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Desludging Service (FSM)

Knowledge Standard

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0 INTRODUCTION

The terminology and vocabulary used for sanitation and septage management differ among Urban Local Bodies (ULBs) across India due to the federal structure of governance, state-specific laws, and varying e-Governance system implementations. Non-standardized interfaces and storage also result in challenges related to data interpretation and interoperability. Therefore, without clear definitions, vocabulary, specifications, and benchmarks for municipal governance, it is challenging to enable 'Data-Driven Governance'. The municipal governance standards are being designed to include minimum base data elements common across municipal services in ULBs to ensure interoperability and harmonization. The Faecal Sludge Management (FSM) / Desludging Services taxonomy defined in this standard includes common FSM entities, channels, processes, stakeholders, reports and Key Performance Indicators (KPIs) and their definitions. The definition of entities for Desludging Services should kindly be guided by relevant State/UT and local laws

Together, these standards will ensure semantic and syntactic interoperability among all e-Governance systems in India.

The audience for this standard includes, but is not limited to government organisation, industry, academics, architects, customers, users, tool developers, regulators, auditors and standards development organizations. This Taxonomy is developed as an open standard under National Urban Digital Mission (NUDM) by National Institute of Urban Affairs (NIUA). No part(s) of the

document may be sublicensed. Any attempted sublicense, whether voluntarily or otherwise, shall be null and void, and will attract penal action.

This document is also interrelated with other Indian standards for e-Governance such as SP7: 2016, IS 18000, IS 18006 (Part 1) and IS 18006 (Part 3/Sec 1):2021.

0.1 Governing Principles in the Design of Knowledge Standard

To ensure this taxonomy fits the needs of interested stakeholders, the following principles have been followed in designing it:

Minimalist

The standards are designed to have minimum base elements common across ULBs to ensure interoperability, harmonisation and data-driven governance. These can then be adopted and built upon by some ULBs with higher process complexities.

Evolvable

The standard is designed to evolve over a period of time thereby adapting to changing needs and emerging technologies thus making the system comprehensive progressively.

Modular

The classifications and categorisations in the knowledge standard are designed modularly, yet they function together as a whole. They are independent and self-contained and may be combined and configured with similar units to suit separate contexts. Classifications and categorizations are designed modularly; for example, the "Desludging Process" and "Vehicle

Management" are independent but function together.

Extensible

The standard is designed such that the elements of Urban Governance are positioned in a hierarchy that accommodates both horizontal and vertical additions. This leaves room for wider adoption and innovation to suit the contexts of any ecosystem. The end goal is to build a knowledge practice that supports Open Standards with the Data Element taxonomy as a base.

Open

The standard is designed to be 'open' to enable wider ecosystem participation and use. The standard is intended to be used by State Governments, Urban Local Bodies (ULBs), industry and technology providers, academia and civil society organisations who are either working in the domain or are providing services to the ULBs in any manner.

Accessible & Inclusive

The standard is designed to be inclusive and accessible for all types of stakeholders. The standard will enable the technology to reach every strata of society.

0.2 Sample Use Cases

The Desludging Service knowledge Standard is applicable for multiple direct and indirect sanitation use cases-

Direct Application

- a. **Citizen-Initiated On-Demand Desludging** – Citizens request desludging of septic tanks or pits via Urban Platform for delivery of Online Governance

(UPYOG) or other portals, mobile apps, call centres, or ward offices.

- b. **Scheduled Desludging Programs** – ULBs may use FSM data to push scheduled services based on tank size, occupancy type, historical desludging records and regulatory requirements.
- c. **FSM Operator Assignment & Vehicle Monitoring** – Includes allocation of licensed desludging operators, vehicle dispatch, GPS tracking, completion verification and safe disposal recording.
- d. **Billing & Digital Payment** – Standardized bill generation, fee rules, payment status tracking and receipt management.

Indirect Application

- a. **Citywide Sanitation Planning** – Aggregated desludging frequency, GIS-based service coverage, and containment mapping help plan FSTPs, co-treatment plants, and transport logistics.
- b. **Environmental Regulation Compliance** – Supports monitoring of disposal at authorized treatment facilities, reducing illegal dumping and environmental contamination.
- c. **Public Health Surveillance** – Data can help identify high-risk zones, recurring blockages, or areas with unsafe containment practices.

Both applications shall help ensure regulatory compliance, minimize conflicts and promote planned urban development.

Information Consistency

The standard ensures consistency across ULBs through the use of:

- Unified data elements
- Standardized processes
- Common reporting structures
- Alignments with UPYOG registries and metadata tags

Integrated systems should auto-fetch or link related data such as:

- Property Identification Numbers (PID/UPIC)
- Containment details (tank type, size, last desludged date)
- Operator and vehicle registry data
- Sanitation worker registry
- Disposal facility availability and capacity

Together, this ensures reliable, comparable and actionable FSM data for governance.

1 SCOPE

This standard covers:

- Service request initiation
- Technical assessment and inspection
- Assignment and scheduling
- Desludging operations
- Transport and treatment
- Safe disposal and closure
- Citizen feedback and performance evaluation

Out of scope (to be incorporated in phase-2):

- Treatment plant engineering specifications
- Sewer network operations
- GIS & GPS integrations

The standard does not prescribe specific treatment technologies or engineering designs for Faecal Sludge Treatment Plants (FSTPs)/Sewage Treatment Plants (STPs). Instead, it standardises service delivery processes, data definitions and governance mechanisms required for effective FSM implementation.

2 REFERENCES

The Desludging Service (FSM) Knowledge Standard draws upon a comprehensive set of National, state, and sectoral guidelines to ensure consistency, standardization and regulatory compliance across ULBs. These references provide the statutory, operational, architectural and digital frameworks required for effective desludging service delivery.

- National Policy on Faecal Sludge and Septage Management, Ministry of Housing and Urban Affairs (MoHUA), 2017
- Swachh Bharat Mission (Urban) 2.0 – Operational Guidelines
- NITI-NFSSM-Alliance-Report
- Faecal Sludge and Septage Management From Policy to Practice, IIT, Mumbai
- Case study FSM challenge in Assam, Odisha etc.

