges

User charges for on-call services shall be levied at the time of desludging of the OSSF, which will cover the expenditure requirement for O&M of desludging operations, as well as for the treatment facility. The Municipal Board on the recommendation of the Sanitation Committee will fix a User Fee applicable to all licensed operators and also for different uses like residential, industrial, commercial, institutional and public toilets. The Municipal Board can decide for differential charges within a city to facilitate the economically weaker section and other vulnerable groups, for example, people living in slums, urban poor, single women households, etc.

### **For Scheduled Desludging, multiple options may be explored for user charges:**

Scheduled cleaning of Septic Tanks/Pit Latrine is not practically possible in case of one-time user charges at the time of service due to a variety of reasons. Most households would be unwilling to pay for a scheduled service and would refuse. So, in order to encourage households to avail for scheduled desludging services, no charges may be solicited at the time of the scheduled service. A periodic charge, called a Sanitation Fee, may be levied to fund scheduled desludging operations. The following are the suggested three options for ULBs to explore scheduled desludging:

**Option 1:** The fee could be combined with the water bill for all households within the ULB. Separate charges would be levied for commercial, institutional, and industrial connections which could be decided by the Municipal Board on the recommendation of the City Sanitation Committee. As per the State Sewerage and Waste Water Policy, 2016, 13% additional surcharge on water bills is recommended for the operation of the treatment facility. The same can also be applicable for all towns with an available treatment facility, whether it is a dedicated facility or the towns are served by the treatment facility of their neighbouring town.

The households availing scheduled desludging services would be required to present a paid water bill receipt in original of past 6 months. The cleaning service would not be provided to households which do not furnish a paid water bill receipt from the past 6 months. The cleaning service may be rescheduled within the next 30 days on request and the household has to fulfil this condition on the rescheduled date.

**Option 2:** The fee could be combined with the waste collection charges for the solid waste for all households within the ULB. Separate charges would be levied for commercial, institutional, and industrial units which could be decided by the Municipal Board on the recommendation of the City Sanitation Committee.

Households availing scheduled desludging services would be required to present paid waste collection charge receipts of past 6 months. The cleaning service would not be provided to households which do not furnish a paid receipt.

The cleaning service may be rescheduled within the next 30 days on request and the household has to fulfil this condition on the rescheduled date.

**Option 3:** A separate FSSM cess may be levied on a monthly or annual basis on each household within the ULB. Separate charges would be levied for commercial, institutional, and industrial units which could be decided by the Municipal Board on the recommendation

# user charges

## option 1

combined fee with the water bill.



Households shall present an original paid **water bill** receipt from the past **6 months**



Cleaning service may be **rescheduled** within the next **30 days** on request.



Households shall present an original paid **waste bill** receipt from the past **6 months**



Cleaning service would not be provided to Households which do not furnish a paid receipt.

combined fee with the waste collection charges (solid waste).

## option 2

## option 3

separate FSSM cess.

Different charges would be levied for:



Residential



Commercial



Institutional



Industrial



This will encourage households to install suitable **on-site containment units**.



of the City Sanitation Committee. This will even encourage households without septic tanks to install a suitable on-site containment unit since they would be obliged to pay for the scheduled desludging services.

The desludging services may be provided onrequest for the first two instances but will be completely paid afterward if the deviation from the fixed schedule is more than 12 months, irrespective of the monthly user charges.

Households that are unwilling to pay these charges shall be surcharged with the standard desludging rate as notified by the ULB or charges as directly negotiated with a private licensed cleaning operator.

## 5.7 Septage Transport and Disposal

It is mandatory that all faecal sludge/septage is pumped out from on-site sanitation systems, such as Kui, Single/Twin Pit Latrines, Septic Tanks, etc., within the ULB by private/municipal septic tank cleaning operators, and should be safely transported and disposed at the proposed Faecal Sludge Treatment Plant within ULB once it is operational.

In an event where the operator is unable to transport the collected septage themselves, the operator shall notify the ULB to request for transport of the septage to the treatment plant. In case of scheduled desludging, the operator will be charged for the transportation and will only be eligible for only a half of the cleaning fee. The operator will also hand-over the Job Card for the cleaning service.

The ULB would monitor the operations and ensure the compliance with these provisions and has the power to levy penalties on non-complying operators. The residents of the respective ULB area would be urged to be vigilant and report incidences of arbitrary/illegal disposal to the ULB.

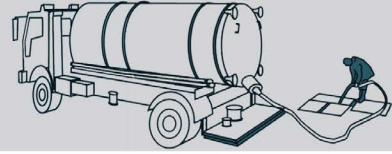
At the treatment facility, the operator shall notify the treatment plant operator, and show the Job Card and operator's license to the treatment plant operator. Once the treatment plant operator is assured that the operator possesses a valid license along with a valid Job Card, the cleaning operator will proceed to dispose the waste into the treatment facility. The treatment plant operator will sign on the Job Card to indicate successful disposal at the treatment facility. The format of the Job Card is enclosed as part of annexure -2.

Other innovative options such as an app-based desludging service may also be explored based on ULBs information (in case of schedule desludging), or with the user request (in case of on-call services) for desludging services can be availed. Individuals not comfortable with the online system may also use the services via a phone call/SMS. This will also help the ULB to update the database on a real-time basis and apprise on the user feedback if any. An illustrative interface of mobile-based desludging is enclosed as part of Annexure - 15.

**Exceptional Circumstances for disposal of Septage:** In case the treatment plant is unable to accept the faecal sludge or septage due to overloading of the plant or undesirable quality of septage/faecal sludge, the operator will have to obtain the reason for rejection in writing from the designated personnel at the treatment plant with the concerned personnel's signature. Under this condition, the operator will have to dispose the waste at another designated location to be notified by the ULB.



# options for Desludging Services



## steps through **mobile app**



**Request from user** for service through app or call which will be sent to ULB for information & operator to respond.

1



Operator may **accept** or **decline** the user request.

2



**After cleaning** the tank vehicle operator will select the **cleaned button** & the information will be sent to User, ULB and FSTP Operator.

3



Once the vehicle operator submit the **status of completion**, the **FSTP operator will be notified**.

4



After **disposal at treatment facilities**, ULB will be notified and **payment** will be processed accordingly.

5

1. **Centralized system** for registering private operators.
2. Services **effectively handled** & managed by the ULBs & users.
3. May work via **online app, on call/sms**.
4. **Real time database** and update of MIS system.
5. **Rating options** by user helps to improve services.

**benefits**

## steps through **job card**



**Intimate operator** for required desludging operations.

1



Customer signature on **Job card** as **proof of service completion**.

2



Plant operator's signature on Job card as **proof of acceptance** of septage disposal at treatment facility.

3



**Submission** and **acceptance** of Job card at ULB.

4



Payment to operator basis submission of filled and valid Job card

5

1. **Simple** to use and **Easy** to adopt.
2. Can be **quickly implemented** with simple training.
3. **Manual filling** required without any app/IT support.
4. **No cost** implication.
5. Can be also explored for **gram panchayats** to connect with neighbouring treatment facility.

**benefits**

## 5.8 Licensing of desludging operators

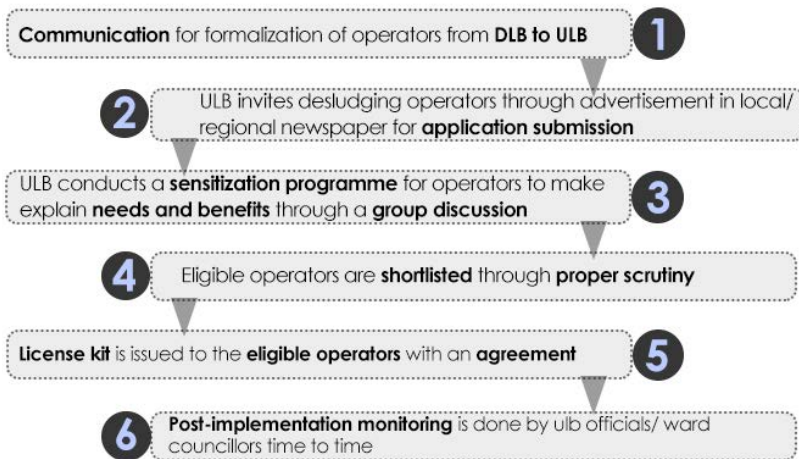
ULBs should certify and license all eligible private operators to desludge, transport waste to the designated treatment facility and its disposal. The process shall be performed only by licensed operators. The licenses would be valid for an initial period of 2 years and could be subsequently renewed for a period of three years. An operators manual shall also be made available to the operators outlining the standard operating procedure along with expected service standards, penalties, terms of payment, vehicle maintenance, safety protocol, etc. The ULB shall organise necessary training programs for licensed operators with the help of the State Government/external agencies/academic institutions to make them familiar with the provisions of the operator's manual, and acquaint them with the standard operating procedure for collection, transport, disposal and reporting of septic tank cleaning. The resolution is in line with the Section 105 and 340 of Rajasthan Municipalities Act, 2009.

The eligibility criteria have been classified into three broad categories, namely:

### Technical Criteria – Pertaining to the equipment quality, specification, and condition.

- Leak-Proof equipment – photographic evidence and random inspection of the drive system (tractor specifications - engine, chassis, etc.), pump, hose, pipe, seals, tank, trailer chassis, etc.
- Proof of vehicle maintenance in the last one-year.
- Adequate inspection equipment, such as sight gauge, and a well-stocked toolbox  
Submission of detailed vehicle & equipment specification

Figure 5.1: Process of Licensing for De-sludging Operators

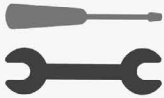


# Licensing

## of de-sludging operators

### technical criteria

Leak-Proof equipment



Proof of vehicle maintenance



Adequate inspection equipment, well-stocked toolbox



Submission of detailed vehicle and equipment specification



### administrative criteria

Identity- owner, driver and helper



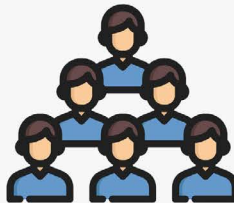
Proof of ownership



Up-to-date P.U.C Certificate  
Vehicle Fitness Certificate



Driver to have a valid driver's license



### health & safety criteria

First-Aid Kit & Anti-septic Soap



Proper Safety Equipment



Health Insurance &  
Life Insurance



### Roles of operators

- ✓ **Timely application** and **renewal of license** while fulfilling all eligibility criteria.
- ✓ To keep **license** every time when **at service**.
- ✓ Following all provisions of the **Operator's Manual**.
- ✓ Keep **up-to-date records** of all cleaning services.
- ✓ Regularly submit completed **Job Cards** to the ULB.



**NOTE: Criteria marked in bold are mandatory.**

## Administrative Criteria – Pertaining to statutory and regulatory stipulations.

- Name and identify of the owner, driver and helper – Minimum two personnel per vehicle
- Proof of ownership – Vehicle Registration (Commercial), Bills for equipment, insurance, etc.
- Up-to-date P.U.C Certificate
- Vehicle Fitness Certificate
- Driver to have a valid driver's license (LMV – TR)
- Certification after attending short-term course/training session on proper desludging operations as per operative manual

## Health & Safety Criteria – Pertaining to hygiene and safety.

- First-Aid/Medical Kit on every vehicle; Anti-septic Soap on the vehicle and at the designated parking/ office.
- Proper Safety Equipment – Safety goggles or glasses with side splash protection; Dust mask that fits over nose and mouth; Clean rubber gloves; Dedicated uniform with apron; Work boots; Battery operated torch.
- Health & Life insurance of truck operators (driver) and helper for minimum of 2 lakhs yearly limit including the death compensation limit of 10 Lakhs.

The underlined criteria are suggested as mandatory eligibility criteria, while the others can be fulfilled incrementally over a period of 12 to 24 months, which would be monitored during periodic review by the ULB.

## Proof of Cleaning and Disposal

Each licensed Operator has to carry Job Cards in prescribed formats (attached as Annexure 2) from the ULB, fill out all necessary information and get it signed by the households at the time of cleaning and by the treatment plant operator at the time of disposal. The difference between the time of cleaning and time of disposal should not be more than 24 hours. One copy has to be given to the household, one submitted to the treatment plant. The job card will have to be submitted within 48 hours of the time of disposal, failing which the operator has to fill out a new Job card and get it signed by the household and treatment plant operator again.

### 5.8.1 Rules for Desludging Operators:

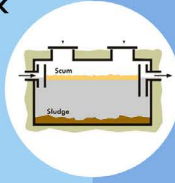
1. The licensed operator shall have workers equipped with uniforms, safety gear, tools, and vacuum trucks as defined in the Manual Scavenging Act, 2013.
2. The licensed operator shall keep records of cleaning operations for all Septic Tank, Kui, Pit Latrine, etc. in the prescribed format which should be periodically submitted to the ULB.
3. The licensed operator shall be provided with an operator's manual and a training session on the same.
4. The operator would be required to adopt the standards and procedures for pumping and desludging as per the manual.
5. Desludging workers shall wear appropriate personal protective equipment, including rubber gloves, rubber boots, a face mask, helmet, safety belt, eye protection glasses, and uniform.



# Do's & Don'ts

## for de-sludging operators

1. Adequately **Clean the Septic Tank**  
– leaving not more than 1 – 2 inches  
of sludge in the tank



1. Do not cause **structural damage**  
to the **septic tank or the property**  
during or after desludging.

2. Maintain a **clean and hygienic**  
environment and regularly clean the  
desludging truck/equipment.



2. **Avoid spillage** and swiftly sanitize  
in case of any spillage.

3. Always perform a **daily check** of  
**desludging truck/ equipment** for  
fuel, oil, etc.



3. Do not clean the **desludging  
equipment** or truck in any other  
manner than as mentioned in the  
**operator's manual**.

4. Maintain updated records & **job  
cards**. Always carry **valid license**  
when at service.



4. **Do not ask for/accept** any other  
**remuneration** from the property  
dweller.

5. Collected waste must be  
**disposed at designated disposal  
site/ treatment plant**.



5. **Do not dispose** the collected  
septage at any site other than the  
designated site **illegally**.

6. Follow the instruction provided in  
the **operator's manual**



6. **Do not violate any rules** provided  
in operator's manual.

7. Ensure **proper training** to staff and  
provision of **adequate safety  
equipment**.



7. **Do not allow direct contact** with  
**faecal matter** for any employee,  
staff, public, etc.

6. The operator shall ensure the availability of protective gear for workers and materials for desludging operations on a daily basis.
7. After desludging, workers should follow proper hygiene practices such as washing hands with soap.
8. After each desludging operation, the area shall be properly cleaned and disinfected with relevant cleaning agents such as bleaching powder and lime.
9. Expected service standards and penalties would be detailed out in the Operator's Manual.
10. Service providers shall deploy and maintain septage vehicles that meet the approved standards for desludging and transport of the sludge/septage.
11. The driver and service providers shall be responsible for safe operation of the vehicle and equipment at all times.
12. In the event of accidental spillage of sludge/septage, the operator shall immediately take action to contain the sludge/septage, minimise the environmental impact, and initiate clean-up procedures.

## 5.9 Septage Treatment and Reuse

Septage/Faecal Sludge Treatment Plant: The ULB shall facilitate construction and operation of a septage treatment plant in case a suitable Sewage Treatment plant of sufficient capacity (size and load) is not available within 20 km radius. In case of availability/proposal of treatment plant (STP or dedicated FSTP) in close proximity (less than 20 km); option of clustering (Refer Annexure 7) may be explored for smaller towns to maintain the financial viability for the FSSM implementation. However, the technical feasibility of an existing/proposed plant should be undertaken to access the viability for handling the additional load of faecal sludge.

The capacity of the treatment facility shall be based on the current and future septage generation in the city calculated as per the number and capacity of on-site containment units in the city, type of septic tank or other containment units, type of cleaning/desludging system (scheduled, on-call or mixed), number of households need to be served on a daily basis.

The Site for Faecal Sludge Treatment Plant: An appropriate site should be identified for the construction of a septage treatment plant giving due consideration to the required environmental compliances and standards (refer Annexure 10). In case of a non-availability of any suitable land, a portion of land allocated for solid-waste management may be used for the construction of a treatment facility. The site selection needs to consider the criteria provided in Annexure 8 after deciding on the technology of FSTP. The public consultation and awareness campaign shall be carried out in order to avoid any resistance from families residing nearby to the proposed plant set-up.

The ULB shall adopt an appropriate financing model for the O&M of septage treatment and disposal facilities and shall levy user charges as appropriate for meeting the O&M expenditure. The State Government shall assist the ULBs with empanelled consultants/agencies for:

- 1) Preparing the FSSM plan/design/investment strategy,
- 2) Construction/operation of the plant.

The septage treatment plant shall adopt appropriate technology for treating septage and the disposed sludge and wastewater after treatment shall strictly comply with the norms as

per the relevant legislation. It is the responsibility of the operator of the treatment plant to ensure the compliance with treatment and discharge norms. The reuse of the treated waste shall be permitted as per the prevailing standards and norms. The standards for the treated wastewater discharge are provided in Annexure 10. The treatment will ideally ensure the maximum reuse of the end residual product, including treated effluent water and treated sludge within the standards and norms.

The treated effluent wastewater may be utilised for irrigation, groundwater recharge, gardening, etc. while the treated sludge is suggested to be co-composted with the organic municipal solid waste to form valuable compost. Other options for reuse of the treated sludge can be vermicomposting, palletisation, direct sale to farmers as a soil conditioner, etc. The idea is to turn residual waste into a valuable commodity in order to recover the O&M and even capital costs of the treatment plant. The treated effluents shall be tested periodically to ensure a consistent output that is compliant with the discharge norms. The compliance that needs to be followed for the agricultural application of biosolids and treated wastewater has been provided in Annexure 10. The class - A bio-solids criteria should be followed in areas where there is high probability of runoff from agricultural fields to mix with surface water body.

As stated in the previous section, it shall be mandatory for all licensed operators for collection and transport of septage to dispose the septage only at the treatment plant as per the approved process. The desludging service providers are prohibited from disposing the septage at any other location and would attract penalties for the same. The ULBs would notify/revise penalty structure from time to time.

## 5.10 Penalties for Non-Compliance

The following is a list of suggestive penalties that may be levied on operators and households in the following conditions.

### For Operators:

1. For illegal disposal of Septage/Faecal Sludge by licensed operators, individual, or group of individuals, a penalty would be imposed. More than three incidences would result in termination of the license.
2. A penalty would be levied on operators not using protective/safety gear such as uniforms, masks, gloves, boots, etc., or any other incidence where workers come in the direct contact with the faecal waste. More than 3 incidences would result in termination of the license.
3. If any spillage caused during cleaning or transport of septage, the containment unit, and the nearby area is not properly cleaned and sanitised by the operator as per the standard procedure prescribed in the operator's manual, a penalty would be imposed on the operator. More than 5 incidences would result in termination of the license.
4. A penalty would be imposed on operators in case of improperly/partially cleaning Septic Tanks/Pits. Further, in case of any damage to the property of a household due to the operator's negligence, a penalty would be charged, and the operator shall reimburse the owner for the damages. More than 5 incidences per quarter would result in temporary suspension of the license and more than 8 incidences would result in termination of the license.
5. If any discrepancies are found between the information in the submitted Job Cards, FSTP records, and during field/telephonic verification of Job Cards, a fine would be levied. This includes incidences of under-reporting or over-reporting of cleaned

# PENALTIES

Households engaging **manual scavengers** would be fined.



People found practicing **Open defecation** would be fined.



A penalty on operators in case of **improperly/partially cleaned** septic tanks/pits.

In case of **damage to property** of the house owner due to the operator's negligence, a penalty would be charged and the operator shall reimburse the owner for the damages.



Households discharging sewage directly into drains **without on-site containment** shall be penalized.

