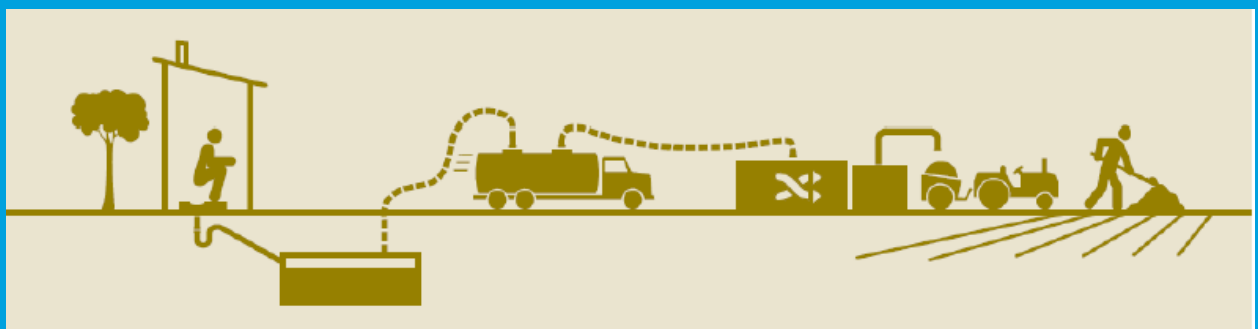


# Odisha Urban Septage Management Guidelines, 2016

For Urban Local Bodies in Odisha



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## 1. Background

The overall goal of the Odisha Urban Sanitation Strategy, 2011 on the lines of the National Urban Sanitation Policy (NUSP) of India is to transform urban areas in Odisha into community-driven, totally sanitized, healthy and liveable cities and towns since efficient sanitation services has a profound impact on quality of life of citizens. To attain this goal, safe management of human excreta including its safe containment, transport, treatment and disposal is of utmost importance.

The “on-site sanitation” systems like septic tanks ensure containment of human excreta at the household level, thus reducing the risk of human exposure to hazardous pathogens present in human excreta. Septic tanks generate both a liquid and solid (sludge or septage) waste streams, however the liquid waste is designed to discharge into the surrounding soil through a soak pit.

In the absence of functional sewerage systems and treatment facilities in all the Urban Local Bodies (ULBs) in Odisha the reliance on on-site sanitation systems for treatment of human excreta is very high (around 45% of the urban households are connected to septic tanks as per Census 2011) and the septage removed from the on-site sanitation systems in ULBs of Odisha are currently discharged locally, thus creating negative impact on the urban environment and on public health.

Given this context, Housing & Urban Development Department, Government of Odisha intends to put in place a set of operative guidelines for ULBs that will formalize and provide for safe handling of septage in the entire sanitation delivery chain (containment, emptying, transport, treatment, and disposal/reuse) and aim to achieve the goals of Odisha Urban Sanitation Strategy, 2011.

These guidelines conform to the advisory note on septage management developed by Ministry of Urban Development (MoUD), Government of India and the guidelines on design and construction of septic tanks issued by the Bureau of Indian Standards (BIS) and the Central Public Health and Environmental Engineering Organization (CPHEEO). Further, these guidelines are intended to strengthen the existing framework focused on implementing the provisions of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 in the state of Odisha.

The operational procedures outlined in these guidelines are applicable to all ULBs of Odisha and covers following areas:

- Framework on septic tanks including standard design and construction;
- Adoption of desludging procedure for the septage generated;
- Safe Transportation of septage from collection point to receiving facility;
- Technological intervention for proper treatment of septage, disposal and re-use;
- Public awareness

## 2. Design of Septic tanks

Septic tank is a watertight, on-site treatment system for human excreta. If properly located, designed and constructed, septic tank can provide long-term, effective treatment of human excreta.

### 2.1 Standard size and design for the construction of Septic tanks

**2.1.1** The design, construction and installation of septic tanks shall be in accordance with the provisions of the a) National Building Code of India, 2005; b) Bureau of Indian Standards, Code of Practice for Installation of Septic Tanks; c) Manual on Sewerage and sewage treatment systems, CPHEEO, 2013; d) Swachh Bharat Mission Guidelines, 2014 and all relevant laws or directions prevailing at the time. The specifications for the construction of septic tanks are described in **Annexure I**. The indicative sizes of septic tank as recommended by IS:2470 of Bureau of Indian Standards and CPHEEO Manual for Sewerage and Sewage Treatment for 5 users and up to 300 users are given below:

No of Users	Length(m)	Breadth(m)	Liquid depth for 2yrs. Cleaning period(m)	Liquid depth for 3yrs Cleaning period (m)
5	1.5	0.75	1.0	1.05
10	2.0	0.90	1.0	1.40
15	2.0	0.90	1.3	2.00
20	2.3	1.10	1.3	1.80
50	5.0	2.00	1.0	1.24
100	7.5	2.65	1.0	1.24
150	10.0	3.00	1.0	1.24
200	12.0	3.30	1.0	1.24
300	15.0	4.00	1.0	1.24

The typical sketches of septic tanks for 5 to 20 users is presented in **Annexure II A & II B**.