Can be referred in Bibliography [6](#)
[BIBLIOGRAPHY](#)

3 TERMINOLOGY AND ABBREVIATIONS

3.1 Terminology

For the purpose of this standard, the definitions given in IS 18006 (Part 1) : 2021 and IS 18006 (Part 3/Sec 1): 2021 shall apply, in addition to the following:

3.1.1 Aadhaar

Aadhaar is a verifiable 12-digit identification number issued by Unique Identification Authority of India (UIDAI) to the residents of India.

3.1.2 Application Programming Interface (API)

The term Application Programming Interface (API) means any mechanism that allows a system or service to access data or functionality provided by another system or service. The API is generally used to interact (like query, list, search, and sometimes submit & update) directly with the specific information on a system, to trigger some action on other systems, or to perform some other action on other systems.

3.1.3 Consumer

A Consumer is a person who purchases a product or avails a service for consideration, either for their personal use or to earn their livelihood by means of self-employment. It also includes a beneficiary of such goods/services when such use is made with the approval of such person. The term Consumer may be used interchangeably as per the State/ULB requirement.

3.1.4 Data Elements

A Data Element is a logical definition of data. Any unit of Data defined for processing is a Data Element. The basic principle of data modelling is the combination of an object class and an attribute to form a more specific 'data element concept'. For example, Application ID, name, address, ULB, building details that are associated with Data entities.

3.1.5 Data Entities

Entities were created to help users to locate their data elements from the entire list. However, this grouping should not be confused with data sets. The data sets are lists of data elements required for a certain program or application to function and should be created by choosing relevant data elements from various entities.

3.1.6 Domain

A sub-category under an Information Technology field is a Domain; specific purpose within a "Domain" is known as "Area". For example, "Document type for Web publishing content" is one Area under the "Presentation" domain.

3.1.7 E-governance

A procedural approach in which the Government and the citizens, businesses and other stakeholders are able to transact all or part of their activities using Information and Communication Technology tools.

3.1.8 Interoperability


The ability of different information technology systems and software applications to communicate,

exchange data, and use the information that has been exchanged.


3.1.9 Metadata


Metadata is data about data. Metadata describes how and when and by whom a particular set of data was collected. Metadata is essential for understanding the information stored.


3.1.10 Depicted Symbols

Domain is depicted as  for e.g. No Objection Certificate

Data Entities are depicted as  for e.g. Building Details

Channels are depicted as  for e.g. Digital and Non-Digital Channels

Stakeholders are depicted as  for e.g. Stakeholder Matrix

Processes are depicted as  for e.g. Application Creation

Reports & KPIs are depicted as 

3.2 Abbreviations

BIS	Bureau of Indian Standards
CDG	Centre for Digital Governance
FSM	Faecal Sludge Management
FSSM	Faecal Sludge and Septage Management
PSSO	Private Sanitation Service Organisation
FSTP	Faecal Sludge Treatment Plant
STP	Sewage Treatment Plant
KPI	Key Performance Indicators

MoHUA	Ministry of Housing & Urban Affairs
NIUA	National Institute of Urban Affairs
NUDM	National Urban Digital Mission
PID	Property Identification Number
PTIN	Property Tax Identification Number
SLB	Service Level Benchmark
SLG	Service Level Guarantee
SMS	Short Message Service
ULB	Urban Local Body/Bodies
UPYOG	Urban Platform for deliverY of Online Governance
W&S	Water & Sewerage
ODF	Open Defecation Free

4 DESLUDGING SERVICE (FSM)

Desludging Service (FSM) is a core mandatory urban sanitation function that ensures the safe, systematic, and regulated removal of faecal sludge and septage from on-site sanitation systems (OSS). As most Indian cities rely heavily on OSS rather than sewer networks, desludging plays a foundational role in maintaining public health, environmental safety and citywide sanitation efficiency. The UPYOG Desludging Module provides a standardized digital workflow that ensures transparency, traceability, and accountability throughout the desludging service cycle.

Proper FSM prevents indiscriminate dumping, reduces disease burden, protects water bodies and supports cities in achieving and sustaining ODF+, ODF++, and Water+ statuses under SBM 2.0.

4.1 Importance of FSM in Urban Sanitation

Desludging services protect citizens and the environment by ensuring:

- Groundwater safety by preventing leaching from overfilled or damaged septic tanks.
- Disease prevention, particularly water-borne diseases arising from sewage overflow.
- Environmental protection by reducing dumping of faecal sludge into water bodies and open lands.
- Sanitation equity by providing access to safely managed sanitation services for all communities, including unplanned and low-income settlements.
- Regulatory compliance with state sanitation policies and national guidelines.

4.2 Legal and Regulatory Framework

FSM service delivery is governed by a combination of National policies, state regulations and local by-laws, including:

- MoHUA FSSM Guidelines (2017) – Establishing national protocols for containment, emptying, transport, treatment, and disposal.
- State-level FSSM Policies – Including norms for desludging frequency (usually every 2–3 years), operator licensing, and disposal facility authorization.
- National Policy on FSSM, 2017
- SBM (Urban) 2.0 guidelines for ODF+ and ODF++
- Environmental protection and pollution control laws
- Labour safety and occupational health regulations
- Municipal Acts and service bye-laws

4.3 Service Delivery Methodology (Aligned with UPYOG Workflows)

This Knowledge Standard has been developed as a digital governance taxonomy aligned specifically with the Urban Platform for delivery of Online Governance (UPYOG) under the National Urban Digital Mission (NUDM). The scope of this standard is restricted to defining data elements, workflows, Channels, stakeholders, processes, reports, and KPIs as operationalized within the UPYOG platform. While the taxonomy captures the entire service lifecycle from request initiation to closure, monitoring and reporting. It enables FSM through configurable, role-based workflows that reflect actual service delivery processes. The methodology ensures that each step—from request creation to disposal—is digitally recorded, verifiable and auditable, thereby strengthening regulatory oversight and service quality.