Households that **directly dispose septage/faecal sludge** from their on-site containment units into drains would be fined.

Any **spillage** caused during cleaning or transport of septage which is **not properly cleaned and sanitized** as per standard procedure by the operator, a penalty would be imposed.

If **discrepancies** are found in the information of submitted **Job Cards**, a fine would be levied.

A penalty would be levied on operators **not using protective/safety gear** such as uniforms, masks, gloves, boots, etc.



For **illegal disposal** of Septage, a penalty would be imposed on Operators.





- households, falsification of information in the Job Cards, etc.
6. A penalty would be imposed on operators working without a valid license.
  7. A penalty would be imposed on operators who fail to present their license at the time of inspection by a Municipal official. The operator would be required to present the original license within 2 days or a fine may be imposed.

#### **For Households:**

1. Households discharging sewage directly into drains without on-site containment shall be penalised for the first incident. These households will be given 6 months to get an on-site containment unit constructed. After the first warning, if the household still discharges sewage into the drains, a penalty would be imposed each month till the time the containment unit is not constructed.
2. People found practicing Open defecation would be penalised.
3. Households availing services from manual scavengers or engaging in the practice of bucket desludging would be penalised.

### **5.11 Database, Reporting, and Record Keeping**

The urban local body may create a computerised database of sanitation infrastructure, staff, and schedule at household, ward, and city level, including septage generation from households and commercial establishments, insanitary latrines, location of septic tanks, details of operators responsible for the collection of sludge/septage, and details of septage treatment plant.

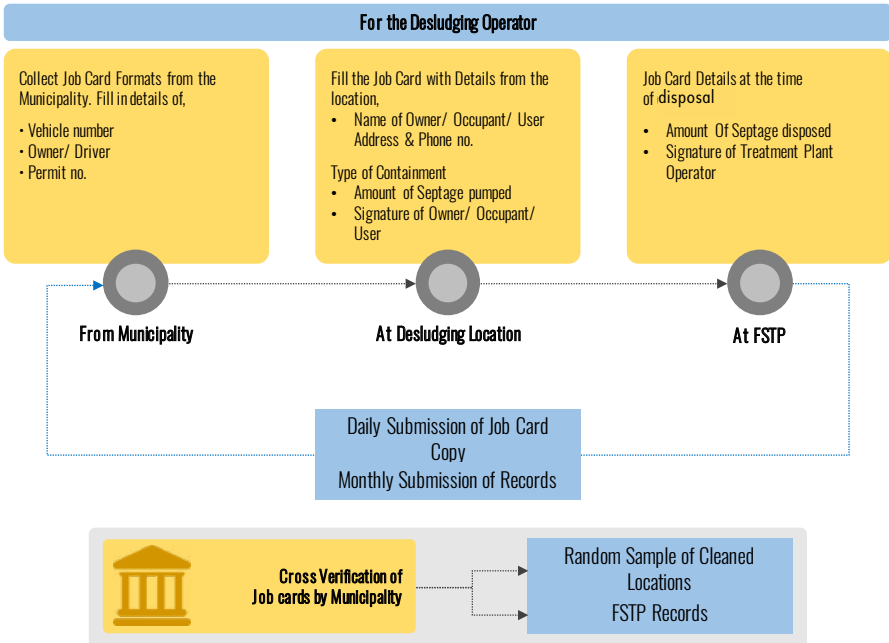
Each operator has to carry Job Cards in prescribed formats (attached as Annexure 2) from the respective ULB, fill-in all necessary information and get the Cards signed by the households at the time of cleaning and by the treatment plant operator at the time of disposal.

The ULB shall ensure that desludging operators keep recording the details of operations in the Job Cards, covering households, areas and location, type of septic tank, the age of septic tank, date of desludging, quantity of septage, user charges collected, accidents and spillages, and the next date of scheduling for desludging.

The ULBs shall maintain and preserve the collected records for a minimum of 5 years, preferably with a backup documentation in computers. Each service provider shall be required to submit copies of all Job Cards for each day on a daily basis to the Municipality.

The difference between the time of cleaning and time of disposal should not be more than 24 hours. One copy has to be given to the household, one submitted to the treatment plant. The Job Card would have to be submitted within 48 hours from the time of disposal, failing which the operator would have to fill out a new Job Card and get it signed by each attended household and treatment plant operator again.

Figure 5.2: Schematic Diagram for Scheduled Desludging System in ULB



The treatment plant operators shall also maintain a daily log of activities performed including the daily inflow of septage from licensed operators, details in the Job Cards, day-to-day activities performed, maintenance/cleaning activities, the status of each treatment module, the amount of final treated effluent released/stored each day, etc. A weekly/monthly report would have to be submitted to the City Sanitation Cell for its review by the City Sanitation Committee. In case of app-based desludging services, the real-time update of services, including the database of household desludging, disposal at the treatment facility, and the payment to operators, would be managed at the Central MIS System of the ULB.

## 5.12 Public Awareness and Stakeholder Engagement

ULBs shall develop appropriate IEC materials and undertake IEC campaigns through public meetings, print and electronic media, outdoor medium, and consultations and workshops targeting the residents to sensitise the health and environmental impact of illegal disposal, promote the adoption of proper toilet designs, construction methods, periodic desludging, and safe sanitation practices. The State FSSM Cell may also help the ULBs to connect with empaneled partner agency for media and campaign activity.

The Ward Councillors shall play a prominent role in engaging residents in their wards during household level surveys and dissemination of information. They can be key actors to convey and persuade the general public on various code of conducts.

The builders, masons, and suppliers of the Septic Tanks and Pits shall be constantly exposed to better designs and better methods of construction through training and illustrated materials.

The desludging operators shall be provided with the information on standard operating procedures.

Non-Government Organisations (NGOs), Community Based Organisations (CBOs), women’s groups, and school children shall be extensively involved in undertaking IEC campaigns. Pride of the neighbourhood or community may prove to be a powerful motivator for communities, which should be part of IEC campaign. The IEC for FSSM implementation should be practiced keeping the community at the centre and ensuring their integrated and coordinated involvement in all stages.

The City Sanitation Committee will take necessary action to involve the community, especially in poor areas, by formulating women-led neighbourhood groups, working with SHGs and NGOs in implementing the sanitation programme. Public awareness and community participation should not be just limited to toilet designs, construction methods, periodic desludging schedules, and sanitation practices but also need to include various motivational aspects such as negative impact of illegal dumping of sludge, untreated sewage discharge into freshwater/stormwater drain etc., the amount of user fee to be paid towards the FSSM and its modality, penalties that can be imposed on households with adverse behaviour, the responsibility of private operators towards desludging and transport of sludge/septage, compensation by the operator in the event of any damages to the property, reporting of spillages, discrepancies, illegal disposal by the operator, grievance redressal mechanism, etc.

### 5.13 Capacity Building & Training

The ULB shall support capacity building of various stakeholders including its own staff through appropriate institutions.

The ULB may also coordinate with the State Government (FSSM Cell) to engage with empaneled partner agencies for capacity -building to undertake training needs assessment, design training modules, and deliver the training programme. The different approach for capacity building along with stages is listed below.

Figure 5.3: Approach to Capacity Building

<b>1</b>	<b>Orientation</b>	<b>Overview and Background</b>	Setting up a framework by introducing the ULB officials to the National and State FSSM Policies, City FSSM Plan, and state FSSM guidelines
<b>2</b>	<b>Education</b>	<b>Explaining various Components across value chain</b>	Educating ULBs and public for safe and sustainable sanitation, proposed approaches, adoption of regulatory reforms and their individual roles and responsibilities
<b>3</b>	<b>Training</b>	<b>Instructing on individual tasks</b>	Customized Training for the employees of City Sanitation Cell, Service Providers such as Desludging /Treatment plant operators, masons, plumbers etc.
<b>4</b>	<b>Hand - holding</b>	<b>Hands-on Support during O&amp;M</b>	Continuous handholding of the employees of City Sanitation Cell on operationalizing and maintaining the proposed interventions
<b>5</b>	<b>Follow-up</b>	<b>Revision, Evaluation and Updates</b>	Refresher training and follow- up assistance to the employees of City Sanitation Cell and Service Providers after six months and a year.

### **Brief of Training:**

1. For ULB Staff & Ward Councillors – On budgeting for FSM, planning of FSM system, O&M of FSTP, monitoring and licensing of operators, service-level benchmarking, the constitution of the Committee and Cell, database management and record keeping, public awareness strategies, etc.
2. For Desludging Operators – On operative guidelines and standard operating procedure for the proper septage collection/transport/disposal, record keeping, vehicle maintenance, licensing procedure and user charges, fleet management, maintenance and asset management for the desludging operators.
3. For masons & plumbers – On design, specification and construction techniques for Septic Tanks, Pit Latrines, piping, and plumbing, etc.
4. For FSTP operator – On standard operating procedure, record keeping, periodic maintenance, and management of treated effluent/residue in the Faecal Sludge Treatment Plant.
5. Residents – Public Meetings for introducing the FSSM concept and relevant provisions of FSSM Guidelines.
6. Women-led community networks such as voluntary neighbourhood groups especially working in poor areas- on hygiene and advantages of FSSM to individual households
7. Youth Groups, Schools champions etc. - sensitizing the timely desludging and advantage of it on environment and Public health.

Involvement of men and women in planning and implementation will better address the gender concerns and in mitigating the gender-based sanitation insecurity directly related to FSSM.

**Training Modalities:** Innovative practices should be adopted to promote interactive learning sessions with a focus on poor and non-poor areas through various message multipliers and segmented targeting. Several types of modalities for capacity-building programmes might be explored, for example:

1. Interactive workshop
2. Consultation workshop
3. One-on-one training
4. Public announcements
5. Illustrations and live demonstration
6. Pamphlets, Brochures, flyers, Posters etc.
7. Advertisement (Newspaper, Television, Radio etc.)
8. Interactive learning sessions

Details on capacity building stages for various stakeholders, brief of all training modalities and checklist for capacity-building gap assessment are enclosed in Annexure -6.

## **5.14 Helpline and Grievance Redressal**

The ULB shall establish a dedicated helpline with the trained staff for providing support to residents on all aspects of Faecal Sludge and Septage Management including complaints & grievances, septic tank designs, approval process, methods of construction, information on masons, the periodicity of desludging, and contact details of operators and so on.

All queries and grievances received by the Municipal Board would be forwarded to the suitable entity (Sanitary Inspector, Operator, Service provider, etc.) and would be replied within 48 hours and would be addressed within 3 working days of reply.

## 5.15 Service Level Benchmarks

All FSSM services in the Municipal Board shall be periodically evaluated on the basis of the Service-level indicators in the table below. These service level benchmarks shall indicate the performance of the FSSM operations in the city.

*Table 5.2: Service Level Benchmark*

Indicator	Target Service Level for 20__	Present Situation	Expected Service Level
Percentage and number of Households connected to Sanitary Containment Units/Sewerage Connection			100%
Number of households desludged by licensed operator Vs Target			100%
Efficiency in collection of user charges			>90%
Efficiency of treatment against emptier sludge			100%
Incidences of Non-Compliance by Operators			Less than 3 per month
Amount of Reusable end product – Compost, treated wastewater, Bio- Gas, etc. generated			100 %
Percentage of O&M Cost Recovery through sale of Reusable end product from FSTP			100%
Grievances received			< 20%
% of grievances addressed within stipulated timeframe			>80%

Annual targets would be set by the City Sanitation Committee as a part of the annual action plan which will be evaluated as per the performance at the end of the perspective year. SLBs may also be linked to the current SLB/SLIP, etc. Such information can inform about the State level decisions and thereon National policies. The State FSSM Cell may coordinate with all ULBs on building capacity for filling relevant information of SLBs and accordingly undertake the annual performance monitoring review for the further course of actions.

# Steps for FSSM Guidelines Implementation:

# Town Level

2 Setting of city sanitation cell and committee

4 Database on town on site sanitation facility (OSSF)

7 Exploring Co-treatment with neighbouring town treatment facility (if any)

9 Refurbishing of defunct desludging trucks (if any)

11 Treatment facility operational (Dedicated/ Co-treatment)

13 Capacity building gap assessment and annual training calendar prepared

Approval of relevant FSSM resolutions from town municipal board 1

Amendments of building bye laws 3

Licensing of private desludging operator 5

Record keeping (MIS) and setting of help line (for monitoring) 6

Development of SLB and filing of ULB's annual target 8

Identification of land for setting up of treatment facility 10

Provision of scheduled desludging 12

Ongoing public awareness and stakeholder engagement 14

6 months

12 months

24 months

# A

## ANNEXURES

1. Model Resolutions need to be adopted by Urban Local Body
2. Formats for Management of Desludging Operations
3. Design and Specification of Onsite Sanitation Facilities
4. Conversion of Insanitary Latrines into Pits
5. Capacity Building Stages for stakeholder consultation
6. Capacity Building Gap Assessment and Training Modalities
7. Clustering Strategies for Sharing of FSTP and STPs
8. Site Selection for a Faecal Sludge Treatment Plant
9. Eligibility Criteria for Licensing and Detail of Licensing Kit
10. General Standards for Discharge of Environmental Pollutants
11. Co-Treatment of Faecal Sludge in STP's
12. Compendium of technology options for FSTP and Desludging Equipment
13. Government Order for State Level Committee - State Sewerage & WW Policy
14. Service Level Improvement Plan for FSSM
15. SANKALP - Mobile Application for FSSM

## NOTICE

**Subject: Disposal of Septage/Faecal Sludge from desludging of On-Site Sanitation Facilities (Kui, Septic Tanks, Pit latrines, etc.) at the proposed Faecal Sludge Treatment Plant/Designated Treatment site or Disposal Facility.**

As per the resolution passed in the municipal board meeting dated -- / -- /----, it has been agreed that all faecal sludge/septage pumped out from on-site sanitation systems such as Kui, Pit latrines, septic tanks, etc. within the jurisdiction of urban local body by private and Municipal septic tank cleaning operators, through mechanical methods, should be safely transported and disposed at the proposed Faecal Sludge Treatment Plant/Designated Treatment site or Disposal Facility (location:.....).

Once this facility is operational, it will be the responsibility of the cleaning operator (Municipal or Private) to transport the septage/faecal sludge to the treatment plant site. In case the operator is unable to transport the septage/faecal sludge, the operator shall inform the Municipality to ensure safe transport of septage/faecal sludge to the Treatment Plant. The resolution is in line with Section 105 and 340 of Rajasthan Municipalities Act, 2009.

**Proof of Cleaning and Disposal**

Each Operator has to carry Job Cards as per the prescribed format (attached in format 3 of Annexure II) issued by the ULBs, fill-in all necessary information and get them signed by each household at the time of cleaning and by the treatment plant operator at the time of disposal. The difference between the time of cleaning and the time of disposal should not be more than 24 hours. A copy of these cards has to be given to the attended households, and a copy has to be submitted to the treatment plant. The Job Cards will have to be submitted within 48 hours from the time of disposal, failing which the operator will have to fill-in new Job Cards and get them signed by each household and the treatment plant operator all over again.

**Penalty**

A penalty of INR ..... would be imposed on any individual or group of operators who are found disposing this waste at a location other than the Treatment Plant, except in case of exceptional circumstances as mentioned below. The ULBs would monitor the operations and ensure the compliance with these provisions and has the power to levy penalties on non-complying operators. The residents of the town are and will be urged to be vigilant and report incidences of arbitrary/illegal disposal to the ULB.

**Exceptional Circumstances**

In case the treatment plant is unable to accept the faecal sludge or septage from the truck operator (due to the overloading of the plant or undesirable quality of septage/faecal sludge), the operator will have to get the reason for rejection in writing from the designated personnel at the treatment plant, along with the personnel's signature. Under this condition, the operator will have to dispose the waste at a designated location to be notified later.

**Chairman  
ULB**

**Executive Officer/Commissioner  
ULB**



**NOTICE**

**Subject: Licensing of Septic Tank Cleaning Operators**

As per the resolution passed in the ULB Meeting dated --/--/---, it has been agreed that all operators (Public and Private) for pumping out faecal sludge/septage from on-site sanitation systems such as Kui, pit latrines, septic tanks, etc. within the jurisdiction of the Municipality, through mechanical methods, shall be provided with licenses, and no operator would be allowed to function without a valid license from the date of the commencement of the proposed Faecal Sludge Treatment Plant/Treatment Facility (location-.....). The application forms for the Cleaning Operators License can be obtained from the respective ULB (location-.....) beginning --/--/---. The format of this application form has been attached as Format 1 of Annexure II. The licenses would be valid for an initial period of 2 years and could be subsequently renewed for a period of three years. An operators' manual shall also be made available to the operators outlining the standard operating procedures along with expected service standards, penalties, terms of payment, vehicle maintenance, safety protocol, etc. The ULBs shall organise necessary training programs for the licensed operators with the help of state government/external agencies/academic institutions to make them familiarise with the provisions of the operators' manual and acquaint them with the standard operating procedures for collection, transport, disposal of faecal sludge/septage and reporting for cleaning of septic tanks. The resolution is in line with Section 105 and 340 of Rajasthan Municipalities

**The eligibility criteria:**

The eligibility criteria have been classified into three broad categories, namely:

**Technical Criteria** – Pertains to equipment quality, specification and condition.

- Leak-Proof equipment – photographic evidence and random inspection – drive system (tractor specifications - engine, chassis, etc.), pump, hose, pipe, seals, tank, trailer chassis, etc.
- Proof of vehicle maintenance in the last one year.
- Adequate inspection equipment (such as sight gauge) and a well-stocked toolbox.
- Submission of detailed vehicle & equipment specification.

*Table A.1: Technical Specification of De-sludging Equipment*

Sl. No.	Components	Description	Remarks
1	Type		
1.1	Tank Capacity		
1.2	Construction		
1.3	Material		
1.4	Vacuum pump		
1.5	Suction Hose (length)		
1.6	ISO Certified Company		
2	Truck/Tractor Chassis		
2.1	Max Power		
2.2	Manufactured by		

**Administrative Criteria** – Pertains to statutory and regulatory stipulations.

- Name and identity proofs of the owner, driver, and helper – Minimum two personnel per vehicle.
- Proof of the ownership – Commercial Vehicle Registration, Bills of the equipment, insurance, etc.
- Up-to-date P.U.C Certificate.
- Vehicle Fitness Certificate.
- A valid commercial driver's license for the driver (LMV – TR).
- Certification after attending short-term course/training session on proper desludging operations
- as per the operators' manual.

**Health & Safety Criteria** – Pertains to hygiene and safety.

- Well-stocked First-Aid/Medical Kit on every vehicle; Anti-septic soaps in the vehicle and at the
- designated parking/office.
- Adequate safety equipment – Safety goggles or glasses with side splash protection; Dust mask that fits over nose and mouth; Clean rubber gloves; Dedicated uniform with an apron; Work boots; and Battery-operated torch.
- Health & Life insurance of truck operators (drivers) and helpers with a minimum INR 2 lakhs yearly limit including the death compensation limit of INR 10 Lakhs.

The criteria underlined are to be considered as a mandatory requirement, while others can be incrementally fulfilled over a period of 12 to 24 months, monitored during the periodic review by the respective ULBs.

**The licensed operator shall be expected to:**

- Always carry a copy of the license and present the license to each household before beginning the cleaning service.
- Only dispose of the collected Septage/Faecal Sludge at the Treatment Plant.
- Strictly adhere to the safety and hygiene protocol as per the Operators' Manual (to be notified soon).
- Follow the standard operating procedure as per the Operators' Manual (to be notified soon).
- Keep a record of all desludging operations and regularly submit the copies of Job Cards to the Municipality office.