### 2.2 Standardization of Septic tanks

**2.2.1** If it comes to the notice of ULB, that a household does not have any on-site treatment facility or the septic tank does not meet the standard design and construction norms, the ULB may issue a notice to the owner of the premise to construct, replace or appropriately modify the septic tank in order to meet the standard design and construction norms.

### 3. Desludging of septic tanks

When the sludge in septic tank exceeds 2/3rd of its total depth, it is time to remove sludge from the septic tank by adopting certain definite procedures. It is pertinent to highlight that regular desludging improves the performance of septic tanks and effluent quality. For proper desludging, involvement of owners of the premises connected to septic tanks are also necessary.

#### 3.1 Regular Operation and Maintenance

**3.1.1** The owner of a premise connected to septic tank shall be responsible for:

- (a) Operation and maintenance of the septic tank and ensuring that, its parts and components are fit for purpose, operational and kept in good order so as to prevent risks to human health or the environment.
- (b) Checking the sludge level at least once in a year, so that the sludge shall not emit, discharge, seep, leak or otherwise escape from the septic tank, or part thereof into surface water or onto the surface of the ground.
- (c) Ensuring that roof water or surface water run-off shall not enter a septic tank.
- (d) Informing the ULB for emptying the septic tank, when the sum of the depth of scum and the sludge exceeds two-third of the depth of the tank or as and when required.

#### 3.2 Desludging

**3.2.1** The ULB shall ensure that desludging shall be carried out by the sanitary workers of the ULB or by the registered and authorized septage transporters. Only registered vehicle shall be engaged by the registered septage transporter in the collection and transportation of septage. The ULBs shall develop detailed Regulations for registration of septage transporters and septage transportation vehicle. A sample permit/registration certificate is presented in **Annexure III**.

**3.2.2** The ULB shall ensure that the operation and cleaning of septic tanks shall be carried out only by using mechanical devices. The desludging trucks shall be fully equipped with required tools, equipment and spares for the operation. A checklist of tools and equipment is presented in **Annexure IV**.

#### 3.3 Precautions to be taken before/during desludging

**3.3.1** The septage transporter shall take the following precautions before/during desludging:

- (a) The vehicle driver shall ensure that the vehicle is parked properly, check wheels, set parking brakes, place safety cones and prepare the vehicle for pumping.
- (b) It should be ensured that the sanitary workers are provided with all required safety gears.
- (c) The septic tank shall be ventilated by keeping cover open for sufficient time before starting the operation.
- (d) The sanitary workers shall never enter septic tank since entry of man into septic tank is banned.
- (e) Care should be taken during the pump back operation when, friction fittings may come apart thus exposing workers to unintended hazards
- (f) Entire contents of a tank should never be emptied at locations of high ground water. If the ground water level is above the bottom of the tank, floating condition will occur. In such conditions, enough contents in the tank shall be left out to counter act the uplift pressure. Local enquiry may be made from the area to obtain this information.

### **3.4 Desludging Procedure**

**3.4.1** After adhering to the necessary precautions, the desludging may be carried out by the sanitary workers following the procedure given below:

- (a) The sanitary workers shall undertake visual inspection of the interior and exterior of the tank after opening the access covers and check for:
  - i. Level of water/sludge with respect to the flow line of outlet pipe
  - ii. Back pressure
  - iii. Whether inlet pipe and sanitary tee are in place
  - iv. Cracks in the wall using mirror on a long pole
  - v. Number of compartments - If more than one, sanitary worker needs to locate and remove lids from all the compartments. Each compartment will need separate pumping.

- vi. Indication for high ground water, saturated soils.
- (b) The sanitary workers shall use a long handle-rod to determine the sludge level in a septic tank.
- (c) Workers shall take out the hoses and fittings from the tool box required to complete pumping.
- (d) To probe the tank, the hose shall be lowered slowly to the last length of hose, to get an indication on the volume of sludge to be pumped
- (e) Then the hose shall be connected to the truck. Screw or clamp fittings shall be used in case back pressure is required to break up the sludge masses.
- (f) Next, the pump or vacuum equipment shall be engaged. The worker must:
  - i. Ensure suction and operation of pump by checking rapid decrease in volume of tank.
  - ii. Monitor the level gauge on the septage cleaning tank. Always ensure there is adequate volume in the cleaning tank to accommodate the load. If only partial load can be pumped, monitor the levels closely.
  - iii. Monitor the septic tank as pumping progresses. Also check for blockages at the inflow and outflow pipes
  - iv. Check the tank for remaining sludge after pumping. Ensure that 1-2 inch of sludge should be left in the tank to facilitate future decomposition
- (g) If accumulated solids are still remaining, the workers shall initiate the pump back procedure, which will send the pumped septage back to the septic tank under pressure and direct this flow towards the sludge mass. This will break the mass, making it possible to pump out again. As little as 200-300 litres will be enough to break the mass.
- (h) After pump-back is completed, pumping out of the septic tank shall be done again. The above steps can be repeated if required. Pumping from the tank shall be continued till about 100-200 litres of septage remains in the tank after cleaning.