UPYOG standardizes the end-to-end desludging process across all ULBs. The typical workflow includes but not restricted to the given workflow:

- **Septic Tank Design Compliance** – The design, construction, and installation of septic tanks shall be carried out in accordance with Bureau of Indian Standards (BIS) standards, specifically IS 2470 (Part 1 & Part 2), which prescribe the code of practice for installation and construction of septic tanks and secondary treatment systems.
- **Service Request Initiation** – Citizen, operator or ULB raises a request.
- **Verification of Property & Containment Details** –

- Ensures accurate tank data and prevents fraudulent requests.
- **Operator Assignment** – Manual or system-based allocation of the nearest/available licensed operator.
- **Vehicle Dispatch & Tracking** – Geo-tagging and GPS monitoring ensure service authenticity.
- **Desludging Operation Execution** – On-site extraction of sludge using approved equipment.
- **Disposal Facility Verification** – Ensures sludge reaches an authorized FSTP/STP.
- **Billing and Payment** – Transparent and standardized charges for the service.
- **Grievance Redressal** – Citizens can escalate service issues digitally.
- **City-Initiated Scheduled Desludging** – The Urban Local Body (ULB) shall implement a city-initiated (scheduled) desludging program based on property database records, septic tank capacity, occupancy levels, and historical desludging data. The frequency of desludging shall be determined through analysis of time-based and performance data trends, enabling a structured, proactive, and evidence-based desludging cycle (e.g., once every 3–5 years), rather than relying solely on-demand requests.

4.4 Key Components of FSM Service Delivery

- Standardised digital service requests
- Verified containment and property information

- Licensing operators, vehicles and drivers
- Data management of FSTP/STP
- Trip scheduling and vehicle logbooks
- Digital proof of safe disposal
- Integrated billing, payment, and subsidy mechanisms
- Real-time tracking
- Citizen feedback and grievance redressal
- Role-based configurable workflows for approval and rejection process
- Integration with Property Tax, OBPAS, Grievance Management, etc.
- Reporting and Dashboards

4.5 Challenges Addressed

The FSM knowledge standard addresses several long-standing challenges in desludging service delivery:

- Fragmented and informal service provision
- Lack of traceability of sludge from source to disposal
- Unsafe disposal practices and environmental violations
- Absence of service-level accountability
- Limited data availability for planning and regulation
- Inconsistent or missing tank and property records
- Unregulated private operators without licensing or oversight
- Inability to track performance metrics such as service times, volumes handled or operator efficiency

By standardizing data elements, processes, and stakeholder roles, the UPYOG FSM module transforms

desludging from an ad-hoc activity into a regulated municipal service.

4.6 Programmatic Benefits of this Knowledge Standard

The adoption of this FSM knowledge standard enables:

- Uniform implementation of desludging services across states and ULBs
- Interoperability with other UPYOG modules and National digital systems
- Improved monitoring for SBM(U), AMRUT, and SDG reporting etc.
- Evidence-based policy formulation and capacity planning

5 TAXONOMY FOR DESLUDGING SERVICE (FSM)

The taxonomy defines all data elements, entities, relationships, and metadata required for the standardized functioning of the Desludging Service (FSM) across ULBs. This taxonomy ensures interoperability, uniformity and reusability of FSM service data across states, platforms, and stakeholders.

Each element of the taxonomy corresponds to a functional requirement within the desludging service lifecycle, from service request initiation to final disposal and closure. **See Fig. 1.**

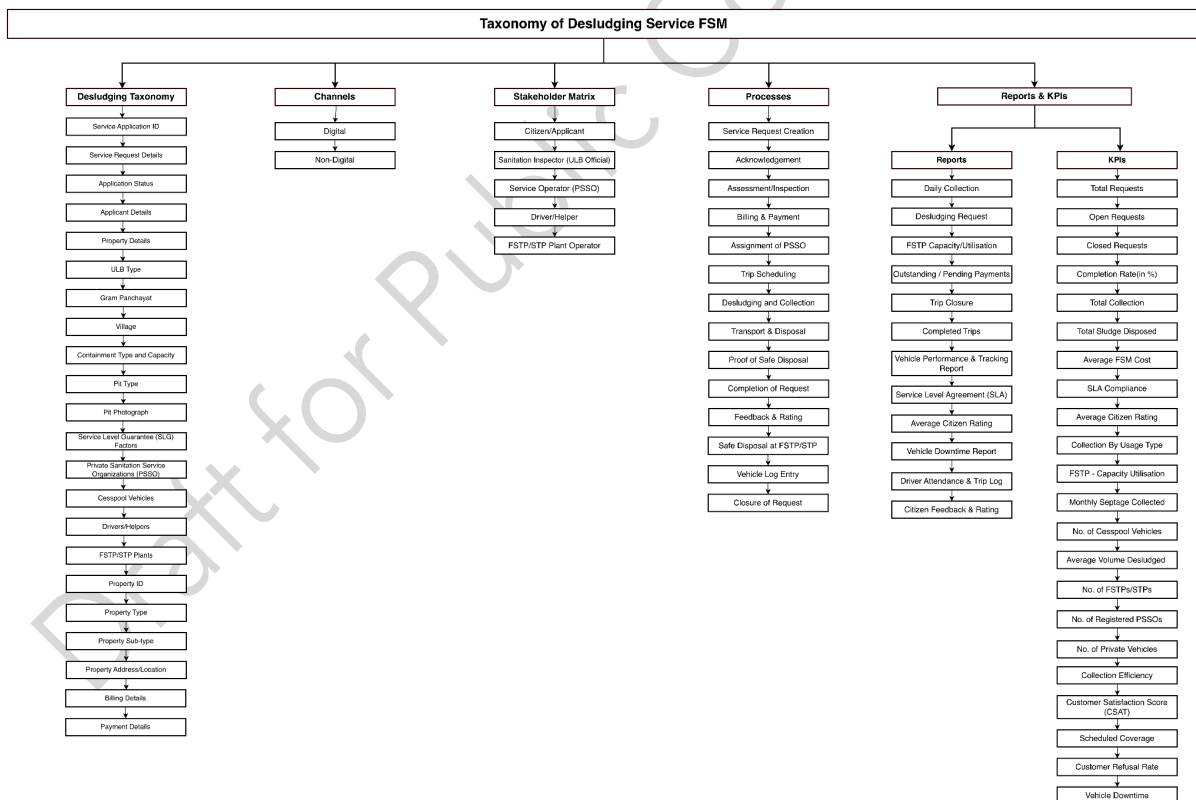


Fig. 1: TAXONOMY OF Desludging Service (FSM)