**Proof of Cleaning and Disposal**

- Each licensed operator has to carry Job Cards in prescribed formats (attached as Format 3 of Annexure II) obtained from the ULBs, fill-in all necessary information and get them signed by the households at the time of each cleaning visits and by the treatment plant operator at the time of disposal. The difference between the time of cleaning and the time of disposal should not be more than 24 hours. A copy of these cards has to be given to the attended households, and a copy has to be submitted to the treatment plant. The Job Cards will have to be submitted within 48 hours from the time of disposal, failing which the operator will have to fill-in new Job Cards and get them signed by each household and the treatment plant operator all over again.

### User charges applicable for On-call desludging services

The user charges collected by private operator within municipal jurisdiction will be subjected to discretion of operator. The charges need note to be more than as given in the various use/type of below section :-

- Residential : INR...../trip
- Commercial : INR...../trip
- Institutional : INR...../trip
- Industrial : INR...../trip
- Public Toilet : INR...../trip
- Others (Slum neighbourhoods, Vulnerable Groups – to be approved by Sanitation Committee)
  - a. .... INR...../trip
  - b. .... INR...../trip


### User Charges applicable for Schedule desludging

User charges for schedule desludging will be applicable as per resolution “Scheduled Septic Tank Cleaning and Periodic User Charges”.

#### Penalty

- A Penalty of INR .....would be imposed on any individual or group of operators who are found disposing this waste at a location other than the Treatment Plant (except in case of exceptional circumstances). Incidences of more than 3 illegal disposals per quarter would result in termination of the license. The operators will have to reapply for the license post-termination.
- A penalty of INR .....would be imposed on operators found violating safety and hygiene protocols including inadequate use of safety equipment during cleaning and disposal of septage (other detailed in the operators manual)
- A penalty of INR .....would be imposed on the operators in case of any spillage during the cleaning procedure of the septic tanks and the transport of septage. More than 5 incidences of spillage may result in a temporary suspension of the operators’ license.
- A penalty of INR .....would be imposed on operators working without a valid license.
- A penalty of INR ..... would be imposed on operators who fail to present their operators’ license at the time of inspection by a Municipal official. The operators would be required to present the original operators’ license within 2 days or a fine may be imposed.
- The operator would be penalised with a fine of INR ..... per mismatched record if any discrepancy is found in the submitted records, Job cards of the operator, the records at the FSTP and during verification of Job Cards by Municipality through telephonic follow-up, and sample survey. Failing to submit Job Cards on time on more than 5 occasions per quarter may result in a temporary suspension of operators license.

Other penalties as codified and detailed in the Operators’ Manual and the State FSSM Guidelines. The respective ULBs would monitor the operations and ensure compliance with these provisions and has the power to levy penalties on non-complying operators. The residents of the city are and will be urged to be vigilant and report incidences of arbitrary/ illegal disposal, spillage of faecal sludge/septage from septic tanks, or other discrepancies to the ULBs.



**Exceptional Circumstances:** : In case the treatment plant is unable to accept the faecal sludge or septage from the truck operator (due to overloading of the plant or undesirable quality of septage/faecal sludge), the operator will have to get the reason for rejection in writing from the designated personnel at the treatment plant with the personnel's signature. Under this condition, the operator has to dispose the waste at a designated location to be notified later.

**Chairman  
ULB**

**Executive Officer/Commissioner  
ULB**

**NOTICE****Subject: Scheduled Septic Tank Cleaning and periodic user charges**

As per the resolution passed in the ULB Meeting dated --/--/----, it has been agreed that all households within a respective Municipality will be periodically provided with the cleaning service of septic tank/pit latrine/Kui etc. every 3 to 5 years based on the size of on-site containment unit with a maximum period of 5 years, in line with the provisions of the CHPEEO manual, BIS Code 2470 and prevailing site conditions in a Municipality. The Resolution is in line with the Rajasthan Municipalities Act, 2009, Section 104.

Moreover, the households will not be charged with a one-time fee for this cleaning service, and instead, an additional monthly/yearly sum of INR ....., proposed to be either:

Option I: Combined with their existing water tariff of all connections; or

Option II: Combined with solid waste collection from every household charges; or

Option III: Levied as FSSM cess to be collected from every household separately.

This resolution has been passed to encourage residents without on-site containment units to construct a suitable unit and for introducing a shift towards regular cleaning of on-site sanitation containment units so as to maintain public health and hygiene. Many households request for such cleaning services from untrained and unlicensed private cleaning operators. Furthermore, such requests are made only when a household's on-site containment units start to overflow into drains, which could create a major nuisance and a public health hazard. Households that are unwilling to pay these charges shall be charged the standard desludging rate as notified by the ULB or charges as directly negotiated with private cleaning operator (licensed). (refer resolution II of licensing of private operators for notified desludging tariff for on-call services )

**Payment to Operator**

Any Licensed Private Desludging Operators interested in operating scheduled cleaning service can directly obtain the cleaning schedule and corresponding Job Cards from the concerned Municipality. Cleaning schedule can be given on a daily/weekly basis. The operator would be paid for successful cleaning operations on the basis of the completed Job Cards submitted to the Municipality with the signature of a household-member of each household visited and Treatment Plant operator, and with all fields of the Job Card completely filled. The Municipality would verify each Job Card through phone calls, conducting visits to the households, and random inspections/sample surveys. The Operators would be penalised in cases of any discrepancies as per the provisions of the City FSSM Resolutions and Operator's Manual.

## Scheduling

The services will be directly provided by the Municipality through trained and licensed operators who comply with the proposed operator's manual and the state FSSM Guideline.

A survey shall be undertaken to identify all on-site sanitation containment units in the Municipality and a periodic cleaning schedule shall be made, based on which each household will be offered this service. After the preparation of a preliminary schedule, each household shall be notified in advance i.e. at the start of the month and two days before their turn and would be requested to be present and oversee the cleaning of their Septic tanks/Kui/Pit latrines on the scheduled day.

Households availing scheduled desludging services would be required to present an original paid water/solid waste collection charge receipt from the past 6 months. Cleaning service would not be provided to Households which do not furnish a paid receipt. The Cleaning service may be rescheduled within the next 30 days on request and the household has to fulfill this condition on the rescheduled date.

Cleaning services may be provided on request for the first two instances but will be completely a paid service afterwards if the deviation with the fixed schedule is more than 12 months, irrespective of the monthly/annually user charges.

## Rescheduling


The households can reschedule their cleaning service in case an adult member is not present at home on the scheduled day or time but will be requested to inform the concerned Municipality in advance i.e. one or two days before the scheduled date.

The households may also reschedule their cleaning service under other circumstances when the cleaning job would not possible because of any scheduled events, special occasion, etc.

In such circumstances, the households would be asked to provide an alternative date and time for cleaning the on-site sanitation containment units within the next 30 days. A household may reschedule the cleaning service a maximum of two times, after which the scheduled cleaning service would become void for the current cycle and the household will have to pay additional charges to avail these services in the current cycle.

## Other Provisions

1. Public Awareness and Stakeholder Engagement Campaign to make people more aware, accepting and solicit opinions and suggestions to improve the scheme. The ward councillors will take a leading role in making residents of their constituency aware of the scheduled service, user charges, and corresponding roles and responsibilities of each household.
2. Creation of a database of all on-site sanitation systems in the Municipality for making the schedule for cleaning on-site sanitation containment units.
3. Steps to increase the coverage of on-site sanitation containment units such as Septic tanks, Pit latrines, etc.
4. Licensing of Cleaning Operators and engaging them for participating in the scheduled desludging work.
5. In case of Option I: Follow-up with PHED for the approval of a scheme to combine the collection of sanitation fee with the water bill and a mechanism for the revenue transfer.
6. Institutional capacity building within the Municipality - Creation of Sanitation



Committee for monitoring and decision-making including sanitation funds; and creation of Sanitation Cell for managing day-to-day operations including creating, managing and maintaining schedule, coordination with desludging operators, manage Job Cards and desludging records, follow-up with households, and grievance redressal.

7. Comprehensive regulatory and monitoring framework to ensure smooth compliance.
8. These provisions would be applicable once the treatment Plant is operational.

**Chairman  
ULB**

**Executive Officer/Commissioner  
ULB**

**NOTICE****Subject: Amendment in the building byelaws**

As per the resolution passed in the ULB Meeting dated --/--/----, it has been agreed that from --/--/----, submission of building applications have to include for the provision of a suitable sanitary toilet containment unit such as Septic tank/Pit latrine in line with the model drawings (Annexure III of State FSSM Guideline) as a part of the building application. A site inspection by designated Municipal officials will be made to ensure that a suitable sanitary toilet has been constructed in line with standards. Some modifications would be made to the Municipal Building Bye-laws (Sthaniy Nikay Bhawan Viniyam 2009) for the same. The changes will be in accordance to the Rajasthan Municipalities Act, 2009, Section 340.

**Some modifications are mentioned below:**

- ➔ In section 8.6, Table 7, the inclusion of minimum dimensions for Septic tank/Pit latrines.
- ➔ The dimensions for Septic tank/Pit latrines shall be applicable for all buildings, including plots less than 100sq.m.
- ➔ In section 12.5 (A), location and size specifications of the Septic tank/Pit latrine (as per Annexure 3, The State FSSM Guidelines) shall be submitted to the authorised personnel in the ULB as a component of the building plan. The ULB staff should assist the applicants in fulfilling this requirement.
- ➔ Addition of Section 8.15, detailed design, drawing and configuration of Septic tanks and Pit toilets as per Annexure 3 of The State FSSM Guidelines.
- ➔ Households with a toilet but without a safe on-site containment unit such as septic tank/soak pit be encouraged to apply for relevant assistance under Swachh Bharat Mission for construction of the same.

**Chairman  
ULB**

**Executive Officer/Commissioner  
ULB**



**NOTICE****Subject: Constituting the City Sanitation Committee and City Sanitation Cell**

As per the resolution passed in the ULB Meeting dated --/--/---, it has been agreed that a City Sanitation Committee and City Sanitation Cell shall be constituted to oversee all Faecal Sludge and Septage Management Operations in the city. In case the Urban Local Body already has a constituted city sanitation committee, it may also include the mandate of FSSM and the committee structure can be also modified accordingly.

Furthermore, a dedicated helpline would be set-up for receiving Septic tank/Pit latrine/Kui cleaning requests along with public grievances/complaints. The committee is being constituted as per the provision specified in Section 55, Para 3 of the Rajasthan Municipalities Act, 2009.

**The Sanitation Committee**

It shall comprise of the following members:

1. Executive Officer/Commissioner – ex-officio
2. Chairman – ex-officio
3. Junior Engineer/Town Planner/any other highest technical officer – ex-officio
4. Sanitary/Health Inspector – ex-officio
5. Ward Councilors – (total members divided by 5) to be changed every year on rotation while ensuring women participation.

The Committee shall be the decision-making body for all Faecal Sludge and Septage Management related matters within the Municipality. The Junior Engineer and Sanitary Inspector will represent the Executive Wing of the Municipality, while the Ward Councilors will represent the interest of the people. The Minutes would be kept for each meeting, signed by the Executive Officer/Commissioner and the Chairman. All decisions made in the meeting need to be agreed upon and signed by both, the Executive Officer and the Chairman. The Committee shall meet at least once a month to review finances, septic tank cleaning records, public grievances, issues, FSTP-related matters, compliance by operators, etc.

**Major Responsibilities of the Sanitation Committee include:**

- Formulating, notifying and modifying important city-level documents, such as the city FSSM Strategy, City FSSM Resolutions, changes in the Building Byelaws related to sanitation, model septic tank/soak-pit design, etc.
- Approving and commissioning new public toilets and community toilets.
- Coordinating with various agencies/stakeholders for the collection of user charges
- Formulating an annual action plan/strategy every year for Faecal Sludge and Septage Management including setting performance targets, setting priority goals, increasing coverage of sanitary latrines, monitoring plan, etc. for the perspective year. The annual action plan/strategy would be reviewed at the end of the perspective year to assess performance – successes, and shortcomings.
- Manage funds for Faecal Sludge and Septage Management Operations, including decisions payment to operators/related staff, fixing and collecting user charges (one-time and monthly), expenses & revenue from FSTP, expenses for training/capacity building/public awareness, the allocation of annual and monthly budget for FSSM, and the arrangement of finances for O&M of Faecal Sludge and Septage Management System.

- Coordinate with the State Government on matters pertaining to FSSM including the financial grant for Capital and O&M expenses, assistance for planning/design/O&M of FSSM infrastructure, capacity-building and training assistance, etc.
- Monthly Progress Review – performance against target for scheduled desludging, amount of septage disposed and treated at the FSTP, public grievances, instances of non-compliance, etc.

### The Sanitation Cell

The Sanitation cell within the ULBs shall be the implementation wing for overseeing day-to-day operations of Faecal Sludge and Septage Management in its Municipality area. The Sanitation Cell shall be responsible for:

- Providing licenses to operators.
- Creating a detailed sanitation database of the city with the help of ward councillors.
- Managing scheduled desludging operations, if Scheduled Desludging system is adopted.
- Ensure the compliance with the City FSSM Resolutions and FSSM Plan provisions.
- Impose penalties on non-compliant operators and households.
- Undertake public awareness campaigns.
- Grievance redressal.
- Overseeing FSTP operation & maintenance.

### The Members and responsibilities include:

Table A.2: Sanitation Cell Member's Responsibilities

Member	Term	Responsibility
Member – 1: Sanitary Inspector	Ex-Officio	Issuing and renewing licenses of Desludging Operators
		Grievance Redressal
		Issuing daily/weekly cleaning schedule to cleaning operators (in case of scheduled desludging)
		Collecting and scrutinizing Job Cards from Operators and FSTP records
		Monthly inspection (sample survey) of cleaned households
		Imposing penalties on non-complying cleaning operators
		Coordinate with the FSTP operator regarding day-to-day operations, septage input, performance of treatment plant and other operational aspects.
Member - 2	Ex-Officio as designated by the Committee (preferably the official responsible for SBM activities)	Assist households with the construction of on-site containment units such as septic tanks, soak-pits, pit latrines, etc. under SBM by providing model designs (booklets/ drawings), trained masons, financial assistance, etc.
		Responsible for O&M of public and community toilets
		Facilitate in Public outreach and awareness with the help of ward councillors

Member	Term	Responsibility
Member - 3: Computer Operator	On Contract/ designated by the Committee	Creating and maintaining a sanitation database of the city including household data, submitted Job Cards, overall cleaning record, instances of non-compliance/penalties, data on licensed operators, etc.
		Creating Daily/Weekly/Monthly schedule and submitting to Sanitary Inspector and Fireman
		Submitting weekly/monthly progress reports to the Sanitary inspector for the perusal of the committee
		Maintain helpline
Member - 4: Assistant/ Helper	On Contract/ designated by the Committee	Telephonic and Field Verification of Job Cards submitted by Cleaning Operators
		Assisting in field surveys for creating sanitation database of the city
		Helping the Computer Operators, Fireman and Sanitary Inspector in their tasks

The Sanitation Cell shall present regular reports (monthly/weekly/annual) to the committee on the progress of FSSM services within the jurisdiction area of the Municipality. The Sanitary Inspector, as a member of both, the Committee and Cell shall be the common link between the policy/decision-making and operational aspects of Faecal Sludge and Septage Management in the jurisdiction area of the Municipality

The Sanitation Committee and Cell shall be constituted immediately after the City FSSM Resolutions are notified. A more detailed structure, roles, and responsibilities for the Committee and the Cell shall be followed as given in State FSSM Guidelines. The ULBs shall also seek assistance from the State Government for training and capacity-building.

**Chairman**  
**ULB**

**Executive Officer/Commissioner**  
**ULB**

**FORMAT 1: LICENSE FOR COLLECTION AND TRANSPORTATION OF SEPTAGE**

In accordance with all the terms and conditions of the Resolution - 2, Licensing of Septic Tank Cleaning Operators passed on --/--/----, the special license conditions accompanying this license and applicable rules and laws of Government of Rajasthan, the permission is hereby granted to:

NAME OF LICENSEE\_\_\_\_\_

ADDRESS\_\_\_\_\_

\_\_\_\_\_

For the collection, transport and disposal of septage from septic tanks, pit latrines, kui and other on-site sanitation units in ..... Municipality This license is based on information provided by the desludging operator in the Septage Collection and Transportation License Application. This license is effective for a period of ..... years from date of issue, set forth below.

EFFECTIVE DATE: \_\_\_\_\_

EXPIRATION DATE: \_\_\_\_\_

The license may be suspended or revoked for Condition of non-compliance and is not transferable.

**FORMAT 2: APPLICATION FOR THE LICENSE OF COLLECTION, TRANSPORTATION AND DISPOSAL OF SEPTAGE IN ULB**

Name of the applicant: Shri/Ms. ....

**Address:**

Regd. office: .....

Head office: .....

Telephone No.: (O) ..... Mobile No .....

Email ID: .....

Registration No. of Vehicle: .....

Pollution certificate of the vehicle valid up to: .....

Insurance of the vehicle valid up to: .....

Fitness of the vehicle valid up to: .....

Vehicle, whether fitted with GPS: .....

Details of the vehicles indicating model, type, capacity, leak proof, odour and spill proof having proper vacuum/ suction and discharging arrangement (with photographic evidence)

Processing fee for license Rs...../- (Non-refundable)

D.D. No..... Date: ..... Bank: .....

I/We certify that information given by me/us in column 1 to 11 is true to the best of my knowledge and belief. I also certify that I have read and understood the attached terms and conditions as per the Operators Manual and agree to abide by them. I agree that if any information given by me is found wrong the application for license will be liable for cancellation at any time.

**Signature(s) of applicant(s)**

**Date:**

No. of document attached:

- 1)
- 2)
- 3)

### FORMAT 3: JOB CARD FOR DESLUDGING OPERATOR

Sr. No. \_\_\_\_\_

Name of the City \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ am/pm

#### 1. Basic Information (must be completed by the septage emptier)

a. What is the Volume of septage emptied (litres) \_\_\_\_\_

b. Number of trips \_\_\_\_\_

c. What is the type of container emptied? (Tick the correct option)

Kull  Septic Tank  Soak Pit/Pit latrine  Other (specify) \_\_\_\_\_

d. Source:  Residential  Restaurant  Office/commercial  Industrial  other

#### 2. Household Information (to be filled by households)

a. Complete name: \_\_\_\_\_

b. Phone number: \_\_\_\_\_

c. Complete address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

d. Water Supply Account: \_\_\_\_\_

The undersigned being duly authorized hereby certifies to the accuracy of the source and type of collected Septage identified above and subject to this manifest.

Date: \_\_\_\_\_ Signature of Customer: \_\_\_\_\_

#### 3. Information about the wastewater emptier (vehicle):

a. Name of Operators (Driver & Helper): \_\_\_\_\_

b. Permit Number: \_\_\_\_\_

c. Vehicle Number: \_\_\_\_\_

.....<.....<.....Tear Here.....<.....<.....

#### 4. Acceptance of Septage by FSTP operator

The above emptier delivered the described septage to this disposal facility and it was accepted.