- (i) On completion of pumping, the hose shall be washed with water by directing water stream back to the tank, and the cleaned hoses shall be placed back in the truck tool box.
- (j) Before leaving the site, the workers shall ensure that the tank lids/access cover is securely placed.

### **3.5 User charges and its collection**

- 3.5.1** All the owners of the premises connected to a septic tank shall pay a user charge, as notified by the ULB under the Regulations, from time to time for desludging their septic tanks, transport and treatment of septage.
- 3.5.2** All the owners of the premises who have their own on-site wastewater treatment system certified by the ULB as functional and compliant and also those who are connected to the existing sewage network may be exempted from paying user charge.
- 3.5.3** The ULB shall revise the charges based on revisions in costs involved from time to time. Such user charges shall include cost of desludging, transportation, treatment and disposal.
- 3.5.4** The user charges may be collected from the owners of the premises by any of the following mode of collection:
  - (a) The ULB may authorize any person including septage transporter to collect user charges from the owners of the premises connected to a septic tank. A Memorandum of Understanding (MOU) shall be entered into and executed between the ULB and authorized septage transporter which authorizes the latter to collect the charges and remit the amount to the ULB.
  - (b) The user charges may be added to monthly water charges or property tax, or could be a special municipal environment fee or pay-as-you-desludge programme.

### **3.6 Safety Measures**

- 3.6.1** The desludging shall be carried out using appropriate procedures, equipment, safety gear and operating practices which are in compliance with all relevant laws or directions prevailing at the time.

**3.6.2** The safety of the workers engaged for desludging are vested with the transporter and he must ensure that:

- (a) all desludging workers must wear appropriate protective attire, carry safety gear and accessories including shoulder length fully coated neoprene gloves, rubber boots, a face mask, and eye protection as specified in the Prohibition of Employment as Manual Scavengers and their Rehabilitation Rule, 2013;
- (b) all the safety equipments are checked for proper working before proceeding to the collection site;
- (c) first aid kit, gas detection lamp and fire extinguisher are kept in the vehicle before it goes to the collection site;
- (d) there are sufficient disinfectant on the vehicle before it goes to the collection site;
- (e) all desludging workers are to be trained to use the safety gear and follow hygiene practices;
- (f) smoking should be strictly prohibited while working at the septic tank;
- (g) all desludging workers must be immunized for tetanus, hepatitis A and B;
- (h) desludging workers shall never enter into the septic tank as entry into manholes/septic tanks is banned;
- (i) children must be kept away and the tank lids are always secured with screws and locks;
- (j) all desludging workers must wash their hands immediately after contacting with septage / septage handling tools and equipment, and always before eating and drinking;
- (k) the workers must be cautious while performing desludging process as excessive weight on lid or manhole cover may result breakage.

### **3.7 Monitoring Mechanism**

**3.7.1** The ULB shall devise a framework for monitoring the desludging services provided by the authorized private septage transporters and define the performance metrics that may be linked to the payment in terms of performance incentive or penalty in

case of non-performance. An indicative monitoring mechanism for septage management activities is given in **Annexure V**.

## 4. Septage Transportation

After desludging of septage from premises, it has to be transported to the approved treatment site designated by the ULBs for safe disposal or reuse. The septage transporter is primarily responsible for the safe transport of septage. The ULBs shall need to ensure that handling, transport and disposal are in compliance with the Environment Protection Act, the Water Act, and the Municipal Solid Waste Management (Handling) and Management Rules.

### 4.1 Transportation Plan

**4.1.1** To ensure safe transportation of septage, the septage transporter in consultation with ULB shall prepare a transportation plan which shall include:

- (a) Scheduling and routing for trucks; and
- (b) Customer service protocols

### 4.2 Responsibility of Septage Transporter

**4.2.1** The septage transporter must ensure that:

- (a) the registered septage transport vehicle including all equipments used for the transport of septage shall have a leak-proof body and lock to secure the septage; comply with applicable standards and must be able to withstand a collision with another vehicle or any permanent structure;
- (b) the tank and equipments used to transport septage shall not be used for the transportation of any other materials or liquids;
- (c) the vehicles used to transport septage shall be equipped, at all times, with spill control or absorbent materials and disinfectant materials such as lime or chlorine bleach;
- (d) the company name, contact number, company logo, and body number of the septage transportation vehicle are displayed on both sides of the vehicle. The information shall be marked using permanent and legible lettering at least 3 inches high and of reflective material;
- (e) list of emergency contact numbers are pasted at the prominent place in all vehicles involved in septage transport;

- (f) most competent trained driver are employed for transportation of sludge and septage;
- (g) each worker wears a proper uniform with company logo on dress and hold identity cards;
- (h) the vehicle involved in transportation is cleaned and washed inside as well as outside every day; the vehicles and equipment shall be serviced, and greasing, oiling, minor repairs, etc. are done at least twice a month;

**4.2.2** The septage transporter shall retain the documentation relating to all stages of septage management i.e. desludging and transportation for a minimum period of 5 years.

**4.2.3** The septage transporter shall retain registration related documentation permanently and shall present such documentation on request by any authorised official.