5.1 Desludging Service

5.1.1 Service Application ID

The Service Application ID is a unique, system-generated identifier assigned to every desludging request registered on the UPYOG platform. This identifier remains constant throughout the service lifecycle and serves as the primary reference for tracking, auditing, reporting, grievance redressal and inter-departmental coordination. It ensures end-to-end traceability of the desludging operation.

This serves as a reference for future verification, renewals, or updates, ensuring streamlined governance and transparency.

5.1.2 Service Request Details

This component captures the core attributes of the desludging request, including the date and time of application, type of request (routine, emergency, institutional, bulk), preferred service window, property details, location, pit details (road width and distance of pit from road) and any specific instructions provided by the

applicant. These details form the basis for service prioritisation, scheduling, and operational planning. Citizens may also indicate the basis of priority or urgency—such as leakage, overflow, backflow, or similar conditions. These details form the basis for service prioritisation, scheduling, and operational planning.

5.1.3 Application Status

Application Status reflects the real-time stage of the service request within the defined UPYOG workflow. Typical statuses include Submitted, Acknowledged, Under Inspection, Approved, Assigned, In Progress, Pending for payment, Payment collected, Payment failed, Rejected, Reassigned, Completed, and Closed. Status updates are automatically logged to ensure transparency and to keep all stakeholders informed of service progress. **See Fig.2**

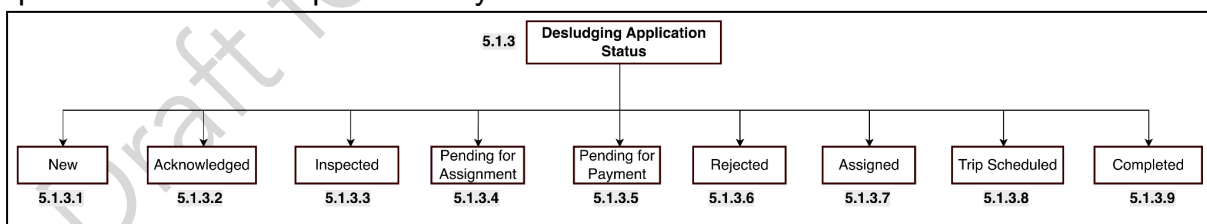


FIG 2 TAXONOMY FOR APPLICATION STATUS

5.1.3.1 New

The status **New** indicates that a desludging service request has been successfully submitted by the citizen through the UPYOG platform (web portal, mobile application, or assisted

channels such as CSCs or ULB facilitation centres).

- The application is captured with essential details such as property location, containment type, contact information and preferred service timeline

- A unique application reference number is generated
- No verification or operational action has yet been initiated by the ULB.

5.1.3.2 Acknowledged

The **Acknowledged** status confirms that the ULB system has formally received the application and that it is eligible for further processing.

Key characteristics of this stage include:

- System-level or official-level acknowledgment of the application
- Communication to the citizen confirming receipt and next steps
- Placement of the application in the inspection or verification queue.

5.1.3.3 Inspected

The **Inspected** status denotes that a field inspection or desk-based verification has been completed by the designated ULB official or authorized personnel.

Inspection may involve:

- Validation of property and containment details
- Assessment of accessibility for desludging vehicles
- Estimation of sludge volume and service requirements
- Verification of safety, environmental, and operational feasibility

The outcome of this stage determines whether the application proceeds for assignment, requires modification, or is liable for rejection.

5.1.3.4 Pending for Assignment

An application moves to **Pending for Assignment** once inspection is completed and the request is approved for service delivery.

At this stage:

- The application awaits allocation to an authorized desludging service provider to assign a vehicle
- Scheduling constraints such as availability, route optimization, and service timelines are considered
- No service provider has yet been formally assigned

This status reflects an internal coordination phase within the ULB or between the ULB and empanelled operators.

5.1.3.5 Pending for Payment

The **Pending for Payment** status indicates that the service charges have been calculated and the applicant is required to make payment prior to service execution, wherever applicable.

Key aspects include:

- Fee computation based on local bye-laws, volume estimates, or trip-based pricing
- Generation of a demand or payment request through UPYOG
- Availability of online and/or offline payment modes

Service execution is not initiated until payment confirmation is received, except in cases where policy permits post-service payment.

5.1.3.6 Assigned

An application attains the **Assigned** status once a desludging vehicle, operator or service provider has been formally allocated to the request.

This stage includes:

- Assignment of responsibility for service execution
- Notification to the service provider with job details
- Communication to the citizen regarding tentative service timelines

The assignment marks the transition from planning to execution readiness.

5.1.3.7 Pending for Vehicle Assignment

The **Pending for Vehicle Assignment** status indicates that the service provider has been identified or approved, but a specific desludging vehicle has not yet been allocated remembering operational constraints.

This stage typically involves:

- Checking availability and fitness of desludging vehicles
- Consideration of vehicle capacity, route plans and proximity to the service location
- Alignment with treatment plant operating schedules and regulatory requirements

This status enables granular operational control and prevents

premature scheduling without confirmed vehicle readiness.

5.1.3.8 Vehicle Assigned

An application attains the **Vehicle Assigned** status once a specific desludging vehicle has been formally allocated to the service request.