Disposal date & time: \_\_\_\_\_

Signature of authorized official and title: \_\_\_\_\_

#### 5. Acceptance of Job Card by Municipal Council

Signature of authorized official and title: \_\_\_\_\_

## FORMAT 4: FOR PREPARATION OF DATABASE OF ONSITE SANITATION FACILITIES

Form No.....	Surveyed By .....		Date.....	
	Location (City and District) .....			
<b>(Individual Toilets) – Survey Form</b>				
Name of Respondent		Ward no.		
Type of Property	<input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Institutional <input type="checkbox"/> Industrial			
Locality				
Disposal of Grey Water (Bathroom and Kitchen)	<input type="checkbox"/> Open Drain	<input type="checkbox"/> Close drain	Other .....	
No. of Toilets in the House	.....	No. of Containment		.....
Size of Containment	L.....B.....H..... or Dia .....Depth.....			
Type of Toilet Disposal	(1) Single Pit	<input type="checkbox"/>	(2) Twin Pit	<input type="checkbox"/>
	(3) Septic Tank – Two Cham.	<input type="checkbox"/>	(4) Septic Tank- with soak pit	<input type="checkbox"/>
	(5) Other -Specify.....			
Disposal System (Multiple Tick)	(1) Effluent is connected to Drain	<input type="checkbox"/>	(2) House accessible by large desludging truck	<input type="checkbox"/>
	(3) Have cover to Open	<input type="checkbox"/>	(4) Accessible from Road	<input type="checkbox"/>
	(5) Cannot be open (Plastered, tiles)	<input type="checkbox"/>	(6) On the Road	<input type="checkbox"/>
Is Disposal System Used by Multiple Dwellings	<input type="checkbox"/> Yes <input type="checkbox"/> No			
Year of Construction	House (.....) Toilet (.....) Containment (.....)			
Year of Last Desludging (Last cleaning)				
Number of Cleaning in last 10 Year				
Cost paid against Desludging				

On-site sanitation can be defined as a system where human excreta are retained and treated on the site of defecation in a way that is hygienic and does not adversely affect the environment. The Onsite sanitation facilities predominant are Septic Tank, Twin pit, and Single pit. Single pits are not recommended but can be opted in extreme conditions provided no adverse impact to ground water. Proper OSSF design considers the following factors:

- Sized properly with appropriate sludge detention time
- Volume and hydraulic retention time.
- Proper inlet and outlet structures
- Water tight
- Access port for each compartment that allows for inspection and pumping

### Design of Onsite Sanitation Facilities:

#### 1. Septic Tank System

Depending on the geography, soil condition, water seepage capacity of the soil the design can be prepared and approved by the Local Bodies. Proper septic tank design considers the following factors:

- Sized properly with appropriate sludge detention time, volume and hydraulic retention time Proper inlet and outlet structures
- At least one baffle separating the tank into multiple compartments
- Water tight
- Access port for each compartment that allows for inspection and pumping Table1:

Table A.3: Recommended Sizes of Septic Tanks as per Number of Users

Number of Users	Length (M)	Breadth (M)	Liquid Depth for a Cleaning Interval of 5 Years (M)
5	2.3	1.15	1.35
10	3.1	1.55	1.4
15	3.7	1.8	1.45
20	4	2	1.55



Number of Users	Length (M)	Breadth (M)	Liquid Depth for a Cleaning Interval of 3 Years (M)
5	1.5	0.75	1.05
10	2	0.9	1.4
15	2	0.9	2
20	2.3	1.1	1.8
50	5	2	1.24
100	7.5	2.65	1.24
150	10	3	1.24
200	12	3.3	1.24
300	15	4	1.24

Note: The CPHEEO Manual and NBC code IS 2470 Part I 1985 may be referred for exact calculations

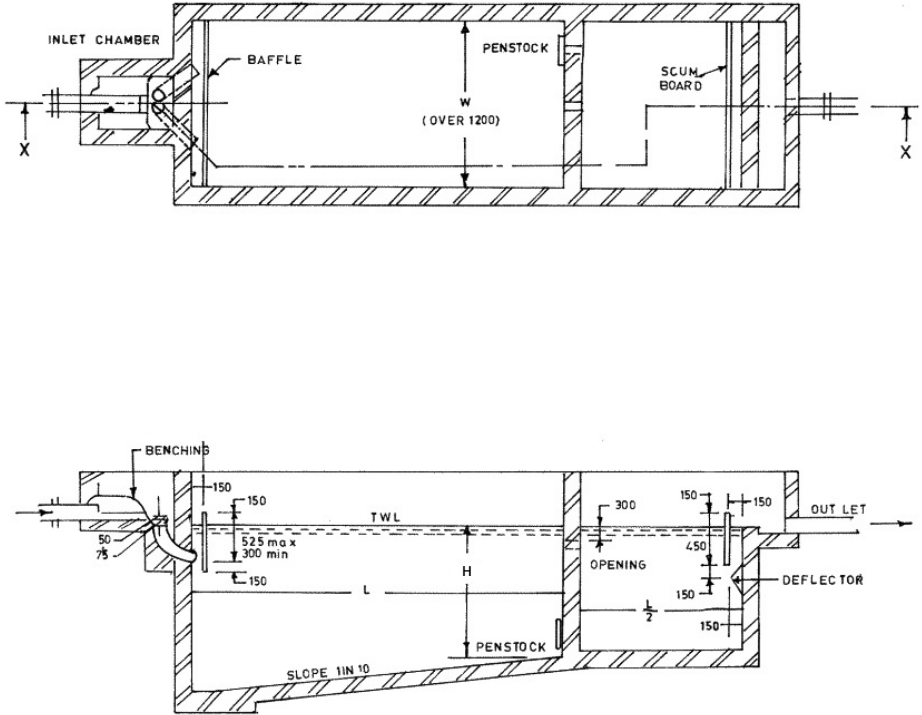
Table A.4: Existing guide lines for design and construction of septic tanks

Parameters	Existing Guidelines	Source of Guideline	General Observations
Location	Septic tanks are recommended only for individual homes, small communities and institutions whose contributory population size doesn't exceed 300	CPHEEO	While all existing guidelines
		Manual	state that the location of septic tank should
	A sub soil dispersion system shall not be closer than 18 meters from any source of drinking water, such as well, to mitigate the possibility of bacterial pollution of water supply	NBC, Part 3: Development Control Rules and General Building Requirements	be given due consideration, in reality, the location of the septic tanks are
	Septic tank should be located at a place open to sky, as far away as possible from the exterior of the wall of building and should not be located in swampy areas or areas prone to flooding.	IS 2470, Part- 1	practically based on the land availability within the household vicinity

Parameters	Existing Guidelines	Source of Guideline	General Observations
Design and Construction	Septic tanks should have a minimum width of 750 mm, depth of 1 meter below water level and a minimum water capacity of 1 cubic meter. The length of the tank shall be 2 to 4 times the width.	NBC, Part 3: Development Control Rules and General Building Requirements	Local masons unaware of the existing design/ construction guidelines for construction
	The minimum nominal diameter of the pipe shall be 100 mm. Further at junctions of pipes in manholes, direction of flow from a branch connection shall not make an angle exceeding 45 degrees with the direction of flow in main pipe		of septic tanks. The criterion governing the design and construction
	Every septic tank shall be provided with a ventilation pipe of at least 50 mm diameter	IS 2470, Part-1	
Design and Construction	When served for a population above 100, the septic tank may be divided into independent parallel chambers for operation and maintenance	IS 2470, Part- 1	

Parameters	Existing Guidelines	Source of Guideline	General Observations
Design and Construction	Baffles are provided at inlet and outlet and should dip 25 to 30 cm into and project 15 cm above the liquid. The invert of the outlet pipe should be provided at 5 to 7 cm below the invert level of inlet pipe.		
	The height of the ventilation pipe should extend at least 2 m above the height of the highest building within 20 meters radius		
	Effluent from septic tanks should be discharged into a soak pit or dispersion trenches depending on water Table. Soak pits or dispersion trenches can be adopted in all porous soils, where soak percolation rate is below 25 minutes per cm and the depth of water table is 2 m or more from the ground level.		
	“Improved Septic Tank” - the walls of the conventional septic tank can be replaced with baffle walls to have a multi chambered baffled septic tank. The paper states “This movement of wastewater inside the tank helps in creating the turbulent flow which causes enhanced mixing of the raw sewage with already existing activated sludge and accelerates the decomposition of the solids because of intensive contact between	CSE Policy Paper on septage management in India	

Figure A.1: Typical section of septic tank

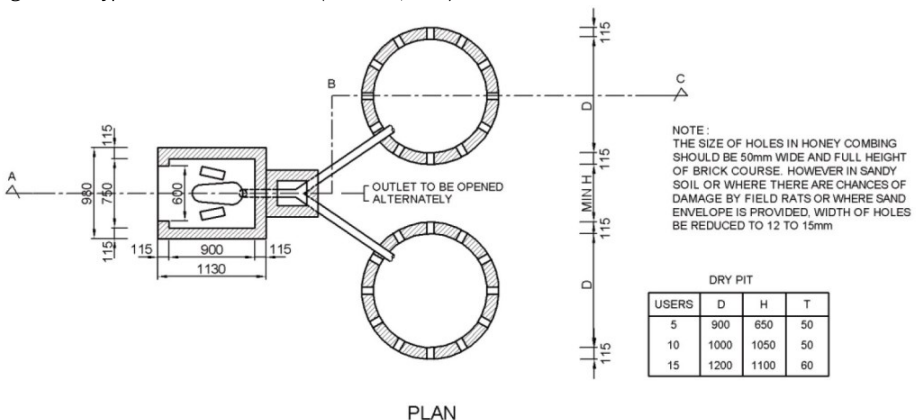


**2. Twin Pit System:** It consists treatment units of two chambers. The two underground chambers (pits) are provided to hold fecal sludge. These are normally offset from the toilet and should be at least 1 meter apart. A single pipe leads from the toilet to a small diversion chamber, from which separate pipes lead to the two underground chambers. The pits should be lined with open-jointed brickwork. Each pit should be designed to hold at least 12 months accumulation of fecal sludge. Wastewater is discharged to one chamber until it is full of fecal sludge. Discharge is then switched to the second chamber. Just before the second chamber is full of fecal sludge, the contents of the first pit are dug out. During the time of storage, digestion should ensure that it is odorless and free of pathogens. The detail drawing and specification is available in SBM (Urban) Guideline and CPHEEO manual, 2013. Specifications are provided to guide the construction of twin pits in different conditions

**Table A.5: Twin Pit Specifications in Different Situation**

High subsoil water level	Where the subsoil water level rises to less than 300 mm below ground level, the top of the pits should be raised by 300 mm above the likely subsoil water level and earth should be filled all-round the pits and latrine floor raised as stated above.
Water logged area:	The pit top should be raised by 300 mm above the likely level of water above, ground level at the time of water logging. Earth should then be filled well compacted all-round the pits up to 1.0 m distance from the pit and up to its top. The raising of the pit will necessitate rising of latrine floor also.
Black cotton soil:	Pits in black cotton soil should be designed taking infiltrative rate of 10 l/m/d. However, a vertical fill (envelope) 300 mm in width with sand, gravel or ballast of small sizes should be provided all-round the pit outside the pit lining.
Where space is a constraint:	Where circular pits of standard sizes cannot be constructed due to space constraints, deeper pit with small diameter (not less than 750 mm), or combined oval, square or rectangular pits divided into two equal compartments by a partition wall may be provided. In case of combined pits and the partition wall should not have holes. The partition wall should go 225 mm deeper than the pit lining and plastered on both sides with cement mortar.

**Figure A.2: Typical section of Twin Pit (CPHEEO,2013)**



- 3. Single Pit System:** Single pits are not recommended and shall be used only in extreme conditions. For single pits following must be adhered.
- The pit must be a maximum of 6 feet in depth
  - The pit must be emptied once every 2 years
  - The groundwater table must be at least 2m below the pit
  - The pit must be at least 18 m away from any source of water (National Building Code, 2005).

**Table A.6: Recommended Size of Pits for Individual Dwelling Units**

Sl. No.	Nos. of User	Diameter	Liquid Depth	Liquid Capacity (with 3-year cleaning period)	Per capita liquid volume (m <sup>3</sup> /head)
1	5	1.8	1.1	2.8	0.56
2	10	2.2	1.4	5.32	0.53
3	15	2.5	1.55	7.61	0.51
4	20	2.75	1.7	10.1	0.5

#### 4. Biodigester Toilet (Developed by DRDO)

##### Description

A bio-digester toilet is an anaerobic multi-compartment tank with inoculum (anaerobic bacteria) which digests organic material biologically. The details of bio-digester toilets are shown in Figure 3. This system converts faecal waste into usable water and gases in an eco-friendly manner. It can be connected to the toilet or a series of toilets. The toilet can be a superstructure fixed on the bio-digester or a separate unit. Bio-digester has an inlet, an outlet and a gas pipe.

The tank has two components, namely, anaerobic microbial inoculum (seed bacteria) and specially designed fermentation tank. The tank can be made out of Stainless steel, Mild steel, FRP or concrete. Semi-treated water from bio-digester tank is needed to be further disposed into a soak pit or a reed bed arrangement for its treatment to acceptable levels of discharge.

##### Advantages

- As there is no sludge formation, there is no need for de-sludging and treatment. It is therefore more economical in the long-term as it conserves water and has minimum O&M
- Night soil degradation occurs through microbial reaction which converts it into bio gas and odorless water.
- Technology is environmental friendly, maintenance free and efficient without depending on conventional energy sources.
- Permits use of toilet cleansing agents.
- Suitable for mobile and stationary platforms.
- Lifelong usage bio-digester tank does not need recharging, re-shifting or maintenance.
- Costs lesser than the conventional toilets.
- Easy to transport and install.
- One-third to one-fourth capacity of septic tank
- Space requirement is less.

## Specifications Bio tank

- (a) Land requirement – 25 sq. ft.
- (b) Tank internal dimensions – 1336 mm x1036 mm x 900 mm
- (c) Diagonal partition wall of 8mm thickness (adequately stiffened by ribs)
- (d) Tank is buried 600mm deep and anchored by 300mm long stainless steel(SS316) anchor bolts at corners
- (e) FRP tanks of 8mm thickness
- (f) Provision of water sealed outlet from the tank
- (g) For 5-6 users:
  - a. Total capacity: 700 liters (1000 mmX700 mm and 1000 mm depth). Where space is a constraint the depth of the tank can be increased to 1.5 m
  - b. Volume of anaerobic Compartment (30% of total capacity): 210 liters
  - c. Tank may be constructed with masonry also.

Figure A.3: Details of bio-digester with reed bed

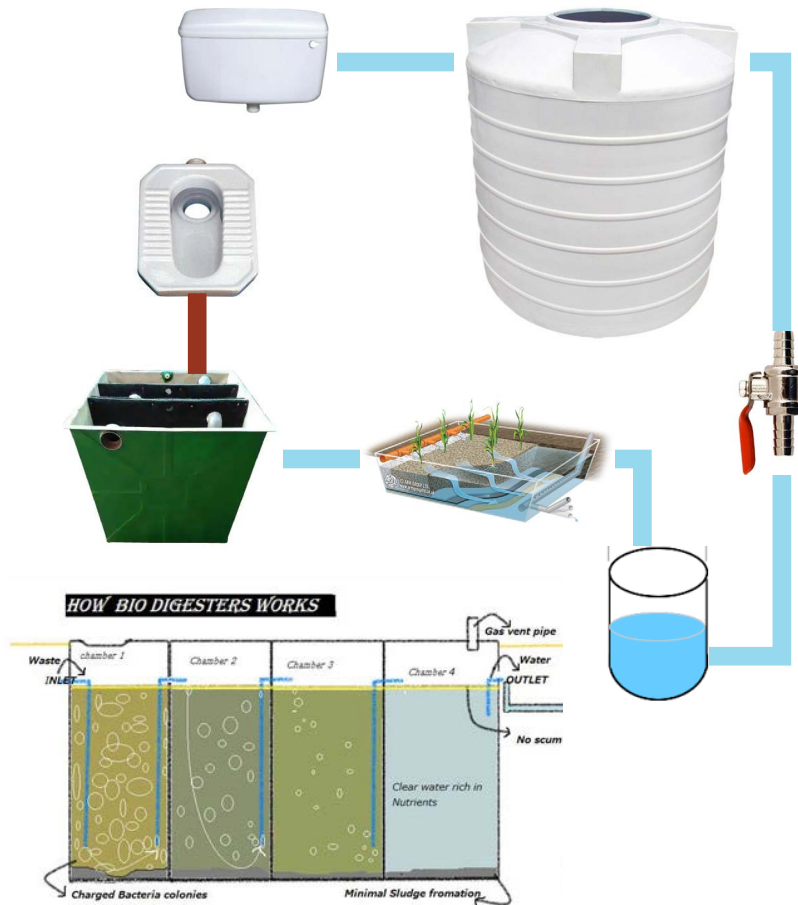


Table A.7: Conversion of Insanitary Latrines into Pits

Parameters	Existing Guidelines	Source
Size (five members)	Diameter - 1000 mm preferred but 750 mm also permitted where space is a constraint Depth - 1300 mm	CPHEEO
Shape	Circular preferred; but rectangular, oval and square also allowed where space is a constraint	CPHEEO
Location	Pits should be placed symmetrically at the back side of the pan. Can be located within premises, under foot pat/road/narrow lane	CPHEEO
	The distance between foundation and pit should be between 0.2 to 1.3 m	
	A minimum distance of 3 to 10 m from water sources such as tube wells and 3 to 10 m from water mains	
	Water pipe should not cut across the pit	
Design and construction	The pits should be lined to avoid collapsing. Bricks joined in 1:6 mortar commonly used for lining. Stones or laterite bricks of cement concrete rings could also be used.	CPHEEO
	Lining brick work 115 mm thick (half brick) with honey combing up to the invert level of incoming pipe or drain.	
	Size of holes 50 mm wide up to the height of brick course Pit bottom should be left in natural condition	
	RCC slab is used for pit cover	
	Toilet pan is connected to the pit through a 75 mm brick channel of U shape	



Table A.8: Capacity Building Stages for stakeholder consultation

Stage	Stakeholders	Subject	Description	Modality
I	ULB officials	State FSSM Guideline	<ul style="list-style-type: none"> <li>• Concept and need of FSSM,</li> <li>• FSSM process across the sanitation value chain,</li> <li>• Issues and challenges,</li> <li>• Statutory provisions,</li> <li>• Roles and responsibilities,</li> <li>• State level Operative Manuals and Guidelines</li> </ul>	Interactive Workshop
I & II	ULB officials of all the project towns	City FSSM Plan & City level Septage Management Resolutions	<ul style="list-style-type: none"> <li>• Understanding existing sanitation situation, need for FSSM interventions, approach, roles and responsibilities.</li> <li>• Adoption of Regulatory reforms for city level septage management.</li> <li>• Setting up of City Sanitation Committee &amp; Cell.</li> </ul>	Consultation Workshop
III	Survey Team	Household level Septic Tank Database	<ul style="list-style-type: none"> <li>• Collection of data on household size; availability, type, size and structure of containments; water supply connection, last desludging date etc.</li> </ul>	One-on-one training
III & IV	Computer operator of the Sanitation Cell	Scheduled desludging and O&M	<ul style="list-style-type: none"> <li>• Preparation of a schedule for desludging,</li> <li>• Receiving calls for desludging requests,</li> <li>• Receiving complaints and grievances, and</li> <li>• Maintaining records and database</li> </ul>	One-on-One training and handholding
II, III & IV	Sanitary Inspector of the Sanitation Cell	O&M, Monitoring and Evaluation	<ul style="list-style-type: none"> <li>• Scheduled desludging approach,</li> <li>• Post- cleaning inspection,</li> <li>• Management of Finances- Revenue and Expenditures,</li> <li>• Redressal of grievances,</li> <li>• Monitoring and evaluation against service level benchmarks,</li> <li>• Preparation of progress reports</li> </ul>	One-on-one training and continuous handholding