### **4.3 Septage Transportation Procedure**

**4.3.1** All the septage transportation vehicles shall be directed to transport septage to the designated treatment sites. Movement of vehicle without a valid license by the ULB shall attract fine and/or even seizure of vehicle.

**4.3.2** Prior to starting the journey, the driver shall ensure that the vehicle is well equipped with spill control or absorbent materials and also disinfectant materials like lime and chlorine bleach.

**4.3.3** The driver of the vehicle shall take the most convenient and congestion free route considering traffic flows and plan the trip to arrive at the treatment site within the specified operating hours.

**4.3.4** While transporting septage, the driver and worker shall ensure that there is no discharge or emptying of septage into locations other than designated treatment sites.

**4.3.5** At the disposal site, the truck must be parked in such a way that the septage may be directed to the inlet chamber with one length of hose, wheels need be checked and parking brakes need be placed properly, then the valves be opened and septage allowed to flow by gravity into the collection chamber.

## 4.4 Accidental Spillage

**4.4.1** In the event of accidental spillage of sludge/ septage, the septage transporter must:

- (a) Immediately take action to contain the sludge/septage, minimize the environmental impact, and begin clean-up procedures
- (b) Disinfect the area of spillage by sprinkling bleach solution or lime in the area and wash it with water after 15 minutes
- (c) Notify the ULB authority immediately

**4.4.2** In the event that a septage transporter fails to perform cleanup operations, the ULB shall perform the clean-up and charge all the related expenses incurred to the septage transporter including applicable fines and penalties.

## 5. Septage Treatment and Disposal

The onsite sanitation system may fail if the collected sludge has not been properly treated in a suitable treatment system and disposed. Septage can be treated in a variety of ways, and there is no single best option, given the wide varying conditions of the septage. The treatment options like using natural processes, including lime treatment, stabilization ponds, drying beds and composting, are the most cost-effective and widely used solutions in treating septage.

The first stage of septage treatment, mostly involves the stabilization of the septage and the separation of the solid and the liquid. In this way, the liquid part can be treated separately with natural wastewater treatment technologies. The solid part can be treated to enhance its characteristics for either landfilling or agricultural reuse.

Hence, septage treatment involves different treatment options and in choosing the most appropriate treatment option, a balance between treatment cost and land requirement must be achieved to suit local factors like population density, hauling distance, technical capacity of the ULB and private operators.

Furthermore, septage treatment facilities can be either privately or publicly owned. The privately owned systems relieve ULBs of the burden of operating and maintaining a facility, and monitoring septage deliveries.

### 5.1 Designated Treatment Facilities

**5.1.1** Only approved and designated treatment facilities by the ULBs shall be used for processing and treatment of the septage.

### 5.2 Service Provider and accreditation

**5.2.1** The ULB may operate a treatment facility and in the absence of service facilities, may contract with private service providers, provided that, they must have necessary funds to support capital expenditures and operating and maintenance expenses of their septage management systems. To become accredited, service providers shall be required to obtain the permits/certifications as required by the ULB from time to time.

## 5.3 Treatment & Disposal

The septage can be treated either at sewage treatment plant or at independent septage treatment facility. A brief description of these two types of treatment is given below.

### 5.3.1 Treatment at Sewage Treatment Plant:

If a sewage treatment plant (STP) exists or planned in an ULB, septage can be co-treated with sewage, provided the STP has sufficient capacity to treat the additional septage load.

The septage arriving at the STP shall usually be discharged into a receiving facility which consists of an unloading area (sloped to allow gravity draining of septage) with screen arrangements, a septage storage tank designed based on expected volume of septage generated in ULB.

The septage in storage tank shall be properly mixed by mixers/air diffusers. The septage shall be transferred from the storage tank to the treatment unit with grinder pumps.

When the capacity of the STP is not sufficient to treat raw septage, the option of co-treatment of sewerage with effluent from septage treatment can be considered. Since the primary treatment eliminates the suspended solids, the STP can then treat much higher volumes of liquid effluent than of raw septage.

### 5.3.2 Treatment at Independent Septage Treatment Facility:

When STPs is not available or the existing plant is of insufficient capacity or its location is too far, a treatment facility specially meant for septage treatment becomes the option to consider. Specified location of treatment facility is to be authorized and notified by the ULBs from time to time, in compliance with the Environment (Protection) Act, 1986 and the Water (Prevention and Control of Pollution) Act, 1974.

The key treatment steps at a septage treatment facility are:

***Pre-treatment of septage*** – Pre-treatment is a physical treatment to ease handling the sludge for further treatment. The plant site is to have an unloading



area with screen arrangements to remove large size particles like plastics, rags from the septage.

**Digestion of Sludge** - As the septage brought to the treatment facility is in partly digested condition, it produces noxious odour and hence the sludge has to be treated by anaerobic process to degrade the organic matter under controlled conditions. This can be achieved in an Anaerobic digester/ Anaerobic baffled reactor (ABR). Also it is imperative to remove the liquid portion of the sludge for the effective treatment of septage.