Key characteristics of this stage include:

- Mapping of vehicle identification details to the application
- Confirmation of driver/operator responsibility
- Readiness of the service request for final scheduling and execution

This status establishes clear operational accountability and serves as a prerequisite for trip scheduling.

5.1.3.9 Trip Scheduled

The **Trip Scheduled** status indicates that the desludging operation has been scheduled for a specific date and time.

Key elements of this stage are:

- Finalization of service schedule
- Alignment between citizen availability, vehicle routing and plant operating hours
- System-generated alerts or reminders to all stakeholders

This status reflects operational confirmation prior to physical service delivery.

5.1.3.10 Rejected

The **Rejected** status signifies that the application has been declined and will not proceed further in the service workflow.

Common reasons for rejection may include:

- Incomplete or incorrect information
- Infeasible access to the containment system
 - Inaccessible Road
 - Locked Premises
 - Lack of Physical Access to Tank
 - Unavailability of Required Hose/Pipe Length
 - Vehicle Breakdown
 - Unavailability of Vehicle
 - Illegal Direct Discharge Connection
 - Excessive Solid Waste in Tank
- Duplicate or invalid service requests

The rejection is recorded with documented reasons and communicated to the citizen to ensure transparency and grievance redressal, if required.

Note: The system has the feasibility to provide timely reassignment to an alternate empaneled vendor or deployment of an appropriate vehicle, ensuring continuity of service and safeguarding households from service disruption due to vendor-side limitations etc.

5.1.3.11 Closure of Request

The **Closure of Request** status confirms that the desludging service has been successfully executed at the property location.

Completion entails:

- Physical emptying of the containment system
- Digital confirmation by the service provider or ULB official

- Capture of service completion details such as date, time, quantity and geo-tagging (where enabled)

This status signifies fulfillment of the core service obligation.

5.1.3.12 Pending for Citizen Feedback

After service completion, the application moves to **Pending for Citizen Feedback**.

At this stage:

- The citizen is invited to provide feedback on service quality, timeliness and overall satisfaction
- Feedback may be captured through ratings, comments or structured surveys
- The status remains open for a defined feedback window

This stage supports service quality improvement, accountability, and performance benchmarking.

5.1.3.13 Pending at FSTP Plant Disposal

The **Pending at FSTP Plant Disposal** status represents the final environmental compliance stage of the desludging workflow.

This status indicates:

- The collected faecal sludge is yet to be disposed at an authorized Faecal Sludge Treatment Plant (FSTP) or Sewerage Treatment Plant (STP)
- Monitoring of vehicle movement and disposal confirmation

- Ensuring regulatory compliance and prevention of illegal dumping

The application is fully closed only after confirmation of safe and compliant disposal at the designated treatment facility.

5.1.4 Applicant Details

Applicant Details record essential information about the individual or entity requesting the desludging service. This includes the applicant's name, mobile number, address reference, and applicant category such as owner, tenant, institution, commercial establishment, or government facility. These details support communication, verification, and service accountability.

5.1.5 Property Details

Property Details capture the physical location where desludging is to be carried out. This includes the property address, ward or locality, holding or assessment number (where applicable), and geo-coordinates (if applicable). Accurate property information is critical for inspection, routing of vehicles and service delivery verification.

5.1.6 ULB Type

This field identifies the administrative jurisdiction responsible for service delivery, such as Municipal Corporation, Municipal Council, Nagar Panchayat, or other notified urban authority. Classification on the basis of ULB type supports differential service configurations, fee structures and reporting requirements.

5.1.7 Gram Panchayat

In cases where the FSM service is extended to rural or peri-urban areas, the Gram Panchayat name and code are captured. This enables integration of FSM services across urban–rural that will support planning under district or state sanitation frameworks.

5.1.8 Village

The Village field records the name and administrative code of the village where the desludging service is requested. This is particularly relevant for FSM service coverage beyond statutory urban boundaries and ensures location-specific monitoring and reporting.

5.1.9 Containment Type and Capacity

This element records the type of on-site sanitation containment structure, such as septic tank, single pit, twin pit, or other approved containment systems, along with its estimated holding capacity. This information is essential for determining vehicle capacity requirements, frequency of desludging and appropriate treatment pathways.

5.1.10 Pit Photograph

A geotagged photograph of the containment structure is captured at the time of inspection or service delivery. This serves as visual evidence for verification, audit purposes, and quality control that helps in reducing disputes related to service execution.

The system also captures access-related parameters, including approximate road width, site

accessibility conditions and the distance of the septic tank/pit from the nearest motorable road. These details support operational planning, appropriate vehicle deployment and informed decision-making in cases of rejection or reassignment.

5.1.11 Service Level Guarantee (SLG) Factors

SLG Factors define the service timelines committed by the ULB, such as maximum time for inspection, service delivery and closure of requests etc. These parameters are configurable as per local policy and enable performance monitoring and enforcement of accountability.

5.1.12 Private Sanitation Service Organizations (PSSO)

This component captures details of empanelled Private Sanitation Service Organizations authorised to provide desludging services. Information includes organisation name, licence or empanelment validity, service jurisdiction, compliance status etc. Only approved PSSOs are eligible for assignment through the system.

5.1.13 Cesspool Vehicles

Cesspool vehicles are a critical operational asset in the Faecal Sludge Management (FSM) service chain, enabling the safe extraction, transport and delivery of faecal sludge from on-site sanitation systems to designated treatment facilities. Under the UPYOG FSM module, all vehicles engaged in desludging operations are required to be registered, authorised,

and digitally mapped to ensure regulatory compliance and operational traceability.

5.1.14 Drivers/Helpers

Drivers/Helpers form the core human resource responsible for executing desludging operations in the field. The FSM taxonomy mandates the registration of all drivers/helper operating cesspool vehicles to establish accountability and ensure adherence to safety and regulatory requirements.

Driver records include personal identification details, mobile number, driving licence number and validity, association with a specific PSSO, and linkage to assigned vehicles. Capturing this information ensures that only trained and authorised personnel are permitted to operate desludging vehicles.