Stage	Stakeholders	Subject	Description	Modality
III & IV	Fireman and Ward Councilors	Support in IEC activities	<ul style="list-style-type: none"> <li>Assisting with collection of household database</li> <li>Ensuring proper construction of containments and desludging operations</li> <li>Gathering and educating people</li> <li>Distributing education and awareness material</li> </ul>	Demonstrations and assistance
II	Households	Public awareness programs	<ul style="list-style-type: none"> <li>Need for sanitary containments systems,</li> <li>Benefits of Scheduled desludging;</li> <li>Health and safety hazards of open discharge,</li> <li>Adverse impacts of open defecation,</li> <li>Proper usage of the public toilets and urinals</li> <li>Proper desludging process,</li> <li>Incentives and penalties,</li> <li>Payment of user charges</li> </ul>	Focus Group Discussions, Public announcements and pamphlets distribution
II	Households	Public awareness programs	<ul style="list-style-type: none"> <li>Applying for emergency desludging request,</li> <li>Registering complaints and grievances,</li> <li>Filling up the records in job card with the desludging operator</li> </ul>	Demonstration and interactive learning session
III	Masons and plumbers	Construction of Sanitary Containments	<ul style="list-style-type: none"> <li>Proper containment size, specifications and design</li> <li>Proper techniques to construct a septic tank, pit latrine, soak pit, toilet superstructure, etc.</li> <li>Various construction materials to be used and its sources</li> </ul>	Operative manual & Guidelines; Illustrations and live on- site demonstrations; Certificate or empanelment by Nagar Palika
III	Desludging Operators	Licensing of operators	<ul style="list-style-type: none"> <li>Licensing procedure and its terms and conditions for the private desludging operators</li> </ul>	Brochure
III		Code of Conduct	<ul style="list-style-type: none"> <li>Proper process of desludging,</li> <li>Use of Safety gear.</li> <li>Maintenance of equipment,</li> <li>Filling up the job card, and</li> <li>Submitting the records with the FSSM Cell</li> <li>Incentives and penalties in case of non- compliance</li> </ul>	Operative manual & Guidelines; Live on- site demonstration and assistance

Stage	Stakeholders	Subject	Description	Modality
III & IV	Treatment Plant operators	O&M of Treatment Plant	<ul style="list-style-type: none"> <li>• Treatment technology</li> <li>• Detailed procedure of operations and maintenance</li> <li>• Keeping records and manifests</li> <li>• Storage and sale of compost generated from the plant</li> </ul>	Operative manual & Guidelines; Continuous training and handholding
III	Public toilet operators	O&M of Public Toilets	<ul style="list-style-type: none"> <li>• Regular cleaning and maintenance of public toilets/ urinals</li> <li>• Keeping log of users</li> <li>• Collection of user charges</li> </ul>	Operative manual & Guidelines; On-site demonstrations
II	Farmers	Benefits of Organic Compost	<ul style="list-style-type: none"> <li>• Adverse impacts of disposal of untreated sludge on farmlands</li> <li>• Benefits of the compost generated from the treatment plant along with the ways to procure it</li> </ul>	Public announcements and pamphlets distribution
III	Volunteers from other institutions	Support in IEC activities	<ul style="list-style-type: none"> <li>• Carrying out rallies and public awareness campaigns</li> </ul>	Demonstration and interactive learning session

Table A.9: Checklist for Capacity Gap Assessment of Stakeholder on FSSM

Stakeholders	Components	Capacity Gaps	Manpower	Skills/ Knowledge	Finances	Equipment/ Resources	
ULB	Containments	No mechanism or database to impose penalties on households who do not have any containment and discharge night soil directly into open drains.					
	Collection	Lack of capacity to provide regular desludging services to all the households					
		No system for maintaining the records of the received requests and services delivered					
		No equipment to provide desludging services in narrow streets inaccessible by the trucks					
	Conveyance	Poor maintenance of desludging trucks available with the Nagar Palika					
	Treatment	No faecal sludge/ sewage treatment facility available					
	Disposal	Arbitrary disposal of faecal sludge at open land or solid waste dumping site					
	Institutional capacity	Lack of enough capacity to monitor and evaluate the desludging operations					
		Lack of regulatory framework to formalize the private desludging operators					
		No mechanism for registering complaints and grievances, & poor capacity to address them.					
	Financial Capacity	Lack of dedicated funds for the purpose of sanitation and desludging services.					
	Households	Containments	Non- standard construction of septic tanks without soak pit or leach pit				
			Open defecation even after IHHL have been provided under SBM				
Poor cleanliness and hygiene while using public toilets							
Households	Collection	Direct discharge or valves for discharge of accumulated sludge into open drains					
		Lack of awareness to get desludging done at regular intervals					

Stakeholders	Components	Capacity Gaps	Manpower	Skills/ Knowledge	Finances	Equipment/ Resources
Masons and Plumbers	Containments	Lack of knowledge and skill to construct containment systems as per the national standards				
Desludging Operators	Collection	Bucket desludging in inaccessible areas				
		No use of safety gear during desludging such as gloves, mask, goggles, boots etc.				
	Conveyance	No permit by Nagar Palika for private desludging operators				
		Poor maintenance of desludging trucks				
Treatment/ Disposal	Arbitrary disposal of collected faecal sludge					
✓ Adequate						
✗ Absent						
● Partly adequate but needs to be upgraded/streamlined						

## Training Modalities

**Interactive workshop** for ULB officials will include presentations, audio- visual illustrations, and Q&A sessions.

**Consultation workshop** for ULB officials of Project Towns will include the presentations, audio- visual illustrations and Q&A sessions on City FSSM Plan and Septage Management Resolutions along with round-table discussions inviting suggestions for their respective towns. Interactive exercises can be held for managing the Sanitation Committee, Cell and City Sanitation Funds by putting up sample problems.

**One-on-one training** of survey team shall include training on framing questions in front of households and extracting necessary information through interactive conversations. Assistance shall be given in the field for filling up of first few survey questionnaires to ensure they are being done right.

Similarly, **One-on-one Training** for computer operators of City Sanitation Cell of all the Project Towns shall include coaching with learning to use the hardware and software properly. **Handholding** shall be done for at least a month to ensure proper techniques are being followed.

Targeted Training of Sanitary Inspector of all the Project Towns through **sample problems, illustrations, presentations and audio-visuals**. Handholding shall be done for at least a month through weekly follow-ups and assistance in preparing progress reports.

## Presentations, demonstrations and discussions

**Focus Group Discussions** shall be targeted at the group of households who practice open defecation, discharge night soil and septic tank overflow directly into open drain, etc. through assistance from Ward Councilors and Health Officer.

Public announcements can be made through speakers mounted on cycle rickshaws, solid waste collection trucks, desludging trucks, public toilets, and other public places.

**Pamphlets** can be distributed through newspaper; service providers such as solid waste collector, milkman; distributed along with utility bills such as water and electricity bills; given to shopkeepers and government offices for distributing amongst visitors and other such public activities.

**Interactive learning sessions** for public shall be held by gathering local residents at community halls and public places. They will be familiarized with emergency desludging requests, complaints/ grievances, filling up a job card and general vigilance.

**Brochures and Operative Manuals and guidelines** for service providers such as masons, plumbers, desludging operators, public toilet operators and treatment plant operators shall be made available at the Nagar Palika office, other public offices and shops that sell equipment to these service providers.

**Illustrations and live demonstrations** shall be conducted for service providers such as masons, plumbers, desludging operators and public toilet operators at a sample site by carrying out dedicated training for each target group.

**Follow up and refresher training** for masons, plumbers, desludging operators and treatment plant operators after six months and one year at site, ensure proper operations and maintenance.

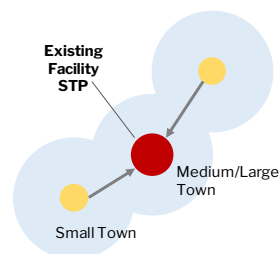
**Pamphlets** distribution at farmers' assistance center and seeds stores.

Each stakeholder shall be engaged in trainings, education and awareness programs for their individual roles and responsibilities through training modules customized for target audience. The material for pamphlets, brochures, Operative manuals and guidelines shall be provided by the consultant and the modules shall be delivered with the assistance from supportive agencies.

Clustering of nearby town (preferably less than 20Km) can reduce the requirement of dedicated FSTP and built treatment units can be shared to larger beneficiary group. This will also help to reduce the financial burden on ULBs and increase the functionality of plant operations. GIS Based proximity analysis of all 191 ULB of Rajasthan suggest the possibility of 24 clusters formulations (Map 3) where either co-treatment or sharing of FSTP can be institutionalized. Three different scenarios of clustering are illustrated for detail deliberations. The ULBs can adopt one of these scenarios for clustering in line with their existing financial situation, physical location, demographic profile etc. Town(s) which fall under cluster of neighboring town may opt for Larger desludging vehicles or Mobile Transfer station to efficiently reduce the inter-town trip length. Small capacity of desludging trucks (preferably of 3000 L) may serve the town needs of desludging operations and accordingly transfer the sludge to the larger desludging truck (preferably of 9000L).

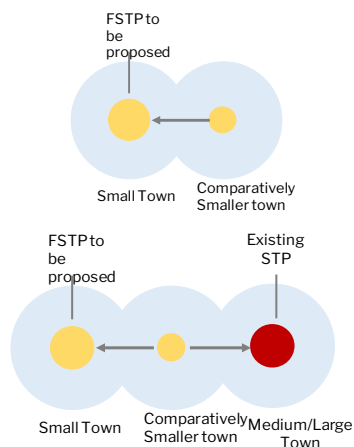
### Scenario 1- Co – Treatment with Existing STPs in nearby Towns

STPs are designed for long term and have spare capacity in term of both pollution load and flow. It is suggested that smaller towns closer to medium or large towns can co-treat the waste to existing STPs available in nearby towns till town sets up its own dedicated plants. It was also suggested to explore the possibility of desludging at existing sewerage manholes. However situations like existing water flow (with adequate self-cleaning velocity) and network pipe diameter also needs to be taken into consideration. This may help to reduce the existing trip length of desludging trucks. ULB should accordingly enforce the monitoring mechanism.



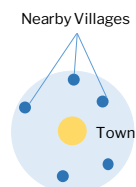
### Scenario 2 – Based on FSTP

This Scenario is for towns of less than 50,000 which are located at a distance lesser than 20 KM. This towns can share the FSTP along with capital and O & M expenditure. This will help smaller town to increase sustainability of FSSM operations and help safeguarding the local environment. The plant should be constructed in bigger town to reduce the trip length. In case if land is not available, plant can be constructed in the smaller town. The depended town (one without the plant) will be taking care of desludging in their premises and disposing it to Treatment Plant.

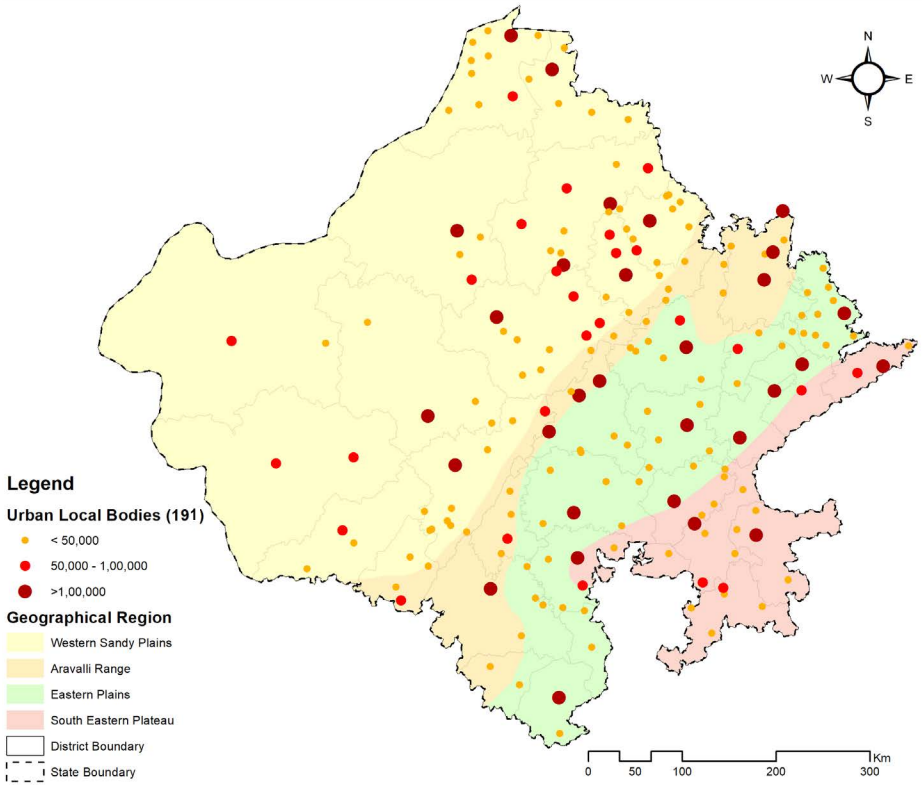


### Scenario 3 – Clustering with census towns & nearby villages

This scenario explains clustering of town and its nearby villages. The ULB of the respective town will consider the population of nearby villages while designing the FSTP. This will help to manage ongoing load of urbanization outside the Municipal Limits.

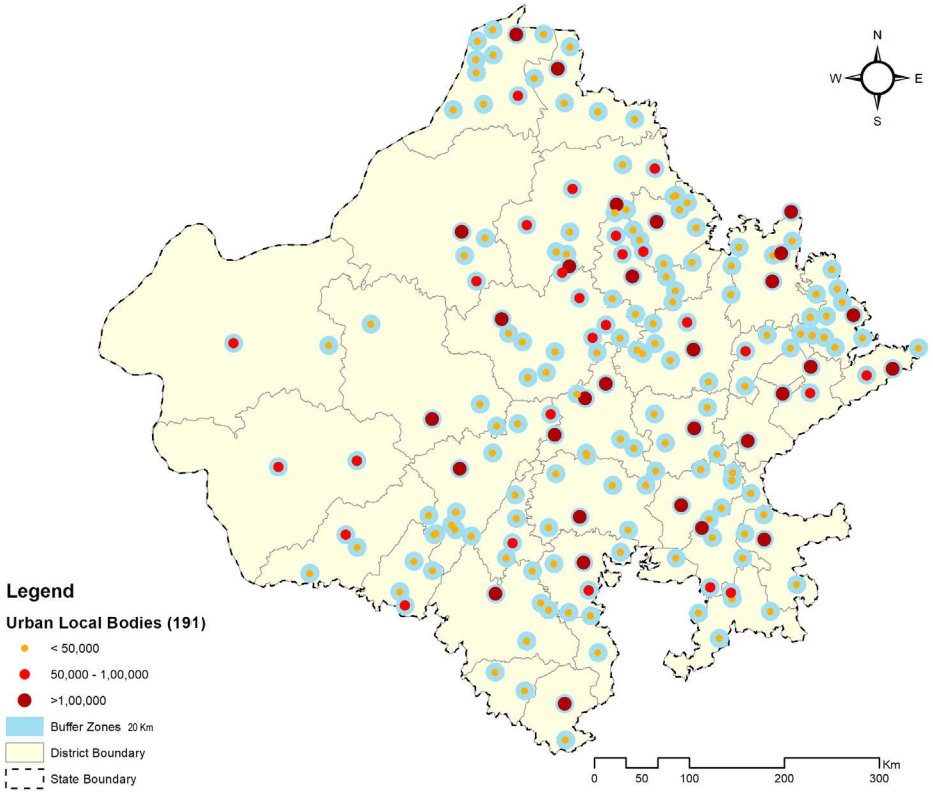


Map A.1: Map showing population of all Local Bodies of Rajasthan

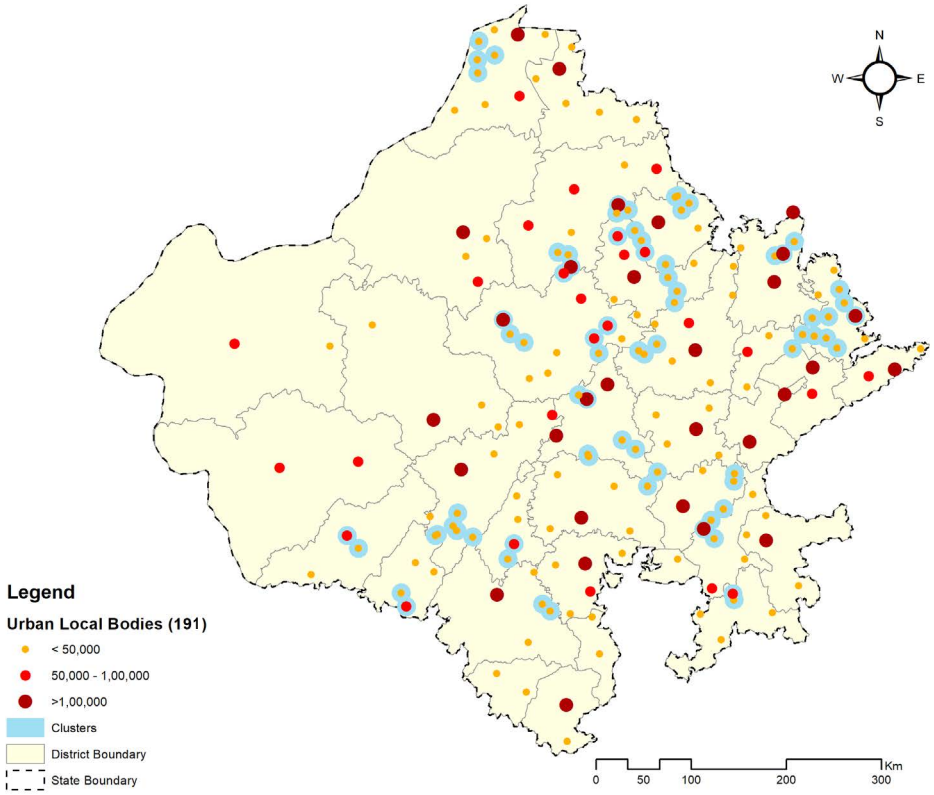




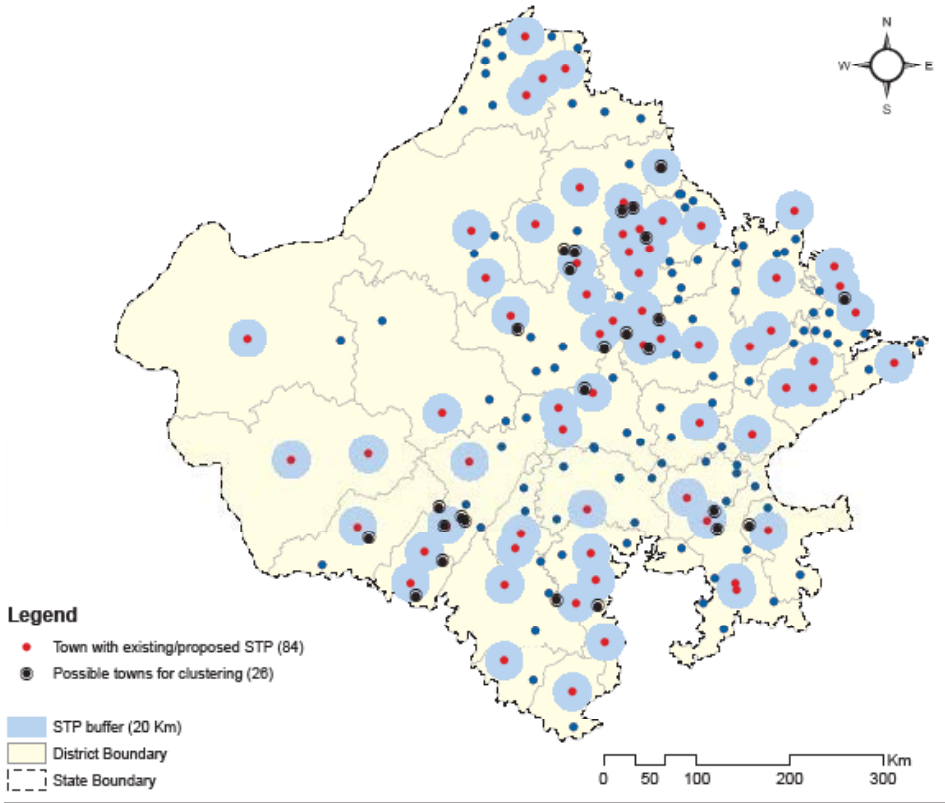
Map A.2: Illustrative Buffer map of all the local bodies of Rajasthan



Map A.3: Map of Possible cluster in Rajasthan



Map A.4: Possible inclusion of town with neighboring treatment facility - Cluster formation



Site selection for setting the dedicated plants for treatment faecal sludge is important for optimizing the distance require for desludging operation in a city. ULBs need to identify the land for FSTP on following parameters:

**Land availability:** Land identification and allotment should be given priority in the city wide FSSM planning. FSTP should be adjacent to Solid waste Disposal site to facilitate the possibility of co-composting. In case it is not feasible to combine with solid waste site, ULBs need to identify the suitable land banks to set FSTP. Land should be adequate for current and future requirement.

