Understand scheduled desludging

We must understand the definitions, roles, benefits, and aspects of scheduled desludging before we start preparing them in our city. It must be clearly understood that scheduled desludging is a measure given in response to the obligation for septic tanks to undergo periodic desludging. Scheduled desludging is a component of the septage management of the city; its effectiveness, performance and sustainability are greatly influenced by the other components. This section concludes with a discussion of the steps for preparing a scheduled desludging scheme in the city.

0.1 A MANDATORY DESLUDGING

Septic tanks have the ability to digest organic material and separate floating material and solids from domestic wastewater. Settled solids are digested anaerobically while the liquid portion overflows into the soak pits or infiltration gallery. Settled solids need to be removed from the septic tank on a regular basis to prevent it from accumulating and reducing the capacity of the tank. Regular desludging will keep the septic tank functioning properly. Once every 2–3 years is recommended as long as the tank is used by the same number of people under the design assumption.

The scheduled desludging is the periodic desludging of the septic tank as required by regulation (see Figure 0.1 and **Step 8: Set regulations**). The municipality, through their designated service provider, determines the desludging time of each septic tank in the area. Thus, septic tanks under a scheduled desludging scheme are not emptied due to requests from households. The desludging is carried out according to the specified schedule. The scheduled desludging is usually conducted every 2–5 years (see Figure 0.2), although the exact frequency will be determined after the municipality comprehends the general characteristics of the septic tanks in their area (see **Step 6: Design operations**).

The scheduled desludging is managed by an organization appointed by the municipality (see **Step 7: Improve institutions**). If necessary, the designated service provider can engage a private desludging company to assist with the task (see **Step 9: Involve partners**).

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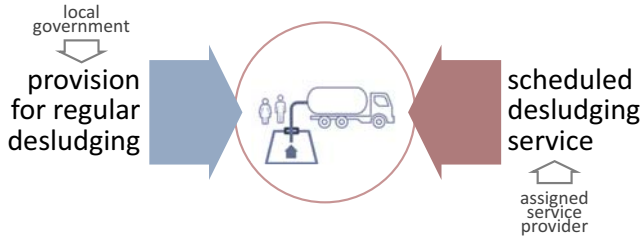

Figure 0.1 Scheduled desludging service is provided in response to regulatory provision requiring septic tanks to be regularly desludged. All septic tank users by law must accept the service.

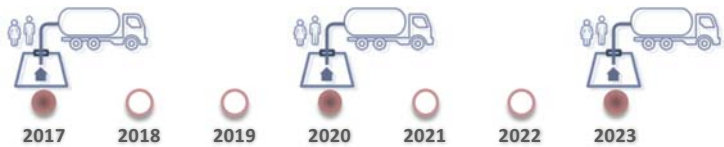

Figure 0.2 The desludging period is the time span between consecutive desludgings. A 3-year desludging period means a septic tank will be emptied in 2017, 2020, 2023, and beyond.

Figure 0.3 The City of Surakarta (Central Java) has implemented the scheduled desludging scheme as required by the local regulations. Each septic tank must be desludged every 3 years. The local water supply firm is appointed to manage the scheduled desludging in 2015.

Scheduled desludging fits well with citywide inclusive sanitation (CWIS). This approach requires guarantees that the services provided by the municipalities will be utilized so that all residents benefit from the existing sanitation system. The existence of continuous and periodic services from scheduled desludging provides onsite solution effectiveness which is almost as good as offsite solution, particularly in handling fecal waste.

0.2 DESLUDGE AND TRANSPORT

A septage (or, fecal sludge) management system consists of four components: (1) septic tank control or supervision, (2) septic tank desludging, (3) septage transportation and (4) septage treatment (see Figure 0.4). Separation of fecal management components can be carried out by cities that want to assign different service providers or establish separate budgets for each of the above components. The scheduled desludging scheme covers only two components, namely septic tank desludging and septage transportation. The septage treatment in several cities is typically managed by a different organization than the septic tank desludging. They also receive and treat septage from on-call or on-demand desludging. Unlike scheduled desludging, on-demand desludging is only done if there is a request from the household (see the following table for the differences between the two types of desludging).