5.1.15 FSTP/STP Plants

Faecal Sludge Treatment Plants (FSTPs) and Sewage Treatment Plants (STPs) are the terminal points of the FSM service chain, responsible for the safe treatment and disposal of collected sludge.

The plant registry includes details such as plant name, location (latitude & longitude), treatment capacity, treatment technology, operating agency, and regulatory approval status etc. Only registered and compliant FSTPs/STPs can be selected as disposal destinations within the system.

5.1.16 Property ID

The **Property ID** is a mandatory and unique foundational identifier within the Desludging Service (FSM) module of UPYOG. It uniquely links every desludging service request to a specific property or premises within the jurisdiction of the Urban Local Body (ULB). The Property ID serves as the primary reference for integrating FSM services with other urban governance systems and ensures traceability, accountability and data integrity throughout the service lifecycle.

5.1.17 Property Type

The **Property Type** identifies the broad functional use of the premises where desludging services are requested. Typical classifications include, but are not limited to:

- Residential
- Institutional (schools, hospitals, hostels, government buildings etc)
- Commercial (shops, offices, markets etc)
- Industrial
- Mixed-use

Property Type classification supports differentiated service planning, prioritization and tariff application as per ULB by-laws and FSM policies.

5.1.18 Property Sub-Type

The **Property Sub-Type** provides a more granular description of the built type or occupancy pattern within each Property Type.

Examples include:

- Row House
- Independent House
- Apartment / Flat
- Shared or Group Housing
- Institutional Campus
- Temporary or Semi-permanent Structure

Sub-Type classification assists in assessing access constraints, containment size, desludging frequency and vehicle suitability.

5.1.19 Property Address/Location

Accurate Property Address and location information is essential for service delivery efficiency, routing optimization and regulatory traceability within the FSM module.

The Property Address shall be captured using standardized fields to the extent feasible, including:

- House / Plot / Holding Number
- Street or Locality Name
- Ward or Administrative Unit
- City or Town (for urban areas)
- Gram Panchayat and Village Name (for rural or peri-urban jurisdictions)
- District and State
- Pincode

The address structure shall be configurable to accommodate urban, rural and mixed governance contexts as per NUDM interoperability principles.

The geo-location coordinates may be captured to:

- Enable precise navigation for desludging vehicles
- Reduce service delays due to address ambiguity
- Support monitoring, analytics, and compliance verification

Location details are validated during inspection or service execution stages to ensure accuracy and operational feasibility.

5.1.20 Billing Details

These are the details of bills generated during the process of application for a new desludging request. **See Fig.3.**

5.1.20.1 Bill ID

Bill ID is a unique identifier that identifies an applicant's bill for accounting purposes.

5.1.20.2 Bill Amount

An amount of money paid by the applicant during the application of the

service. The application processing fees are included in the overall fee calculation.

5.1.20.3 Billing Date

Billing date is the date on which a bill is generated during the application process.

5.1.20.4 Payment Status

Payment status is the status of payment against a raised bill.

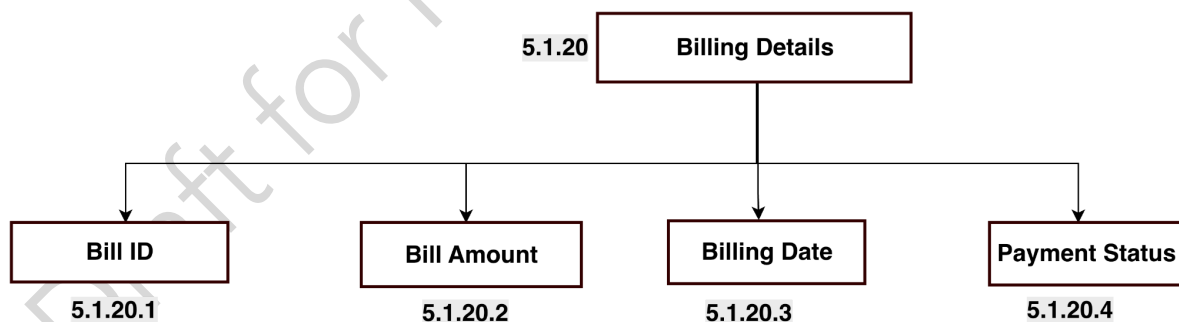


FIG. 3- TAXONOMY FOR BILLING DETAILS

5.1.21 Payment Details

Payment Details include the applicable desludging fee, billing reference, mode

of payment (online or offline), transaction ID and payment status. Integration with UPYOG's payment services ensures secure transactions, financial transparency and automated reconciliation. **See Fig.4**

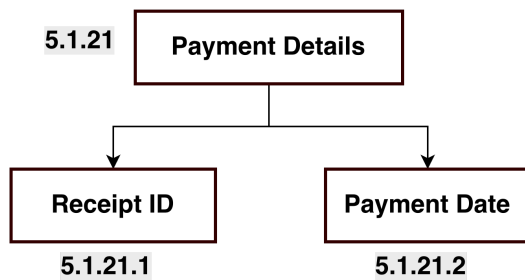


FIG 4. TAXONOMY FOR PAYMENT DETAILS

5.1.21.1 Receipt ID

Receipt ID is a unique identifier which is generated once payment is completed and payment details are captured on the accounting system.

5.1.21.2 Payment Date

The date on which the desludging fees (application for desludging service) is paid by the applicant.