**Topography of Site:** Preference should be given to site with natural slope where gravitation flow can be utilize to reduce the pumping cost.

**Distance of Site from center of City:** Site should be located such that distance of center of city to FSTP site can be optimize, it will allow to reduce the trip length of desludging equipment. Site located far from city center usually results in more fuel costs to public and private operator which reduces the profit margin.

**Road Connectivity:** Site should have accessibility from road, in absence of road connectivity overall cost of plant increases due to construction of approach road.

**Reliability of Electricity:** Treatment technology which either needs pumping or mechanical parts need regular supply of electricity. In case of fluctuations, it may increase the treatment time and effect optimal performance of plant. Provision of Solar power should be considered in such cases.

**Nearby habitation:** A treatment plant, depending of technology can generate nuisance, especially bad odors. Plant should be located to an appropriate distance from the residential areas.

**Geological Parameters:** Assessment of existing geological conditions on site like groundwater table, type of soil, prone of flooding is always recommended for the selection of better technology option.

Table A.10: Site Selection for FSTP

S.No.	Description	Proposed Treatment Site- 1		Proposed Treatment Site – 2	
1	Land Available for Plant (Sqm.)				
2	Land Ownership	<input type="checkbox"/> Public (ULB) <input type="checkbox"/> Public (Other) <input type="checkbox"/> Private		<input type="checkbox"/> Public (ULB) <input type="checkbox"/> Public (Other) <input type="checkbox"/> Private	
3	Enough land available for future expansion at proposed site	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Distance of existing septage disposal site from (Km)				
5	Distance of SWM treatment or disposal facility from (Km)				
6	Type of SWM treatment facility				
7	Average distance and duration of emptying trip to site	Distance (Km) .....	Time (Min) .....	Distance (Km) .....	Time (Min) .....
8	Electricity availability	<input type="checkbox"/> Yes <input type="checkbox"/> No  If No, then nearest availability (in Km) .....		<input type="checkbox"/> Yes <input type="checkbox"/> No  If No, then nearest availability (in Km) .....	
9	Nearby Habitation (meters)				
10	Water Table (Meters)				
11	Soil Type				
12	Availability of Large Drain	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
13	Prone to flooding	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	

## ELIGIBILITY CRITERIA FOR LICENSING OF DESLUDGING OPERATORS

The eligibility criteria have been classified into three broad categories, namely:

**Technical Criteria** – Pertains to equipment quality, specification and condition.

- ➔ Leak-Proof equipment – photographic evidence and random inspection – drive system (tractor specifications - engine, chassis, etc.), pump, hose, pipe, seals, tank, trailer chassis, etc.
- ➔ Proof of vehicle maintenance in the last one-year
- ➔ Adequate inspection equipment (such as sight gauge) and a well-stocked toolbox
- ➔ Submission of detailed vehicle & equipment specification

Table A.11: Technical Specification of De-sludging Equipment

Sl. No.	Components	Description	Remarks
1	Type		
1.1	Tank Capacity		
1.2	Construction		
1.3	Material		
1.4	Vacuum pump		
1.5	Suction Hose (length)		
1.6	ISO Certified Company		
2	Truck/Tractor Chassis		
2.1	Max Power		
2.2	Manufactured by		

**Administrative Criteria** – Pertains to statutory and regulatory stipulations.

- ➔ Name and identify of the owner, driver and helper – Minimum two personnel per vehicle
- ➔ Proof of ownership – Vehicle Registration (Commercial), Bills for equipment, insurance, etc.
- ➔ Up-to-date P.U.C Certificate
- ➔ Vehicle Fitness Certificate
- ➔ Driver to have a valid driver's license (LMV – TR)
- ➔ Certification after attending short-term course/training session on proper de-sludging operations as per operative manual

**Health & Safety Criteria** – Pertains to hygiene and safety.

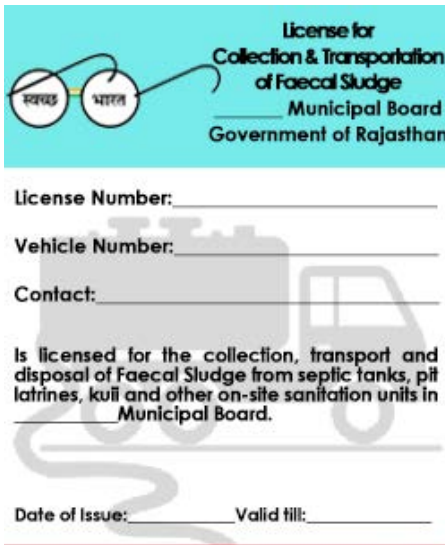
- ➔ First-Aid/Medical Kit on every vehicle; Anti-septic Soap on the vehicle and at the designated parking/ office.
- ➔ Proper Safety Equipment – Safety goggles or glasses with side splash protection; Dust mask that fits over nose and mouth; Clean rubber gloves; Dedicated uniform with apron; Work boots; Battery operated torch.
- ➔ Health & Life insurance of truck operators(driver) and helper for minimum of 2 lakhs yearly limit including the death compensation limit of 10 Lakhs.

The criteria underlined are suggested as mandatory while others can be incrementally fulfilled over a period of 12 to 24 months, monitored during periodic review by the ULB.

### LICENSE KIT

A license kit should be part of registration process of desludging operators. The kit will comprise of following:

1. License: A License for Collection & Transportation of Faecal Sludge from septic tanks, pit latrines, kui and other on-site sanitation units in ULB, will be provided to all authorized operators, in accordance with all terms & conditions of the State FSSM Guidelines, by ULB.



**License for  
Collection & Transportation  
of Faecal Sludge**  
\_\_\_\_\_ Municipal Board  
Government of Rajasthan

स्वच्छता भारत

License Number: \_\_\_\_\_

Vehicle Number: \_\_\_\_\_

Contact: \_\_\_\_\_

Is licensed for the collection, transport and disposal of Faecal Sludge from septic tanks, pit latrines, kui and other on-site sanitation units in \_\_\_\_\_ Municipal Board.

Date of Issue: \_\_\_\_\_ Valid till: \_\_\_\_\_



Contract No.  
xxxxxxxx



This license is issued in accordance with all terms & conditions of the Faecal Sludge Management Regulations of \_\_\_\_\_ Municipal Board.

The license may be suspended or revoked for condition of non-compliance and is not transferable.

If found, kindly return to office of:  
Municipal Mandal, Phulera.

Licensor

Licensee

एक कदम स्वच्छता की ओर

2. First-aid kit: A first aid kit contents include elastic bandages, antiseptic wipes, gauze pads, antibiotic ointment, ice packs, compresses, pain relievers, an instructional first aid guide, and more.



3. Safety Gear: These includes protective gear for workers including rubber gloves, rubber boots, face mask, safety belt, uniform with apron, helmet, eye protection glasses, torch and anti-septic soap.





1. Health Insurance for workers: Considering the unsafe handling of waste and unskilled man power involved in this entire operation leads to various accidental and critical health issues, the health insurance for the workers will hence ensure security and provide claims up to INR 2 lakh.



2. GPS for live vehicle tracking: This device will be used to track the vehicle's movements, stoppages, intervals, live location and distance and to determine the time required to reach a location from another. There are various data tracking software available for smartphones with GPS capability.



Table A.12: General Standards for Discharge of Environmental Pollutants

S. No.	Parameter	Inland surface water	Public sewers	Land for irrigation
1	Suspended solids mg/l, max.	100	600	200
2	Particle size of suspended solids	shall pass 850 microns IS Sieve	-	-
3	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
4	Temperature	shall not exceed 5 °C above the receiving water temperature		
5	Oil and grease, mg/l max,	10	20	10
6	Total residual chlorine, mg/l max	1	-	-
7	Ammonical nitrogen (as N),mg/l, max.	50	50	-
8	Total kjeldahl nitrogen (as N);mg/l, max. mg/l, max.	100	-	-
9	Free ammonia (as NH <sub>3</sub> ), mg/l,max.	5	-	-
10	Biochemical oxygen demand (3 days at 27°C), mg/l, max.	30	350	100
11	Chemical oxygen demand, mg/l, max.	250	-	-
12	Arsenic (as As).	0.2	0.2	0.2
13	Mercury (As Hg), mg/l, max.	0.01	0.01	-
14	Lead (as Pb) mg/l, max	0.1	1	-
15	Cadmium (as Cd) mg/l, max	2	1	-
16	Hexavalent chromium (as Cr + 6),mg/l, max.	0.1	2	-
17	Total chromium (as Cr) mg/l, max.	2	2	-
18	Copper (as Cu) mg/l, max.	3	3	-
19	Zinc (as Zn) mg/l, max.	5	15	-
20	Selenium (as Se)	0.05	0.05	-
21	Nickel (as Ni) mg/l, max.	3	3	-
22	Cyanide (as CN) mg/l, max.	0.2	2	0.2
23	Fluoride (as F) mg/l, max.	2	15	-
24	Dissolved phos- phates (as P),mg/l, max.	5	-	-

S. No.	Parameter	Inland surface water	Public sewers	Land for irrigation
25	Sulphide (as S) mg/l, max.	2	-	-
26	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH) mg/l, max.	1	5	-
27	Radioactive materials:			
	(a) Alpha emitters micro curie mg/l, max.	10-7	10-7	10-8
	(b) Beta emitter micro curie mg/l	10-6	10-6	10-7
28	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
29	Manganese	2 mg/l	2 mg/l	-
30	Iron (as Fe)	3mg/l	3mg/l	-
31	Vanadium (as V)	0.2mg/l	0.2mg/l	-
32	Nitrate Nitrogen	10 mg/l	-	-

**Revised Effluent discharge standards set by MOEF & CC 2017**  
**MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFICATION**  
**New Delhi, the 13th October, 2017**

G.S.R. 1265(E).—In exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely:- 1. Short title and commencement.—(1) These rules may be called the Environment (Protection) Amendment Rules, 2017. (2) They shall come into force on the date of their publication in the Official Gazette. 2. In the Environment (Protection) Rules, 1986, in Schedule – I, after serial number 104 and the entries relating thereto, the following serial number and entries shall be inserted, namely: —

Sl. No.	Industry	Parameters	Standards	
Effluent discharge standards (applicable to all mode of disposal)				
"105	Sewage Treatment Plants (STPs)		Location	
			Concentration not to exceed	
			A	
			B	
		pH	Anywhere in the country	6.5-9.0
		Bio-Chemical Oxygen Demand (BOD)	Metro Cities*, all State Capitals except in the State of Arunachal Pradesh, Assam, Manipur, Meghalaya Mizoram, Nagaland, Tripura Sikkim, Himachal Pradesh, Uttarakhand, Jammu and Kashmir, and Union territory of Andaman and Nicobar Islands, Dadar and Nagar Haveli Daman and Diu and Lakshadweep	20
			Areas/regions other than mentioned above	30
Total Suspended Solids (TSS)	Metro Cities*, all State Capitals except in the State of Arunachal Pradesh, Assam, Manipur, Meghalaya Mizoram, Nagaland, Tripura Sikkim, Himachal Pradesh, Uttarakhand, Jammu and Kashmir and Union territory of Andaman and Nicobar Islands, Dadar and Nagar Haveli Daman and Diu and Lakshadweep	<50		
	Areas/regions other than mentioned above	<100		
Fecal Coliform (FC) (Most Probable Number per 100 milliliter, MPN/100ml)	Anywhere in the country	<1000		
*Metro Cities are Mumbai, Delhi, Kolkata, Chennai, Bengaluru, Hyderabad, Ahmedabad and Pune.				

Note :
(i) All values in mg/l except for pH and Fecal Coliform.
(ii) These standards shall be applicable for discharge into water bodies as well as for land disposal/applications.
(iii) The standards for Fecal Coliform shall not apply in respect of use of treated effluent for industrial purposes.
(iv) These Standards shall apply to all STPs to be commissioned on or after the 1st June, 2019 and the old/existing STPs shall achieve these standards within a period of five years from date of publication of this notification in the Official Gazette.
(v) In case of discharge of treated effluent into sea, it shall be through proper marine outfall and the existing shore discharge shall be converted to marine outfalls, and in cases where the marine outfall provides a minimum initial dilution of 150 times at the point of discharge and a minimum dilution of 1500 times at a point 100 meters away from discharge point, then, the existing norms shall apply as specified in the general discharge standards.
(vi) Reuse/Recycling of treated effluent shall be encouraged and in cases where part of the treated effluent is reused and recycled involving possibility of human contact, standards as specified above shall apply.
Central Pollution Control Board/State Pollution Control Boards/Pollution Control Committees may issue more stringent norms taking account to local condition under section 5 of the Environment (Protection) Act, 1986".

**Table A.13: Treated Bio-solids characteristics for Fertilizer application:**

Parameters		Characteristics
Class A Bio-solids of US EPA (either)	A Faecal coliform density	< 1000 MPN/g
	Solmonella Sp. Density	< 3MPN per 4 g
Class B Bio-solids of US EPA	A faecal coliform density	<2,000,000 MPN/g
WHO 2006	Helminth egg concentration	< 1 per gram total solids
	E-coli	1000 /g total solids

## Co-Treatment of Faecal Sludge in STP's

Co-treatment is a common method for septage treatment with Sewerage Treatment Plants. A sewage treatment plant (STP) is often located at a convenient and an environmentally friendly location. This treatment plant could be utilized for septage disposal and treatment. The existing STP's in the towns can be modified and proposed to be redesigned to receive and treat septage effectively along with sewage. Addition of septage, however, can have a significant impact on plant operations or performance, primarily on primary units of STP, if receiving facilities are not properly designed or not having adequate reserve capacity to take extra load. Septage increases plant operation and maintenance (O & M) costs. However, if effectively designed during the planning stage of the plant, it would not cause any effect to the plant operation and performance could be achieved.

### 1. Estimating plant capacity

Determining the ability of an existing plant to handle additional septage and estimating the amount of material that can be effectively handled are complex processes. The lists the potential impacts of septage addition to a STP are as below.

Impact of Septage addition in STP above a threshold limit it becomes critical, if it's capacity (with respect to hydraulic load and organic load) is not augmented or modified to take septage load.

- Increased volume of screenings and grit requiring disposal
- Increased order emissions from head works
- Scum accumulation in clarifiers
- Increased organic loadings to the biological process
- Potential order and foaming problem in aerated basins
- Increased loading to sludge handling process
- Increased sludge volume requiring final disposal
- Increased housekeeping requirements

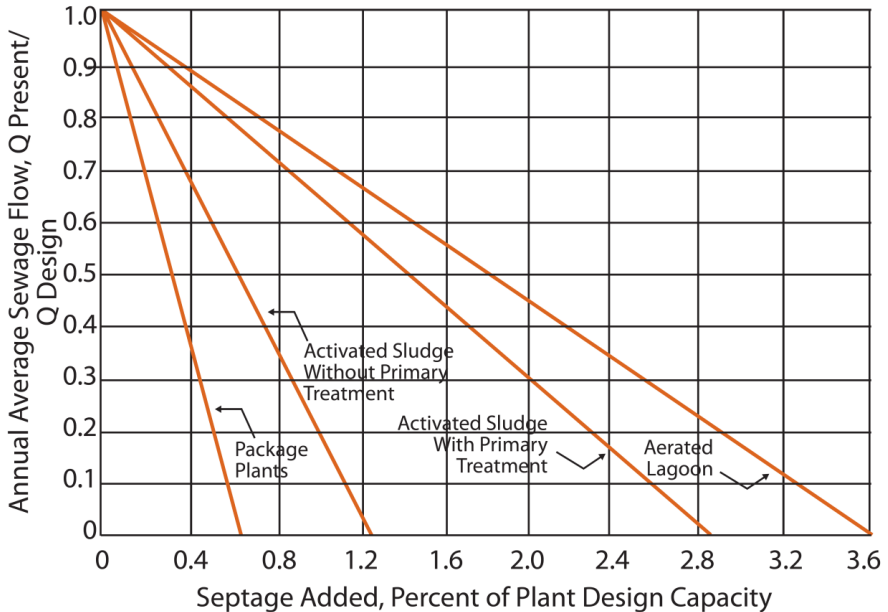
These will create difficulty in functioning of STPs and could not achieve performance standards.

In absence of primary information's and data, Figure below provides a method to estimate the allowable rates of septage addition, assuming that a holding tank is provided and that septage is added to the sewage flow on a semi-continuous basis (or in batch flow basis) in the primary units. This holding tank will absorb surge load of septage and it should be designed to have a homogeneous character with adequate detention time and mechanical arrangement or effluent recirculation, if necessary. In absence of specific primary information, the chart, given below, takes into account the current loadings to the plant compared with its design loadings. Package plants that do not employ adequate flexibility in primary treatment are the least amenable to septage handling. Also, septage can be dispose to manholes with appropriate modification; ULBs need to ensure that dumping happens only to predetermine manhole in well recorded manner. In all cases, allowable septage volume is influenced by septage characteristics, treatment plant operations, and sewage flow patterns. A factor of safety should be included in establishing allowable septage volumes.

If septage is added to the solids handling train, allowable loadings must be estimated based on site-specific information and will vary depending on both the existing solids handling processes used at the plant and their design capacity. First, information on current process versus design of hydraulic and design loading parameters (solid and organic) must be studied

and compiled for those respective processes that will be employed to co-treat septage-sludge mixtures. Such processes may include thickening, aerobic or anaerobic digestion, dewatering, chemical stabilization and composting. Then, conservative estimates of the volumes of septage that could be processed without exceeding the design capacity of each unit process can be developed.

Figure A.4: Allowable septage loadings to a sewage treatment plant having septage-holding tank (U.S. EPA, 1984)



## 2. Present proposal

The present study is aimed to scientifically dispose the faecal sludge generated from household level in the city to the existing sewage treatment plant. Considering that State/ULB's is planning for construction of sewerage network in future for the entire town, it is important that until such services are in operation, an alternative arrangement shall be in place. State FSSM Cell/ULB's will undertake technical feasibility study of the all STPs in the town and will identify their ability to take septage load. In this context, a guiding document called Technical Feasibility Guideline will be prepared by Sanitation Cell/ULB/DLB/RUIDP, which shall consist of general guidelines as well as a Field and Desk survey form. Data of the existing STPs will be collected and the septage load will be calculated with use of the graph, in absence of primary data, as shown in above Figure.

It has been experienced that in most of the towns a few pockets of the town are always being left out and devoid of getting direct connection to the sewerage system. This is due to unfavorable topographical condition, congested road network with narrow roads, inadequate funds, non-availability of land required for lift pumping station. These pockets need to be served by septage management solution with treatment process as co-treatment with STP

With the available information, a Detailed Project Report will be prepared, which will discuss the demand estimation, CAPEX, OPEX, recovery of O&M cost, VTO market size, environment friendly effluent disposal mechanism and implementation framework to carry out the up-gradation work of selective Sewage Treatment Plant (STP).