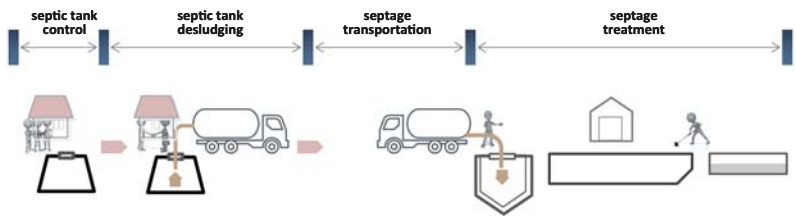

Figure 0.4 In the septage management chain, septic tank desludging occurs between septic tank control and septage transportation to treatment. The performance of each component is very important for the overall continuity and performance of the septage management system.

Scheduled desludging does not replace on-demand desludging. Both types must be available side-by-side in the city because there are always households that need more frequent or emergency septic tank emptying. The scheduled desludging must be regulated institutionally while on-demand desludging does not always require any arrangement from the municipality.

Scheduled desludging vs on-demand desludging.

	Scheduled Desludging	On-demand Desludging
Nature	Mandatory	Voluntary
Implementation	Scheduled by the municipality	Requested by the households
Customers	Registered	—
Institutional	Requires a citywide managing service provider	—

0.3 THE MANY BENEFITS

Scheduled desludging has direct and indirect benefits. The direct benefits of scheduled desludging are:

- improve performance of septic tanks in the city,
- maintain continuous supply of septage to treatment facility,
- reduce environmental pollution and improve public health,
- provide higher revenues.

The indirect benefits of scheduled desludging are:

- raise public awareness about their responsibilities in managing wastewater, including its financial implication,
- create business opportunities for private sectors,
- enhance image of a city.

It should be noted that the above benefits will only occur if all components of septage management function properly. In a city with many sub-standard septic tanks, scheduled desludging will not optimally prevent pollution. However, the scheduled desludging operation with its regular house visits can assist the municipality to identify and record sub-standard septic tanks (see Figure 0.5). Scheduled desludging will not bring optimal benefits if a city does not have a well-performed septage treatment plant.

It should also be noted that scheduled desludging is not an easy scheme to implement. Some cities fail to establish it, others fail in maintaining its sustainability. The introduction of scheduled desludging gave new

Figure 0.5 Scheduled desludging ensures all septic tanks in the city will be periodically inspected. The municipality will have data on the existence and condition of septic tanks in the area and the government will have a basis to enforce their septic tank regulations to the households.

obligations to households so it was often met with rejection. In implementing cities, households are not always willing to accept the desludging services that have arrived in the location. This also happens even though the households have actually paid the monthly service fee. Public awareness raising is needed before scheduled desludging is developed in a city. Due to the various conditions of the septic tanks, scheduled desludging operators often find it difficult to carry out their duties, especially in the first cycle of scheduled desludging.

0.4 SEVEN ASPECTS TO CONSIDER

Scheduled desludging has seven aspects that need to be considered in its preparation and implementation, these include the operations, customers, infrastructure, regulations, institutions, procedures, and finances (see Figure 0.6). These seven aspects form an integrated joint support system to ensure scheduled desludging operations are carried out systematically, properly and sustainably. If one aspect is ignored, it is likely the scheduled desludging will not function as expected.

The following is a description of each aspect of scheduled desludging preparation and implementation.

(1) **Operation scheme:** Scheduled desludging must have an appropriate operating scheme in accordance with regional conditions and service targets, specifically regarding (a) the desludging period, (b) service zonings, (c) desludging volume, (d) scheduling algorithm and (e) transportation routes.

(2) **Customer:** Scheduled desludging must have enough customers to optimize their service operations and bring in large financial revenues. Scheduled desludging customers must meet the following criteria: (a) septic tank user, (b) location accessible by desludging trucks, and (c) willingness to pay for services.

(3) **Infrastructure:** Scheduled desludging needs to be supported by desludging and transportation vehicles, treatment facility, and office and management information systems. All infrastructure must be selected and provided in accordance with the operating scheme and financial condition of the city or service provider.