**Solid and liquid separation** – The solid and liquid portions can be separated and they can be treated depending upon its loading pattern and various relevant parameters. The solids can be separated in a planted / unplanted drying bed or a geomembrane tube. The liquid can be treated in a ABR / CW / Stabilization Pond. Further treatment of solid sludge can be achieved by composting for reuse. Composting is the aerobic decomposition of the organic matter in the sludge to a relatively stable humus-like material similar to fertilizer.

The final effluent can be discharged into surface water after chlorination or can be re-used for gardening, agricultural purpose without causing any harm to the environment and risk to public health.

In addition to the existing technologies, any other emerging technology may be considered for treatment at independent septage treatment facility.

### 5.3.3 Disposal

The dried sludge shall be spread on designated land and disposed for land filling purposes. The ULB shall ensure that the sanitary landfill is located above the highest ground water level and located in close proximity to septage treatment plant. The type of area to be avoided for landfills are:

- (a) Sources of ground water and groundwater recharge aquifers,
- (b) Wetland, habitat and ecological areas with conflicting land use like parks, historical monuments and recreational areas.
- (c) Prone to landslides, underlying mine areas, sinkholes, or near earthquake faults.

The ULB shall select the site for treatment & disposal in consultation with the District Collector, Pollution Control Board and the general public.

#### **5.3.4 Reuse**

The dried sludge acts as organic fertilizer hence it may be applied to agricultural field, forests and plantation areas. Co-composting of septage with the organic fraction of municipal solid waste (MSW) like food wastes, paper, leaves, branches etc. is also possible.

The reuse of sludge must be in accordance with the WHO Guidelines on the reuse of human excreta, wastewater and grey water, 2006.

### **5.4 Responsibilities of the Treatment Plant Operator**

**5.4.1** The operator of the treatment facility shall be responsible for:

- (a) Operating the septage treatment facility during working hours only;
- (b) Testing the input quality of the collected septage for presence of any metal or traces of industrial waste and ensuring that no commercial or industrial waste is unloaded in these facilities;
- (c) The sanitary landfill workers shall cover the disposed sludge/septage with 15 cm of soil cover every day and final cover of 2 feet within a week after the placement of final lift;
- (d) Maintenance of minimum amenities at the treatment facilities including hand wash facilities and toilet/ bathroom, drinking water, medicated soaps and approved hand-drying machines and first aid kits.

## **6. Administration and Enforcement**

For effective and efficient administration and enforcement of septage management system in the city or town, the ULBs shall monitor through a Committee constituted at the ULB level, with such composition as it may deem fit through a notification.

### **6.1 Functions of the Committee**

**6.1.1** The function of the Committee shall be to:

- (a) Oversee the conduct of a survey of all properties and premises to determine if a septic tank is present, and if it is accessible for desludging
- (b) To accredit and license septage transporters, service providers or treatment facilities
- (c) To review and approve the applications for accreditation of service providers and to recommend the same for approval
- (d) To receive and hear complaints from residential owners and issue directions for their appropriate redressal
- (e) Serve notices of non-conformance to the provisions of the Regulation prepared by the ULB to the owners/administrators, or occupants
- (f) Visit properties for the purpose of inspection, observation, measurement, sampling and testing
- (g) Plan and implement an information, education and communication (IEC) program for municipal staff, resident welfare association, community organizers, self-help groups, general public, septage transporters and private operators on wastewater management and the city's septage management.

### **6.2 Violations and Penalties**

**6.2.1** The ULB shall by way of Regulation list the violations and prescribe penalties thereto if a person is found guilty of contravention of the provisions of the Regulations. The Committee shall review implementation of the Regulation with regard to compliance and penalties, and recommend revisions.

### **6.3 Record keeping and reporting**

**6.3.1** The ULB shall be responsible for record keeping of information relating to all stages of septage management i.e. desludging, transportation, treatment and disposal. These information includes, but are not limited to, the following:

- (a) Data on the households and other properties with septic tanks
- (b) Buildings and structures who have desludged their septic tanks
- (c) Volume of septage generated, treated and disposed
- (d) Septage Transporter's information including operator-in-charge for each location, vehicle details
- (e) Name and location of Treatment Facilities earmarked for disposal of septage
- (f) Public Grievances

**6.3.2** The service provider shall retain other documentation relating to all stages of septage management i.e. desludging, transportation, treatment and disposal for a minimum of 5 years, and shall, on request by an authorised official, present such documentation.

### **6.4 Complaint redressal system**

**6.4.1** The ULB shall set up a complaint redressal system to monitor the performance of the private sector operators in terms of whether they are emptying the septic tanks properly or not and to monitor whether they are dumping the septage at the designated site or not.

## **7. Information, Education and Communication**

The information, education and communication needs pertaining to septage management must be addressed to ensure successful implementation of the guidelines.