It is prudent, however, to develop realistic site-specific estimates before undertaking co-treatment at the STP. The first step is to understand the details of the STP including its operational performance. Key factors to be kept in mind are the characteristics of sewage arriving at the STP for treatment, spare capacity of the STP, technology and treatment process employed by the STP, and the sewage diurnal flow patterns as well as the difference in seasonal flows. The critical variables should be considered when planning to co-treat wastewater and faecal sludge, viz. organic loading rate, solids load and ammonium/ammonia nitrogen concentration, solid accumulation.

Septage contains more concentration of coliform than waste sewage water, which hampers normal functioning of microbes and bacteria that works efficiently in STP. So it is recommended to reduce coliform load by perchlorinating in holding tank and maintain a definite favorable pH before promoting for co-treatment. Additionally a recirculation system of a part of effluent liquid in holding tank could also enhance efficiency of co-treatment.

### 3. Dimensions of Application

There are 4 dimensions of application of Co-Treatment with STP for septage solution –

- (i) Existing STP which had not been designed to take load of additional sanitation coverage;
- (ii) Existing STP which had been designed to take load of 100% sanitation coverage, but selective pockets could not be connected due to practical problems;
- (iii) Proposal of STP to take load of sewage and septage, and
- (iv) Existing STP which is not getting organic load as designed due to which it is vulnerable to mal-functioning.

In the first case where existing STP had not been designed without considering additional load of septage, overall redesign is required. If septage load (in kg per day) is about 10-18% not more than 10-18% of sewage load measured over an extended time of at least 24 hours, the existing STP could be utilized with minor modification. If septage organic load is more than overall rehabilitation of STP is required.

In the second dimension, existing STP had been designed to take load of 100% sanitation coverage. But due to practical problems selective pockets could not be connected. In this case there is no requirement of substantial design work in STP. As septage of few selected pockets will be added in the treatment system as surge, the primary unit, mainly holding tank, could be modified to solve the problem.

In the third dimension, proposed STP has to be designed to take care of respective load of septage. It is not an issue. It will be designed from scratch and all considerations could be taken care right at the design level. Land could be selected accordingly.



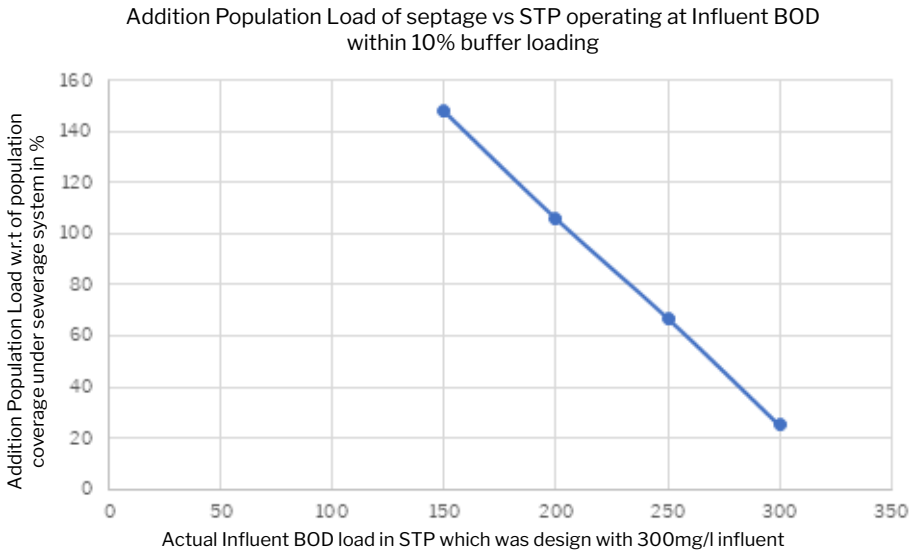
The fourth case is most common in India. STPs are designed at a specified organic load. But due to non-availability of adequate organic load (the reasons are not under purview of this note). The STPs go into endogenous phase and start malfunctioning. In this case to additional organic load, septage should be added to revive the system.

Normally STPs are designed to take overload of 10-20% depending on designer and requirement of end user, i.e. ULB. In this co-treatment process this provision of overload kept within design philosophy could be utilized to take additional septage, even if the STP was not designed for the same. A sample calculation is shown in the following table.

**Table A.14: Sample Calculation for STP Loading**

Population served with sewer network	100000	100000	100000	100000	nos.
Rate of Wastewater generation	108	108	108	108	lit/day
Wastewater generated	10800	10800	10800	10800	m <sup>3</sup> /day
Influent BoD of waste to STP	300	250	200	150	mg/l
Organic load	3240	2700	2160	1620	kg/day
Additional population served by septage	25	67	106	148	%
Population served with Septage management	25000	67000	106000	148000	nos.
Household size	5	5	5	5	nos/HH
No. of septic tank	5000	13400	21200	29600	nos.
Size of each septic tank	2	2	2	2	m <sup>3</sup>
Total volume to be cleaned	10000	26800	42400	59200	m <sup>3</sup>
Cleaning interval	730	730	730	730	days
Volume to be cleaned in each day	14	37	58	81	m <sup>3</sup> /day
Cleaning operation days	300	300	300	300	days/yr
Peak volume of cleaning	17	45	71	99	m <sup>3</sup> /day
Influent BoD of septage	20000	20000	20000	20000	mg/l
Organic load	333	893	1413	1973	kg/day
From mass balance,					
Total population	125000	167000	206000	248000	nos.
Total Organic load at influent of STP	3573	3593	3573	3593	kg/day
Total waste volume	10817	10845	10871	10898.7	m <sup>3</sup> /day
Average influent BoD	330	331	329	330	mg/l
% of increase w.r.t. wastewater	10	10	10	10	%

Figure A.5: Addition Population Load of Septage vs Operation



#### 4. Operation and maintenance

There are several important factors to be considered while planning co-treatment of faecal sludge with the existing sewage treatment plant or by setting up a new Faecal Sludge Treatment Plant (FSTP) which has direct impact on O & M and monitoring. Since O & M aspects are important for overall long-term success of the programme, O & M planning, including the financial provision of funds should be included in the terms of references (ToR) for designing such facilities. Furthermore, O & M should be reviewed and approved along with engineering designs and specifications by including operation and maintenance cost. Extent of O&M activities will depend of which dimension of problem the proposal will fall on. The following points should be kept in mind for developing such a facility;

- Location of disposal sites and its proximity to the residential areas.
- Volume and schedule of FS collection.
- Degree of mechanization of technologies.
- Final end use or disposal of end product.
- Recovering the money by the way of user charges.
- Running it on PPP mechanism and charging the household with a septage tax or on number of trips made by vacuum trucks.

### Technology for Primary Treatment (Solid Liquid Separation)

The technologies used for primary treatment are unplanted drying bed (UDB), planted drying bed (PDB), anaerobic digester (AD), centrifugation, settling and thickening tank (S&T), Imhoff tank (IT), anaerobic baffled reactor (ABR), belt filter press (BFP) and geobags. The following table shows a comparison of the above mentioned technologies and a decision making matrix for the same.

Table A.15: General Description of Primary Treatments

Treatment Option	Properties	Advantages	Disadvantages
UDB	Solid-liquid separation as well as treatment of solid-liquid part.	<ul style="list-style-type: none"> <li>-Ease of Operation and low cost.</li> <li>-Good dewatering efficiency, especially in dry and hot climates</li> <li>-Skill and energy is not required</li> </ul>	<ul style="list-style-type: none"> <li>-High Land Requirement</li> <li>-Odors and flies are normally noticeable.</li> <li>-Limited reduction of pathogens</li> <li>-Liquid part requires further treatment</li> </ul>
PDB	Solid liquid separation as well as stabilization of solids.	<ul style="list-style-type: none"> <li>-It can handle loading</li> <li>-Sludge treatment is better than that in unplanted drying beds</li> <li>-Easy to operate</li> <li>-Low CAPEX and OPEX</li> <li>-Energy is not required</li> <li>-Plants and fruits can be grown in PDBs.</li> </ul>	<ul style="list-style-type: none"> <li>-High Land requirement</li> <li>-Odors and flies may be noticeable.</li> <li>-Liquid part required further treatment.</li> <li>-Only applicable during dry seasons, or needs a roof and contour bund.</li> </ul>
Ad/UASB[1] Reactor	Stabilization of sludge by anaerobic digestion	<ul style="list-style-type: none"> <li>-High reduction of BOD.</li> <li>-It can handle high organic and hydraulic loading rates.</li> <li>-Low sludge production.</li> <li>-Biogas can be used for energy</li> </ul>	<ul style="list-style-type: none"> <li>-Required skilled personnel; difficult to maintain.</li> <li>-Needs consistent quantity and quality of input sludge for good performance.</li> <li>-Usually UASB is used in the co-treatment of waste water and sludge.</li> <li>-Start-up time is long.</li> <li>-A constant source of electricity is required to operate the UASB reactor.</li> <li>-High O&amp;M cost and complexity.</li> <li>-All components of a UASB reactor are not easily available.</li> <li>-Sludge removed from a UASB reactor may need thickening before disposal.</li> </ul>

[1] Upflow anaerobic Sludge Blanket Digestion

Treatment Option	Properties	Advantages	Disadvantages
Centrifugation	Dewatering of faecal sludge using centrifuge	<ul style="list-style-type: none"> <li>-It is an enclosed system.</li> <li>-It controls odor and moisture.</li> <li>-Land availability is not a constraint.</li> </ul>	<ul style="list-style-type: none"> <li>-It requires high electricity for operation.</li> <li>-The centrifugation machine is expensive and internal parts are subject to abrasive wear.</li> </ul>
Settling and thickening tank	Solid-liquid separation as well as treatment of solid-liquid part	<ul style="list-style-type: none"> <li>-Relatively robust and resilient</li> </ul>	<ul style="list-style-type: none"> <li>-Sludge and effluent require further treatment. The end products of settling tanks cannot be discharged into water bodies or directly used in agriculture.</li> <li>-Low reduction of pathogens.</li> </ul>
Imhoff tank	Solid and liquid separation of faecal sludge using gravity settling.	<ul style="list-style-type: none"> <li>-Solid Liquid separation and sludge stabilization are combined in one single unit.</li> <li>-It can handle high organic load.</li> <li>-Less land required.</li> <li>-Low operating cost.</li> </ul>	<ul style="list-style-type: none"> <li>-Infrastructure is deep; depth may be a problem in case of a high groundwater table.</li> <li>-Requires a skilled operator.</li> <li>-Low reduction of pathogens.</li> <li>-Effluent, sludge and scum require further treatment before disposal</li> </ul>
Anaerobic baffle reactor	Anaerobic stabilization of faecal sludge	<ul style="list-style-type: none"> <li>-Energy is not required.</li> <li>-It can handle high organic load.</li> <li>-Low operating costs, moderate capital.</li> <li>-Service life is long.</li> <li>-High reduction of BOD.</li> <li>-Sludge production is low.</li> <li>-Land requirement is medium</li> </ul>	<ul style="list-style-type: none"> <li>-Requires skilled designers and laborers.</li> <li>-Sludge and effluent require further treatment.</li> <li>-Pathogen reduction is low.</li> </ul>

Treatment Option	Properties	Advantages	Disadvantages
Belt filter press	Dewatering of faecal sludge using belt press	-Good dewatering capacity	-Difficulty in controlling odors. -Skills required -Capital costs are high -Operating costs are high (Costs can be higher if a polymer is used.) -Sludge and effluent need further treatment
Geobags	Solid Liquid Separation using geo bags	-Requires minimal equipment -Economical option -No complicated procedure or parts. -Can run at all times with minimal labour.	-May need a pump for filling. -Space for storage over long periods. -Dried sludge before disposal must be solar dried to ensure pathogen/helminth eradication.

Table A.16: Decision making matrix for primary treatment (Solid liquid separation) of sludge

Technology	Land Requirement	Energy Requirement	Ground water Level	CAPEX	OPEX	Skill	Discharge Standard
UDB	High	Low	Low	Low	Low	Low	Medium
PDB	High	Low	Low	Low	Low	Low	Medium
AD	Low	Low	Low	Medium	Medium	High	High
Centrifugation	Low	Medium	Low	High	High	Medium	Low
S&T	Low	Medium	Low	Low	Low	Medium	Medium
IT	Low	Low	High	Medium	Low	High	Medium
ABR	Medium	Low	Low	Medium	Low	High	Medium
BFP	Low	Medium	Low	Medium	Medium	High	Low
Geobags	High	Low	Low	Medium	Medium	Low	Low

## Technology for Effluent Treatment

A liquid part would be produced after primary treatment. This is a partially treated liquid, which needs further treatment before disposal. The technologies used for effluent (liquid) treatment are waste stabilization ponds (WSP), activated sludge process (ASP), sequence batch reactor (SBR), membrane bioreactors (MBRs), anaerobic filter (AF), anaerobic baffled reactor (ABR) and constructed wetland (CW).

Table A.17: General Description of Effluent Treatments

Treatment Option	Properties	Advantages	Disadvantages
Waste stabilization pond (WSP)	Natural process with usually three tanks for maturation, facultative and aerobic treatment.	<ul style="list-style-type: none"> <li>-High reduction of BOD, suspended solids and pathogens.</li> <li>-High removal of nutrients when it is combined with aquaculture.</li> <li>-Energy is not required except for pumping.</li> <li>-No real problems with odor and flies if designed and maintained correctly.</li> <li>-Low OPEX (drying bed would need manual removal of dried sludge cake. Once in 10 years, the pond would have to be deslugged and the sludge disposed. This could mean a significant cost)</li> </ul>	<ul style="list-style-type: none"> <li>-Requires a large land area.</li> <li>-High capital costs depending on the price of land.</li> <li>-Requires skilled personnel.</li> </ul>
Activated sludge process (ASP)	Aerobic method for treatment of effluent, using aerators.	<ul style="list-style-type: none"> <li>-Efficient removal of BOD and pathogens.</li> <li>-High nutrient removal possible.</li> <li>-High quality of effluent produced.</li> <li>-Less land is required compared with an extensive natural system (Eg. Waste stabilization ponds, constructed wetland, unplanted/planted drying bed, etc.)</li> <li>-This machine can be modified to meet specific discharge limits.</li> </ul>	<ul style="list-style-type: none"> <li>-High CAPEX and OPEX</li> <li>-Constant energy supply is required, high energy consumption.</li> <li>-Prone to complicated chemical and microbiological problems.</li> <li>-Requires skilled personnel.</li> </ul>

Treatment Option	Properties	Advantages	Disadvantages
Sequential batch reactor (SBR)	Batch process, similar in concept to ASP	<ul style="list-style-type: none"> <li>-Requirement of land is low.</li> <li>-Effluent quality is high.</li> <li>-It can handle high organic load.</li> <li>-SBR can be modified to meet specific discharge limits.</li> </ul>	<ul style="list-style-type: none"> <li>-High CAPEX and OPEX.</li> <li>-Constant energy supply is required, high energy consumption.</li> <li>-Prone to complicated chemical and microbiological problems</li> <li>-Requires skilled personnel.</li> </ul>
Membrane bio reactors (MBR)	It is a combinational treatment process using aerobic and membrane based treatment	<ul style="list-style-type: none"> <li>-This operates at higher volumetric loading rates.</li> <li>-High removal efficiency of BOD, TSS, etc.</li> <li>-Less land required</li> <li>-No equalization of hydraulic and organic loadings required</li> </ul>	<ul style="list-style-type: none"> <li>-Fouling problems is noticeable on the membrane surface.</li> <li>-Complex process.</li> <li>-High CAPEX and OPEX</li> <li>-Energy intensive process</li> </ul>
Constructed wetland (CW)	Natural process, uses certain species of plants to absorb and treat the effluent.	<ul style="list-style-type: none"> <li>-It is cheaper to operate than other treatment systems.</li> <li>-Energy is not required because the wetland is entirely gravity operated.</li> <li>-Low CAPEX and OPEX.</li> <li>-It provides an environment for a wide range of native animals.</li> </ul>	<ul style="list-style-type: none"> <li>-High land requirement</li> <li>-Labor is required for sludge removal.</li> <li>-Pathogen reduction is low.</li> </ul>
Anaerobic filter(AF)	Anaerobic filtration of effluent.	<ul style="list-style-type: none"> <li>-It is resistant to hydraulic shocks.</li> <li>-Energy is not required.</li> <li>-Higher reduction of BOD and TSS</li> <li>-It can be built with local materials.</li> <li>-Moderate CAPEX and OPEX</li> <li>-Sludge removal frequency is low.</li> </ul>	<ul style="list-style-type: none"> <li>-Lower reduction pf pathogens.</li> <li>-Requires skilled designers and laborers.</li> <li>-Clogging of filter material possible.</li> <li>-Cleaning of AF material is tedious.</li> <li>-The treated liquid requires further tertiary treatment.</li> </ul>

Table A.18: Decision making Matrix for effluent treatment

Technology	Land Requirement	Energy Requirement	Ground water Level	CAPEX	OPEX	Skill	Discharge Standard
WSP	High	Low	Low	Medium	Low	Medium	High
ASP	Low	High	Low	High	High	High	High
SBR	Low	High	Low	High	High	High	High
MBR	Low	High	Low	High	High	High	High
ABR + CW	High	Low	Low	High	Low	High	High
CW	High	Low	Low	High	Low	High	High
AF	Low	Low	High	Medium	Low	Medium	Medium

### Technology for Sludge Treatment

A solid part would be produced after primary treatment. This is partially treated solid, which needs further treatment before disposal. The technologies used for sludge treatment are composting, vermicomposting, deep row entrenchment, shallow trenches, solar drying, solar sludge over, lime stabilization and sludge drying bed.

Table A.19: Technology for Sludge Treatment

Treatment Option	Properties	Advantages	Disadvantages
Co-composting	Solids from the faecal sludge is composted with organic solid waste	-High pathogen reduction -Output of co-composting is a good soil conditioner	-Requires technical and managerial skills for operation of the co-composting plant and for generating a safe \ product with value.
Vermi-composting	Solids from faecal sludge are composted using worms which aid composting and increase the value of the end product	-Pathogen inactivation is good. -End product generated from vermicomposting is a good soil conditioner.	-Requires technical and managerial skills for operation of the vermicomposting plant and for generating a safe product with value. -Worms are liable to be affected by toxic components. -Cost is higher than co-composting.