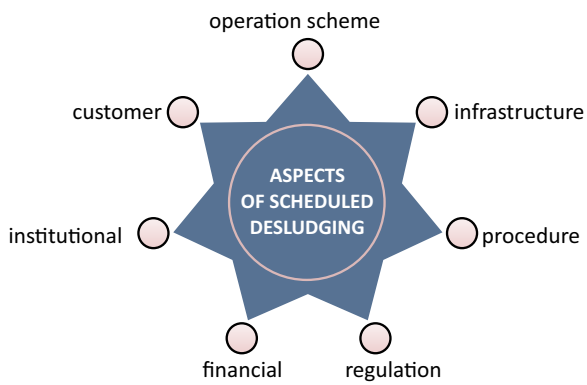

Figure 0.6 Scheduled desludging has seven management aspects to allow desludging to be carried out properly, systematically and sustainably. The seven aspects must be developed in accordance with the characteristics and capabilities of the city, as well as with the service objectives and targets to be achieved.

(4) **Institutional:** The performance and sustainability of scheduled desludging needs to be supported by institutions that have specific functions, namely planning, compliance with regulations, operations management, and service delivery. One organization may be able to carry out several of these functions as long as it does not create a conflict of interest. Scheduled desludging can involve private companies to carry out the service delivery function.

(5) **Procedure:** Scheduled desludging must be supported by (a) a customer management procedure, (b) a septic tank desludging procedure, (c) a septage transportation procedure, (d) a customer billing procedure, (e) a performance evaluation procedure. The consistent implementation of operating procedures will make scheduled desludging run regularly and systematically in accordance with the agreed operating scheme and objectives.

(6) **Financial:** Scheduled desludging must earn enough revenue from the households to cover all operating and management costs. To the extent possible, revenues from the scheduled desludging service can be used to help finance the infrastructure investment and provide a reasonable profit to the municipality or the service provider.

(7) **Regulation:** Scheduled desludging needs to be supported by a set of regulations requiring: (a) proper specifications and use of septic tanks, (b) periodic desludging, (c) monitored septage transportation, (d) disposal of septage in treatment facilities or other designated points, (e) septage treatment to meet effluent and other environmental standards, and (f) payment of service rates. In addition, regulations must also provide direction on (a) institutional framework, (b) private involvement, (c) payment mechanisms, and (d) tariff of the service.

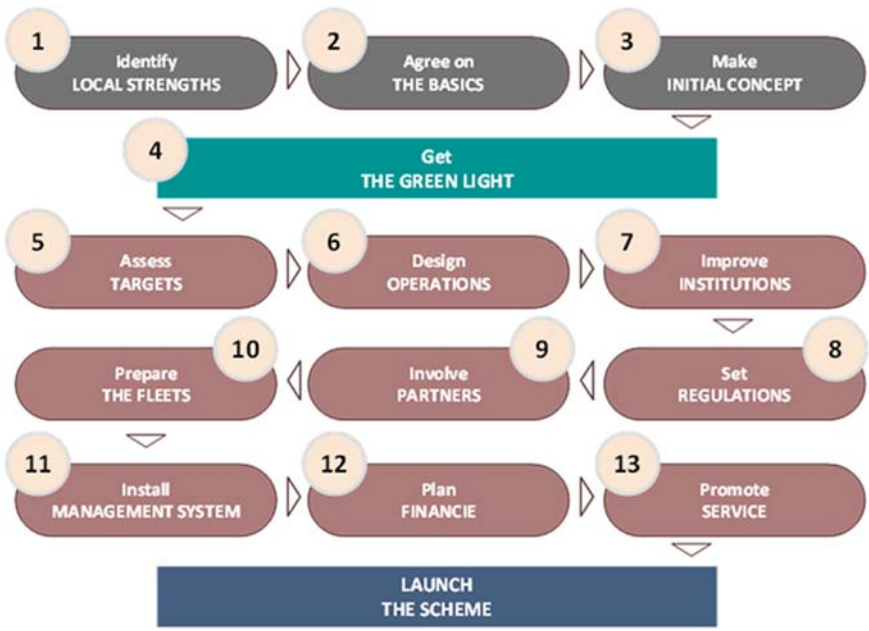

Figure 0.7 The 13 generic steps to set up the scheduled desludging scheme in a city.

0.5 THIRTEEN DEVELOPMENT STEPS

There are 13 general steps for preparing or setting up a scheduled desludging scheme in the city (see Figure 0.7). Some steps are sequential, others can be done simultaneously. Each city has its own characteristics and abilities so the steps in one city may be different from those in another city. Before the first step, the city should form a team that will facilitate the development of a scheduled desludging scheme. The following are the 13 steps to set up a scheme (see diagram).