### **7.1 Public Awareness**

**7.1.1** Members of the Resident Welfare Associations, community-organisers, self-help groups and the general public shall be periodically sensitized about:

- (a) the need for a robust septage management system including health hazards associated with improper collection and treatment of septage and the ill-effects of unscientific disposal of septage;
- (b) the standard design and construction of septic tanks, proper desludging procedures, transportation, treatment and safe disposal methods of septage;

### **7.2 IEC for ULB officials**

**7.2.1** The State Government shall organize periodic training for the ULB officials on:

- (a) septage management and its best practices;
- (b) the standard design and construction of septic tanks, proper desludging procedures, transportation, treatment and safe disposal methods of septage;
- (c) need for periodic inspection of tanks; and
- (d) safety standards.

### **7.3 IEC for septage transporters and other private operators**

**7.3.1** ULB shall conduct periodic training programmes for all septage transporters and private operators for safe handling of septage at the time of desludging and transporting.

## **8. Public Private Partnership for Septage Management**

For sustainability of septage management in the city, the ULB shall be required to draw a long term financing and investment plan. While public funding shall be needed to finance septage management systems, facilities, equipment and manpower, the ULB may innovatively explore Public Private Partnership (PPP) options wherever possible.

### **8.1 Structuring of an appropriate PPP Option**

**8.1.1** Prior to structuring of an appropriate PPP option, the ULBs need to assess work profile, interests and capacity of private sector players doing septage management activities in Odisha and explore their willingness to undertake various activities in the sanitation value chain as per their competencies and interests.

**8.1.2** The ULBs need to consider the following aspects before selecting an appropriate PPP structure:

- (a) Operational role of the private player;
- (b) Source of revenue to meet the private players' return expectations;
- (c) Investment/ownership of capital assets;
- (d) Payment structure;
- (e) Contract length and value;
- (f) Risk mitigation and allocation measures for the private player and the ULB.