5.2 Channels

FSM services under UPYOG are designed to be accessible through multiple service delivery channels to ensure inclusivity, ease of access and equitable service availability across different user groups. **See Fig.5**

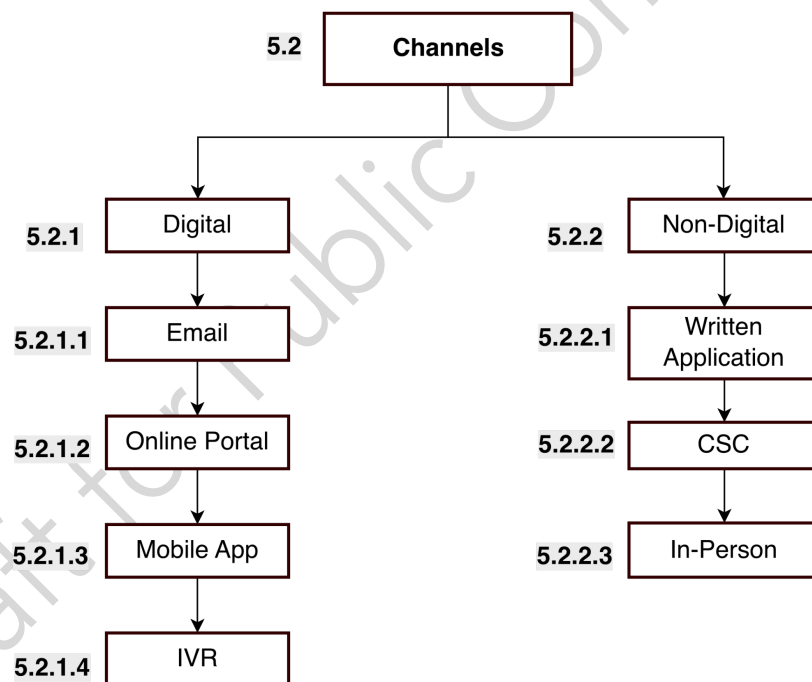


FIG 5. TAXONOMY FOR FSM CHANNELS

5.2.1 Digital

Digital channels include the UPYOG citizen portal, mobile applications, Common Service Centres (CSCs) and other assisted digital platforms. These

channels allow applicants to submit desludging requests, make payments, track service status, upload

documents, and provide feedback in a transparent and time-bound manner.

Digital access promotes efficiency, reduces manual intervention and enables real-time monitoring and analytics for ULBs and state authorities.

5.2.1.1 Email

Electronic media for transfer of messages and information through the internet.

5.2.1.2 Online Portal

Web portals or web applications refers to the websites developed to request for the desludging service. This broadly includes an assessment calculator, desludging data (FSTP, Vendor, Driver, Boundary, property, location etc.), owner's information and facility to pay the desludging fees through payment gateways linked to the portals. These portals also include the websites developed by the National, State or ULB for e-governance service delivery.

The system will also auto direct the application to the requisite departments during the application process to ensure minimal hassle for the applicant.

5.2.1.3 Mobile App

A mobile application, also referred to as a mobile app or simply an app, is a computer program or software application designed to run on a mobile device such as a phone, tablet, or watch.

5.2.1.4 IVR

Interactive Voice Response (IVR) is a technology that allows humans to

interact with a computer-operated phone system through the use of voice and DTMF tones input via a keypad. The call centre operator will listen to the request for desludging and register the same in the system. The call centre operator may contact the citizen in case information provided is insufficient or any clarification required.

5.2.2 Non-Digital

Non-digital channels include municipal helpdesks, ward offices and designated facilitation centres. In such cases, authorised officials assist citizens by entering service requests into the UPYOG system on their behalf.

This ensures that lack of digital access does not become a barrier to avail FSM services, while maintaining a unified digital record for all requests.

5.2.2.1 Written Application

A written application refers to a channel for desludging which includes an application in a prescribed Form/Format, addressed to the Municipal Commissioner or any other competent authority, requesting for desludging request.

5.2.2.2 CSC

Common Service centers are the access points for delivery of various services using Information and Communication Technology (ICT). CSCs were introduced under the National E-government Project by the Government of India.

5.2.2.3 In Person

A person/s can walk in to the municipal office/ ward office to request for the desludging service.

5.3 Stakeholder Matrix

The desludging service involves multiple stakeholders, each playing a defined role in ensuring effective, safe, and compliant service delivery. The stakeholder matrix clarifies responsibilities and system interactions. Participation by all relevant stakeholders ensures sharing a common understanding and involvement in the decision-making process as well as accountability in urban governance. Participation by all stakeholders leads to empowerment and joint ownership and harmonized access to information connecting multiple urban departments to serve citizens better. *See Fig.6.*

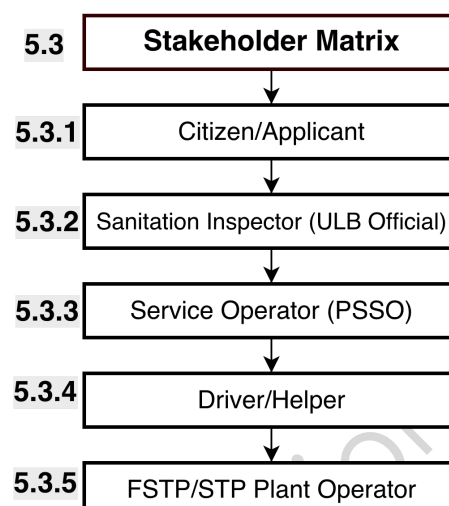


FIG 6. TAXONOMY FOR DESLUDGING SERVICE (FSM) STAKEHOLDER

5.3.1 Citizen/Applicant

The citizen/applicant and the counter employee is the initiator and beneficiary of the desludging service. The applicant submits a request for desludging through available digital or assisted channels and provides accurate information related to the property, sanitation containment system and access conditions. This information forms the foundation for service planning, inspection, and execution.

In addition to initiating the request, the applicant is responsible for ensuring physical access to the containment structure at the time of service delivery and for cooperating with inspection or verification activities, if required. Upon completion of the service, the applicant participates in the feedback and rating process, which serves as an important input for service quality monitoring and continuous improvement.

5.3.2 Sanitation Inspector (ULB Official)

The Sanitation Inspector represents the regulatory and supervisory authority of the Urban Local Body (ULB) within the FSM service framework. This role is central to ensuring that desludging services are delivered in accordance with prescribed standards, safety norms, and service-level guarantees.