(1) **Identify local strengths:** The team should obtain information on the population of the community and building use, the level of use of septic tanks, the availability of desludging trucks, the capacity of septage treatment facilities, and the existence of regulations and institutions related to sanitation issues. The team should investigate which of these items allow setting up of the scheduled desludging scheme to be feasible and less complicated and which of these will be the bottleneck.

(2) **Agree on the basics:** There are a number of basic and fundamental issues that need to be discussed and agreed on between team members and relevant parties that will provide general direction to the preparation of the scheduled desludging scheme. This might include the targets (area, types of buildings, and level of coverage), timelines, stages of development, and financial principles.

(3) **Make initial concept:** The initial concept should at least describe the estimated number of households to be served, the scale of operations, required infrastructure and financial estimates. The initial concept is made using existing secondary data and several logical assumptions.

(4) **Get the green light:** The green light from city leaders, particularly the mayor, must be obtained before implementing a scheduled desludging scheme. The green light of the leadership will enable the team to get support from other agencies. The initial concept of the scheduled desludging scheme must be presented to the leaders

(5) **Assess targets:** The scheduled desludging scheme is intended for all households and other buildings that use accessible septic tanks. The team must collect information from all households and buildings before a building can be classified as a viable scheduled desludging target or customer. At the end of this step, the team should have information on the amount, spatial distribution and type of buildings as well as the specifications and conditions of a proper septic tank. The best way is to survey or to perform a census on all households and buildings in the city.

(6) **Design operations:** Information collected from surveys or a census is used as a basis for determining the service zones, amount and classification of targeted buildings, desludging periods, scheduling period, and desludging modes. The operations design also includes the daily volume of septage, desludging frequency, number of desludging trucks or other vehicles and required treatment capacity for septage originating from scheduled desludging operation.

(7) **Improve institutions:** After the main service provider of scheduled desludging is appointed, the team should plan the capacity building activities for the organization. Starting from setting the organizational structure, improving functions and increasing the number and qualifications of personnel. In addition to service providers, the city government also needs to determine the role of planners, regulators and supervisors in other institutions. All must have the capacity needed to support scheduled sludge removal schemes. In addition to the service provider, the municipality needs to determine and establish the role of a planner, regulator, and supervisor on the other institutions. These roles must have the capacity required to support a sustainable and well-regulated scheduled desludging scheme.

(8) **Set regulations:** There must be regulations to require the use of proper septic tanks which must be desludged regularly and periodically as well as requirements for transporting septage safely to the

treatment facility where the septage will be treated to meet the effluent and other environmental standards. Regulations regarding service tariffs in several cities require approval from the legislature. All regulations must be developed together with their community promotion and compliance strategies.

(9) **Involve partners:** Third parties, both private entities and community groups, may need to be involved in providing septic tank desludging services. After choosing the right partner, we need to fix the scope and form of cooperation between the main service providers and the partners. Agreement must be made in writing and officially signed.

(10) **Prepare the fleets:** The septage desludging fleet needs to be prepared according to the operating scheme, modes of desludging and transportation and general conditions of traffic. This includes desludging vehicles, crew members and operating procedures. A licensing scheme for desludging vehicles needs to be established, as well as a fleet monitoring system. All crew members must undergo trainings before they can carry out their duties.

(11) **Install management system:** The quality of the business process of the scheduled desludging service provider will be determined by the quality of the management system. By utilizing digital information technology, we can manage information consistently, accurately, and efficiently. The management system will also be connected to a fleet monitoring device so that all operations can be monitored and recorded in real time.

(12) **Plan finance:** We need to estimate capital and operational expenditure based on the agreed operating design. Tariffs can be calculated afterwards according to the cost recovery policy and customer groupings. Projections on profit and loss, as well as balance sheet should be prepared to better ensure the financial health of scheduled desludging operation. The team can adjust the operational plan until the financial plan meets the expectations of all parties.

(13) **Promote the service:** Scheduled desludging is a mandatory measure. All households must understand the reasons and benefits of scheduled desludging as well as their rights and obligations as customers. A promotion strategy must be developed, before marketing tools and promotional officers are prepared.

The steps above are open for modification according to the characteristics and capabilities of each city. The speed at which scheduled desludging is prepared will be affected by the intensity and effectiveness of the team and all parties involved. It is also possible to adopt a more conservative approach that starts with raising awareness of on-demand emptying, applying incentives to those who request regular service before going for full-fledged scheduled desludging