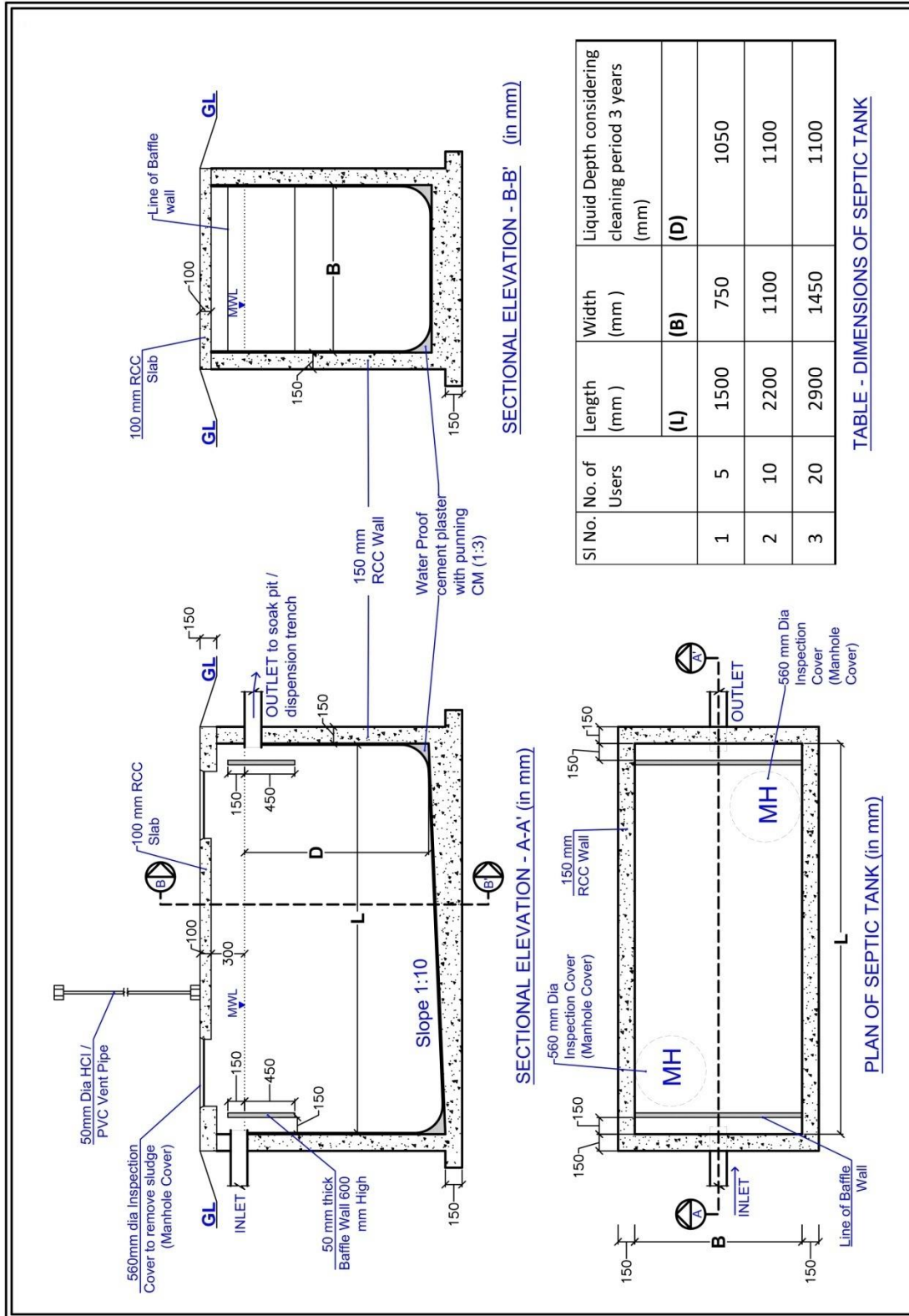
## Annexure I

### Specifications for septic tank design and construction

- The sizes of septic tanks as recommended by IS:2470 of Bureau of Indian Standards and CPHEEO Manual for Sewerage and Sewage Treatment for 5 users and up to 300 users are to be adopted. The septic tank is to be sized properly with appropriate detention time and volume;
  - Septic tanks are normally designed as rectangular tanks with a length to breadth ratio of 2:1 keeping liquid depth as 1-2m considering cleaning (desludging) interval of 2-3 years
  - A free board of minimum 30 cm should be kept over the liquid depth.
  - The walls of septic tanks preferably are of RCC structure having minimum thickness of 150 mm. It can also be constructed in brick with wall thickness not less than one brick length in cement mortar 1:4, and should be plastered both inside and outside in cement mortar 1:3.(1cement:3sand).The bricks used shall be KB bricks, the compressive strength of which shall not be less than 35 kg/ cm<sup>2</sup>.
  - It should be water tight
- Concrete is a common material for septic tank construction. Steel, wood, or other materials that are subject to decomposition in soil should never be used.
- There shall be proper inlet and outlet arrangements;
  - The inlet and outlet should be located as far away as possible from each other (preferably on both ends) and at different levels to avoid short circuiting of liquid
  - The floor should have minimum slope of 1:10 sloping towards the sludge outlet to facilitate easy removal of sludge.
- Septic tanks of more than 2000 litres capacity may have 2 compartments separated by a baffle wall, the second compartment being half of the capacity of 1<sup>st</sup> one. For septic tanks of more than 100 users capacity, 2 chambers are to be constructed each of half of the total capacity.
- Hanging baffles of 45-60cm wide shall be provided after the inlet to make the inflow quiescent, and before the outlet, so as to prevent scum going out with the effluent. The baffles should dip 25-30cm into the liquid and project 15cm above the liquid surface. A ventilation pipe not less than 50mm dia should be provided and the top of which should be covered with mosquito proof wire mesh.
- There should be an access port for each compartment that allows inspection and pumping