Treatment Option	Properties	Advantages	Disadvantages
Sludge Drying Bed + Co-composting	Solids are dewatered by drying in sludge drying beds and is further co-composted along with organic municipal solid waste	<ul style="list-style-type: none"> <li>-Easy to operate</li> <li>-Energy is not required.</li> <li>-End product can be used as a fertilizer.</li> <li>-Water amount of sludge is reduced</li> </ul>	<ul style="list-style-type: none"> <li>-Requires stabilized sludge to reduce nuisance and odors.</li> <li>-High land requirement.</li> <li>-Blockage of same bed.</li> <li>-Only applicable during dry seasons.</li> </ul>
Solar Drying	Solids are dewatered in a controlled environment to regulate temperature and humidity.	<ul style="list-style-type: none"> <li>-Low energy requirements.</li> <li>-Low investment costs.</li> <li>-High potential dewatering efficiency</li> </ul>	<ul style="list-style-type: none"> <li>-High space requirements.</li> <li>-Skilled staff is required</li> </ul>
Deep Row entrenchment	Dewatered faecal sludge is disposed in deep trenches, which can also be used for agro forestry.	<ul style="list-style-type: none"> <li>-Inexpensive technique</li> <li>-Trees planted on top get many benefits such as extra CO<sub>2</sub> fixation, erosion protection or potential economic benefits.</li> </ul>	<ul style="list-style-type: none"> <li>-It may cause groundwater pollution</li> <li>-High land availability</li> <li>-Potential nuisance to adjacent areas.</li> </ul>

Table A.20: Decision Making Matrix for sludge treatment

Technology	Land Requirement	Energy Requirement	Ground water Level	CAPEX	OPEX	Skill	Discharge Standard
Co-composting	High	Low	Low	High	High	Low	High
Vermi-composting	High	Low	Low	High	High	Low	High
Sludge drying bed + Co-composting	High	Low	Low	High	Medium	Low	High
Solar Drying	High	Low	High	Medium	Medium	Medium	High
Deep Row Entrenchment	High	Low	High	Low	Low	Low	

Compendium of Technology for Desludging Equipment				
Equipment Type	Brief About Technology	Advantages	Disadvantages	O&M Requirement
Vacuum Tankers	Vacuum tankers consist of a truck or any other mobile vehicle combined with a tank and a vacuum pump. They use a de-sludging technology which is characterized by high tank volume, high mobility and fast de-sludging with the help of electricity.	<ul style="list-style-type: none"> <li>- High de-sludging speed</li> <li>- High storage volume</li> <li>- High mobility</li> </ul>	<ul style="list-style-type: none"> <li>- Low access – cannot reach areas with smaller roads</li> <li>- Face problems with trash which choke the inlet</li> <li>- High capital and operating costs</li> <li>- Requires repairs, which can result in long delays</li> </ul>	<ul style="list-style-type: none"> <li>- It is necessary to check the oil level of the vacuum pump, oil-cooling tank, hydraulic tank and tanker engine daily</li> <li>- The cooling water and the wash water from the truck also should be checked</li> <li>- In addition, it is necessary that the cooling radiators for the hydraulic oil and pump oil are kept running. After each day the oil and sludge separators should be drained</li> <li>- The tire pressure, lights, indicators, horns, valves, gaskets and the hydraulic system should be checked weekly</li> </ul>
Omni-Ingestor	The Faecal Sludge Omni-Ingestor is one of the first mobile pre-processing system and can separate solid material from the sludge and hygienically treat it right next to the pit. The FSOI suite of technologies includes pumping, debris extraction, sludge thickening and disinfection sub-systems. This system is innovative in integrating the collection and treatment components at a single stage. Such a system reduces the requirement of transporting sludge to far distances for treatment and disposal.	<ul style="list-style-type: none"> <li>- Integrated solution of handling collection and treatment at point of operation</li> <li>- Can handle different types of sludge viscosity</li> <li>- Pre-processes from the sludge, thereby reducing need for dewatering at treatment plant</li> <li>- Allows for only thickened sludge to be transported, reducing cost of transportation</li> <li>- Provides an opportunity to reuse the sanitized water</li> </ul>	<ul style="list-style-type: none"> <li>- Capital cost is high</li> <li>- Is a complex system and needs skilled manpower for operation and maintenance</li> <li>- Requires chlorine and electricity for operation</li> </ul>	<ul style="list-style-type: none"> <li>- Chlorine has to be replenished as and when required</li> <li>- Pumps and other moving parts need to be lubricated</li> <li>- Trash and heavy particles must be collected and disposed</li> </ul>

**GOVERNMENT OF RAJASTHAN  
ADMINISTRATIVE REFORMS (Gr.3) DEPARTMENT**

No. F 6(4) AR/Gr.3/2017

Dated: 22.02.2017

**Order**

The Cabinet vide their decision (111/2016) has approved 'State Sewerage & Waste Water Policy – 2016' on 2<sup>nd</sup> August, 2016. In pursuance to the Policy, 'State Level Committee' is thereby constituted for effective implementation and to resolve any issue/difficulty in implementation of 'State Sewerage and Waste Water Policy-2016'.

1.	Principal Secretary, LSG, GoR	Chairman
2.	Principal Secretary/ Secretary, PHED, GoR	Member
3.	Managing Director, RIICO or his representative not below the rank of Joint Secretary or equivalent.	Member
4.	Principal Secretary, Agriculture or his representative not below the rank of Joint Secretary or equivalent.	Member
5.	Member Secretary, Rajasthan State Pollution Control Board or or his representative not below the rank of Joint Secretary or equivalent.	Member
6.	Joint Secretary (Finance)GoR	Member
7.	Director, Local Bodies	Member
8.	Executive Director, RUDSICO	Member Secretary

The Administrative Department of the above said committee will be Local Self Government Department. The quorum of the committee shall not be less than 5 members.

**The ToR of the committee will be as follow :-**

1. Overall review of sewerage status & progress monitoring
2. Prepare guidelines, directions and clarifications.
3. Interdepartment coordination

(Dr. Prem Singh Charan)  
Dy. Secretary to Govt.

**Copy for Information and necessary actions:**

1. PS of Hon'ble Minister, LSG and UDH, Rajasthan, Jaipur
2. SDS to Chief Secretary, Rajasthan Jaipur
3. PS of Principal Secretary, LSG, Rajasthan , Jaipur
4. PS to Managing Director, RIICO , Rajasthan , Jaipur
5. PS to Principal Secretary/ Secretary, PHED , Rajasthan , Jaipur
6. PS to Principal Secretary, Agriculture, Rajasthan, Jaipur
7. PS to Member Secretary, Rajasthan State Pollution Control Board, Rajasthan
8. PS to Joint Secretary, Finance, Rajasthan, Jaipur
9. PA to Executive Director RUDSICO, Rajasthan, Jaipur
10. PS to Director, Local Bodies, Rajasthan, Jaipur
11. PD (Urban Infra), RUDSICO, Rajasthan , Jaipur
12. Guard File.

K.K. Khandelwal  
Section Officer

Following are major aspects against which the ULB can assess its capacity to provide the sanitation services in the city. This has been prepared on the lines of 'Service Level Improvement Plan' framework of AMRUT provided by MoHUA. This will assist the ULBs in identifying their capacity gaps and needs of FSSM, and help identifying projects and other related requirements to meet the objectives of sustainable sanitation systems.

City Sanitation cell shall prepare this 'Service Levels Assessment' at the start of each year and review its outcomes, and update targets for the perspective year. State Sanitation Cell shall review these records every year and prepare annual budget and targets for perspective year. State shall disseminate funds and other assistance to the ULBs based on the service level gaps, performance in previous year, identified projects and funding requirements etc.

### 1. Coverage of Sanitation Services

- What kind of baseline information is available related to sewerage/ seepage management in the city? Tick or list down the data, plans, guidelines, manuals, reports etc. in the following table

	Yes/No
Household level sewerage connections/ on- site containment users database	
City FSSM Plan	
City Level Resolutions passed from Municipal Board	
Updated Building Bye-Laws with on- site containments construction designs and drawings	
Service level benchmark status - last year	
Other city level plans and documentation	

- What is the status of household connections in each zone/ ward? Have you correlated your data with census 2011 or with latest census data available? Provide latest information in following table

Zone/ Ward No.	Total No. of Households	HHs with latrine facility within premise	HHs depend- ent upon Community Latrines	HHs with Piped Sewerage Connections	HHs with Sanitary Containment Systems	HHs with Single Pit System
HH: Households						
Are there any areas in the city, which are not connected with sewerage network and inaccessible by desludging vehicles? (Y/N)						
Does the city have any building plan approval mechanism to include on- site containment systems? (Y/N)						
Do the building inspectors check the compliance to approved plan during construction? (Y/N)						

## 2. Collection & Conveyance

- What is the average interval period for cleaning of on- site sanitation systems (in years)?
- Is there any systematic and organized method to collect and treat waste from on-site sanitation systems?

Separate City Level Sanitation wing/cell (Y/N)	
Designated personnel for receiving desludging requests, complaints/ grievances etc. (Y/N)	
Dedicated helpline number for sanitation (Y/N)	
Availability of office equipment- Table, Chair, Computer, Telephone (Y/N)	
Desludging Schedule (Y/N)	
Average No. of Desludging requests per day (or per month)	
Specific Receipt/ Job Card format (Y/N)	
Fixed desludging fee (Rs./ per trip)	

- Indicate infrastructure available for O&M of the sewerage system and septage conveyance i.e. vacuum suction emptier, sewer jetting machines etc.?

Sr. No.	Type of trucks	Capacity (Ltr.)	Condition (Functional/ De-functional)	Ownership status (ULB/ Private)	Operated by (ULB/ Private)

- Indicate human resource available for O&M of the sewerage/ septage maintenance system i.e. driver, helper, plumber etc.?

Sr. No.	Service Category	No. of employees	License/ Registration Status	Type of Operations (ULB/ Private)

- Does the city have dedicated parking, cleaning and washing area for desludging vehicles? State the parking area and capacity.

### 3. Sewage/ Faecal Sludge Treatment System

- Does city have Sewage/ Faecal Sludge Treatment Plant (STP/ FSTP)? Provide details in the following table.

Sr. No.	Location	Type of Technology	Capacity (KLD)	Current Inflow (KLD)	Treatment Efficiency in %	Operated By (ULB/ Private/ Joint)

- Where is the collected sludge disposed in case of no treatment facility?
- How much of the generated sewage or collected septage reaches the treatment plant? What is the Biological Oxygen Demand (BOD) of incoming and outgoing sewage/ septage?

Volume of sewage generated (Ltr.)	
Volume of septage collected (Ltr.)	
Volume of sewage received at the STP (Ltr.)	
Volume of Septage received at the FSTP (Ltr.)	
BOD of incoming sewage at STP	
BOD of incoming septage at FSTP	
BOD of outgoing sewage from STP	
BOD of outgoing septage from FSTP	

- Is treated sewage/ septage being reused or recycled? Is treated water being reused for irrigation or industrial purpose? Has the option of revenue generation from treated outputs been explored?

Bio- solids output (kg/ day)	
Reuse of Bio-solids (Y/N)	
If yes, Reuse as	
Cost recovered (Rs./kg)	
Disposal Location of bio-solids in case of no reuse	
Treated Water Output (KL/ day)	
Reuse of Treated Water (Y/N)	
If yes, Reuse as	
Cost recovered (Rs./KL)	
Disposal Location of treated water in case of no reuse	

- How much human resource is available at the treatment facility for O&M?
- How much energy is consumed to run the treatment plant? Has the option of renewable energy been explored?
- How much fresh water supply is required to run the treatment plant? Is the treated water being reused in plant operations?

#### 4. Institutional Framework

- ➔ Does the city have a mechanism for keeping records of day-to-day sanitation operations? (Tick)

Record of desludging requests received and serviced	
Complaints/ Grievances received and addressed	
Inspection/ site visit records	
Non- compliance/ penalties records	
Vehicle repairs and maintenance records	
Licensing applications received and granted	
Record of all the employees	

- ➔ Does the city have a mechanism for collection of sanitation user charges?
- ➔ Does the city have a record of all the incomes and expenditures related to sanitation services?

Sr. No.	Budget Heads	Income (in Rs.) (A)	Expenditure (in Rs.) (B)
1	Desludging and Sewerage service charges		
2	City Sanitation Cell O&M		
3	Desludging Trucks O&M		
4	Public/ Community Toilets O&M		
5	STP O&M		
6	FSTP O & M		
7	Toilets/ Containments construction		
8	Licensing/ Tipping fee		
9	Penalties collection		
10	Advertisements		
11	IEC Activities		
12	Printing, Publications, Office equipment and stationary etc.		
13	Miscellaneous		
	Total		
	<b>Revenue (+) / Deficit (-) (in Rs.)</b>	<b>A-B</b>	

➔ Does the city have a regular review and monitoring mechanism? (Tick)

Updation of sanitation database	
Updation of City FSSM Plan	
Updation of Sanitation Benchmarking Targets	
Updation of Desludging Schedule	
Regular Inspection at the following	
· On- Site Containments	
· Public/ Community Toilets	
· Desludging Operations	
· Disposal Sites	
· Vehicle Parking & Cleaning site	
· STP	
· FSTP	
Regular repair and maintenance of the following	
· Desludging Vehicle	
· Public/ Community Toilets	
· STP	
· FSTP	
Annual Financial Audit	
Annual review of City Sanitation Cell records	



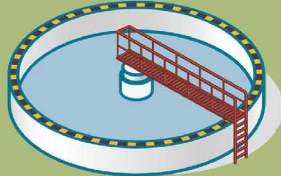

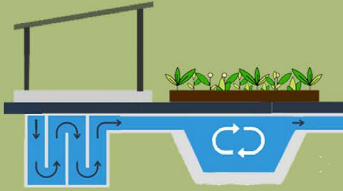


















## 5. Service Level Gaps

- ➔ What are existing service levels and gaps for sanitation against the set benchmarks. Provide information in the following table

Indicator	Target Service Level for 20	Present Situation	Expected Service Level
Percentage and number of Households connected to Sanitary Containment Units/Sewerage Connection			100%
Number of households de-sludged by licensed operator Vs Target			100%
Efficiency in collection of user charges			>90%
Efficiency in treatment of emptier sludge			100%
Incidences of Non-Compliance by Operators			Less than 3 per month
Amount of Reusable end product – Compost, treated wastewater, Bio- Gas, etc. generated			100%
Percentage of O&M Cost Recovery through sale of Reusable end product from FSTP			100%
Grievances received			<20%
% of grievances addressed within stipulated timeframe			>80%

In Rajasthan, around **57%\*** of towns do not have any treatment facility

# ADVANTAGES OF FSSM

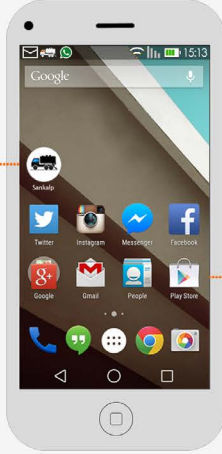
 <p>Sewerage</p>	 <p>Parameters</p>	 <p>FSSM</p>
 <p>preferably more than 100 lpcd</p>	 <p>City Water Supply</p>	 <p>Functions in water scarcity as well</p>
 <p>12,000 - 15,000 Rs per capita</p>	 <p>Capex (approx.)</p>	 <p>500 - 600 Rs per capita</p>
 <p>150 - 200 Rs per capita per year</p>	 <p>Opex (approx.)</p>	 <p>30 - 40 Rs per capita per year</p>
 <p>4x</p>	 <p>Manpower</p>	 <p>x</p>
 <p>40 pph</p>	 <p>Population Density</p>	 <p>40 pph</p>
 <p>high</p>	 <p>Implementation Challenges</p>	 <p>low</p>

\* This includes existing, under construction and upcoming treatment facility

# mobile application for FSSM services interface design



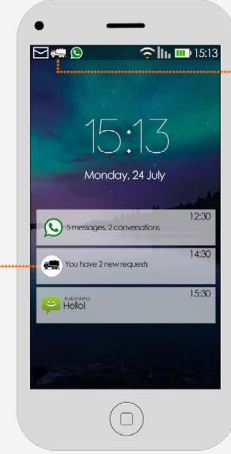
## HOME SCREEN



after download, icon of app can be seen in the screen.

app is downloaded from Play Store

## LOCK SCREEN



icon in notification panel for every new service call.

notifications prompt for every new service call

## WELCOME PAGE



language changing option

dropdown menu to select ULB

## MULTIPLE USER SCREEN



home icon to return to homepage

icons for respective users to proceed further

## USER LOGIN



multiple login options for users

## USER HOME



basic details of user in database

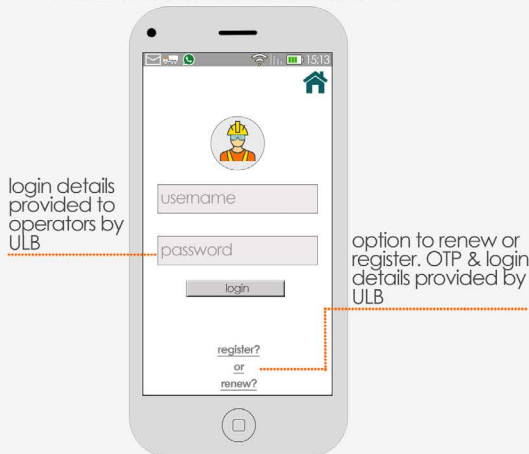
option for service request

for complaints and other help

feedback



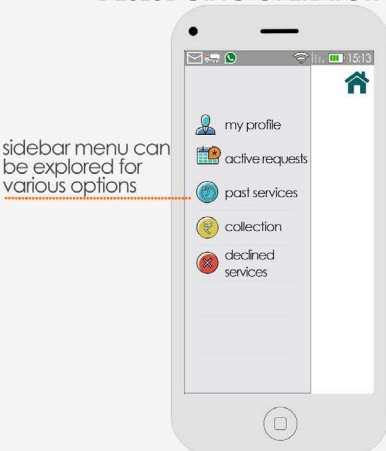
## DESLUDGING OPERATOR LOGIN



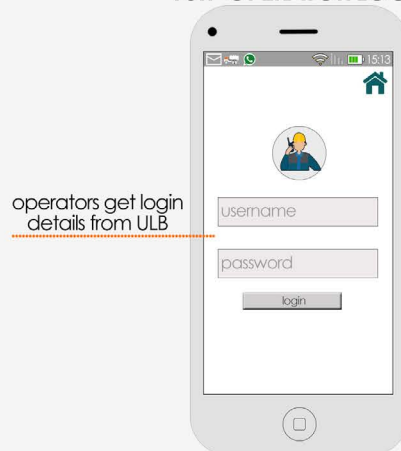
## DESLUDGING OPERATOR HOME



## DESLUDGING OPERATOR SIDEBAR



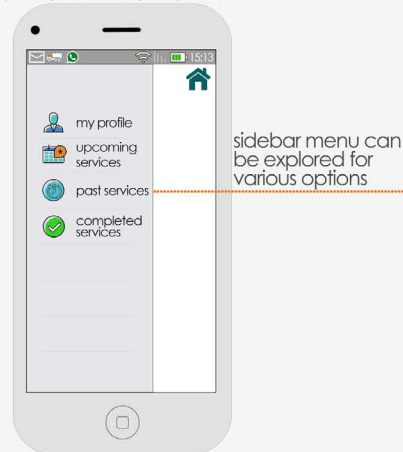
## FSTP OPERATOR LOGIN



## FSTP OPERATOR HOME



## FSTP OPERATOR SIDEBAR





एक कदम स्वच्छता की ओर

## स्वच्छता शपथ

महात्मा गांधी ने जिस भारत का सपना देखा था उसमें सिर्फ राजनैतिक आजादी ही नहीं थी, बल्कि एक स्वच्छ एवं विकसित देश की कल्पना भी थी।

महात्मा गांधी ने गुलामी की जंजीरों को तोड़कर माँ भारती को आज़ाद कराया।

अब हमारा कर्तव्य है कि गंदगी को दूर करके भातर माता की सेवा करें।

मैं शपथ लेता हूँ कि मैं स्वयं स्वच्छता के प्रति सजग रहूँगा और उसके लिए समय दूँगा।

हर वर्ष 100 घंटे यानी हर सप्ताह 2 घंटे श्रमदान करके स्वच्छता के इस संकल्प को चरितार्थ करूँगा।

मैं न गंदगी करूँगा न किसी और को करने दूँगा।

सबसे पहले मैं स्वयं से, मेरे परिवार से, मेरे मुहल्ले से, मेरे गांव से एवं मेरे कार्यस्थल से शुरूआत करूँगा।

मैं यह मानता हूँ कि दुनिया के जो भी देश स्वच्छ दिखते हैं उसका कारण यह है कि वहां के नागरिक गंदगी नहीं करते और न ही होने देते हैं।

इस विचार के साथ मैं गांव-गांव और गली-गली स्वच्छ भारत मिशन का प्रचार करूँगा।

मैं आज जो शपथ ले रहा हूँ, वह अन्य 100 व्यक्तियों से भी करवाऊँगा।

वे भी मेरी तरह स्वच्छता के लिए 100 घंटे दें, इसके लिए प्रयास करूँगा।

मुझे मालूम है कि स्वच्छता की तरफ बढ़ाया गया मेरा एक कदम पूरे भारत देश को स्वच्छ बनाने में मदद करेगा।



Local Self Government Department  
Government of Rajasthan