Annexure II A

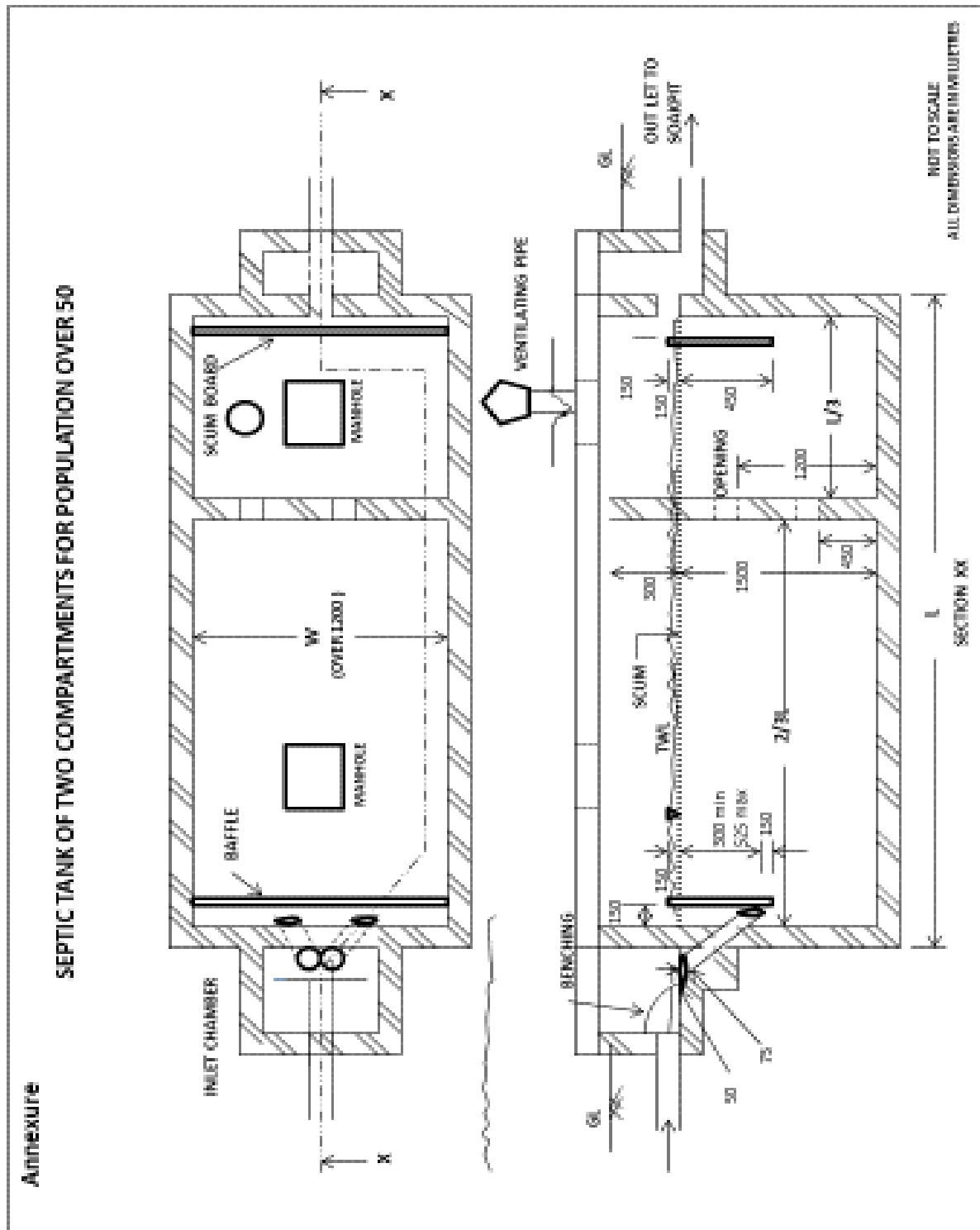
Septic Tank for 5 to 20 users





Annexure II B

Septic Tank of Two Compartments for Population over 50



## Annexure III

### Permit for Septage Transporter

Septage Transporter Permit for \_\_\_\_\_ Municipality

In accordance with all the terms and conditions of the current \_\_\_\_\_ Municipality's Rates, Rules and Regulations, the special permit conditions accompanying this permit, and all applicable rules, laws or regulations of Government of Odisha, permission is hereby granted to:

NAME OF PERMITTEE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

For the disposal of septage from domestic septic tank or commercial holding tank at the \_\_\_\_\_ treatment facility. This Permit is based on information provided in the Septage Transporter Permit application which constitutes the Septage Management Hauled Permit. This Permit is effective for the period set forth below, may be suspended or revoked for Non-Compliance Permit Condition and is not transferable. The original permit shall be kept on file in the Permittee's office. A copy of this Permit shall be carried in every registered vehicle used by the permittee.

EFFECTIVE DATE:

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

CHECK IF RENEWED PERMIT

Permit is liable to be cancelled in case of violations of any Acts, Rules and Regulations relating to the operation of Septage System or in cases of safety protocols not being adhered to or in case of non-permitted disposals.

**Annexure IV**  
**Checklist of tools and equipments to be kept with the septage transport vehicle**

Sl. No.	Particulars	Remarks
1	Engine Oil	
2	Air Pressure on tires	
3	Safety back up horn	
4	Pumping truck equipment	
5	Hoses inspection for cracks & wear	
6	Safety gears: a) Hand gloves b) Boots c) Hard hat d) Face mask	
7	Disinfecting and spill control equipment: a) Bleach solution b) Lime c) Safety cone	
8	Tools: a) Shovel and digging bar b) Rake trafficker c) Broom d) Lifting bar for tank lids e) Screw drivers, vice grip, pliers for opening tank lid f) Hand wash supplies( soap, towels, water, waterless hand washing soap) g) Log book, work orders, extra forms, receipts ,pens h) Work orders for the day-review for special instructions. i) Map	

## Annexure V

## Monitoring Framework for Septage Management Activities

Activities to be Monitored	Performance Metrics	Type of Monitoring Mechanism				
		House-holds Reporting	Self-Reporting by Septage Transporters	ULB sample HH survey	ULB random treatment site inspection	Grievance Redressal
Cleaning of Septic Tanks	Number of instances where safety regulations weren't adhered to or manual scavenging took place			✓		✓
	Number of instances of spillage during cleaning		✓	✓		✓
	Number of septic tanks damaged	✓	✓	✓		✓
	Percentage septic tanks cleaned inadequately	✓	✓	✓		✓
Transportation of fecal Sludge	Number of instance of spillage during transportation		✓			✓
	Number of instances of fecal matter being dumped at non-designated sites					✓
Safe disposal of fecal sludge	Time taken to construct sludge drying beds				✓	
	Standard of constructed sludge drying beds				✓	
	Number of instances where safety regulations weren't adhered to at treatment site		✓		✓	
	BOD and COD level of the treated septage effluent				✓	

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial data. This includes not only sales and purchases but also expenses, income, and transfers between accounts.

Next, the document outlines the various methods used to collect and analyze financial data. It mentions the use of spreadsheets, accounting software, and manual ledgers. Each method has its own advantages and disadvantages, and the choice depends on the size of the business and the complexity of its operations.

The document then delves into the process of reconciling accounts. This involves comparing the company's records with the bank statements to identify any discrepancies. Common reasons for discrepancies include timing differences, errors in recording, and unauthorized transactions. Reconciling accounts is a crucial step in ensuring that the financial statements are accurate and reliable.

Finally, the document discusses the importance of regular audits. An audit is a systematic review of the company's financial records to ensure that they are free from errors and fraud. It provides an independent opinion on the accuracy and fairness of the financial statements. Regular audits are essential for maintaining the trust of investors, creditors, and other stakeholders.