Key responsibilities include verification of service requests, conducting physical inspections wherever mandated, approving service execution and monitoring compliance throughout the service lifecycle. The Sanitation Inspector also plays a critical role in resolving discrepancies, enforcing corrective actions and ensuring that desludged material is

transported and disposed of only at authorised treatment facilities.

5.3.3 Service Operators (PSSOs)

Private Sanitation Service Organisations (PSSOs) are empanelled entities authorised by the ULB to carry out desludging operations. They form the operational backbone of FSM service delivery and are responsible for deploying compliant vehicles, trained drivers, and supporting staff.

PSSOs are accountable for executing desludging services within assigned timelines, adhering to safety and environmental norms, and ensuring that all collected sludge is transported directly to designated FSTP or STP facilities. Their performance is monitored through system-generated records, service completion data, and citizen feedback.

5.3.4 Driver / Helper

Drivers and helpers are responsible for executing desludging operations at the field level. Their duties include operating desludging equipment, handling faecal sludge safely, following prescribed occupational health and safety protocols, and accurately reporting service execution details.

This role is critical from both operational and compliance

perspectives, as improper handling or deviation from approved routes and disposal practices can result in significant health and environmental risks. System-level recording of driver activities ensures accountability and supports enforcement of safety standards.

5.3.5 FSTP / STP Plant Operator

The FSTP or STP Plant Operator is responsible for receiving faecal sludge delivered by cesspool vehicles and ensuring its treatment and disposal in accordance with environmental regulations and approved operating procedures.

The plant operator confirms receipt of sludge, records quantity and source details, and updates treatment confirmation within the system.

0.35.4 Processes

The desludging service process under UPYOG follows a structured and sequential workflow designed to ensure transparency, traceability, service quality, and regulatory compliance. Each stage of the process is digitally recorded, enabling monitoring, audit, and performance evaluation. **See Fig.7.**

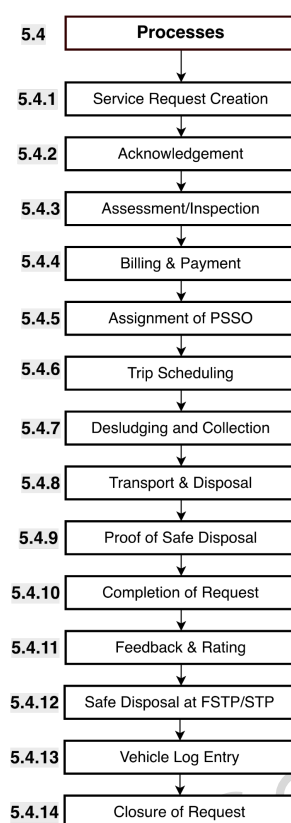


FIG 7. TAXONOMY FOR DESLUDGING SERVICE (FSM) PROCESSES

5.4.1 Service Request Creation

The service lifecycle begins with the creation of a desludging request by the citizen or through assisted channels (CSC centers/counter employees). At this stage, essential details such as applicant information, property

location, containment type, and service requirements are captured. Accurate data entry at this stage is critical for subsequent inspection, scheduling, and execution.

5.4.2 Acknowledgement

Upon successful submission of the request, the system generates an acknowledgement containing a unique Service Application ID. This acknowledgement serves as formal confirmation of request receipt and enables the applicant to track the status of the service.

5.4.3 Assessment / Inspection

Where required by local policy or based on request parameters, a sanitation official conducts an assessment or inspection. The inspection verifies containment type, capacity, accessibility, and any site-specific constraints. Findings from this stage determine service feasibility, resource requirements, and applicable charges.

5.4.4 Billing & Payment

Based on approved inspection details or predefined fee structures, the system generates the desludging charges. Payment is collected through integrated digital payment mechanisms or approved offline modes. Successful payment is a prerequisite for scheduling service execution.

5.4.5 Assignment of PSSO

Following payment confirmation, an authorised PSSO is assigned to the request. Assignment is based on factors such as availability, proximity, vehicle capacity, and jurisdictional coverage, ensuring efficient and timely service delivery.

5.4.6 Trip Scheduling

The desludging trip is scheduled in coordination with the assigned PSSO and driver. Scheduling information, including date and time, is communicated to all relevant stakeholders to ensure preparedness and minimise service delay.

5.4.7. Desludging and Collection

On the scheduled date, the PSSO team performs desludging at the applicant's premises. Operations are carried out using approved equipment and safety protocols to prevent spillage, exposure, or damage to property.

5.4.8 Transport & Disposal

Collected sludge is transported in sealed vehicles directly to an authorised FSTP or STP. Direct transport without intermediate dumping is mandatory to ensure environmental safety and regulatory compliance.

5.4.9 Proof of Safe Disposal

Upon arrival at the treatment facility, digital proof of disposal is captured. This typically includes geotagged photographs, timestamps, and system confirmations, providing verifiable evidence of safe disposal.

5.4.10 Completion of Request

Once desludging and disposal activities are completed and verified, the service request is marked as completed in the system, subject to final confirmation.

5.4.11 Feedback & Rating

The applicant is invited to provide feedback and rate the service. This feedback contributes to service quality assessment and operator performance evaluation.

5.4.12 Safe Disposal at FSTP

The treatment plant operator confirms receipt and treatment of the sludge, completing the disposal verification process.

5.4.13 Vehicle Log Entry

Vehicle movement, trip completion details, and disposal records are logged within the system. These logs support monitoring, audit, and compliance enforcement.

5.4.14 Closure of Request

After verifying that all process steps have been completed and service-level guarantees have been met, the request is formally closed. Closure signifies the completion of the desludging service lifecycle.

0.4 5.5 Reports and KPIs

A robust reporting and performance measurement framework is essential for monitoring the effectiveness, efficiency, and regulatory compliance of desludging services under the Faecal Sludge Management (FSM) system. Reports provide operational

visibility and support day-to-day decision-making, while Key

Performance Indicators (KPIs) enable performance evaluation, benchmarking, and long-term planning. Together, they ensure transparency, accountability, and continuous improvement across the desludging service lifecycle. **See Fig. 8**

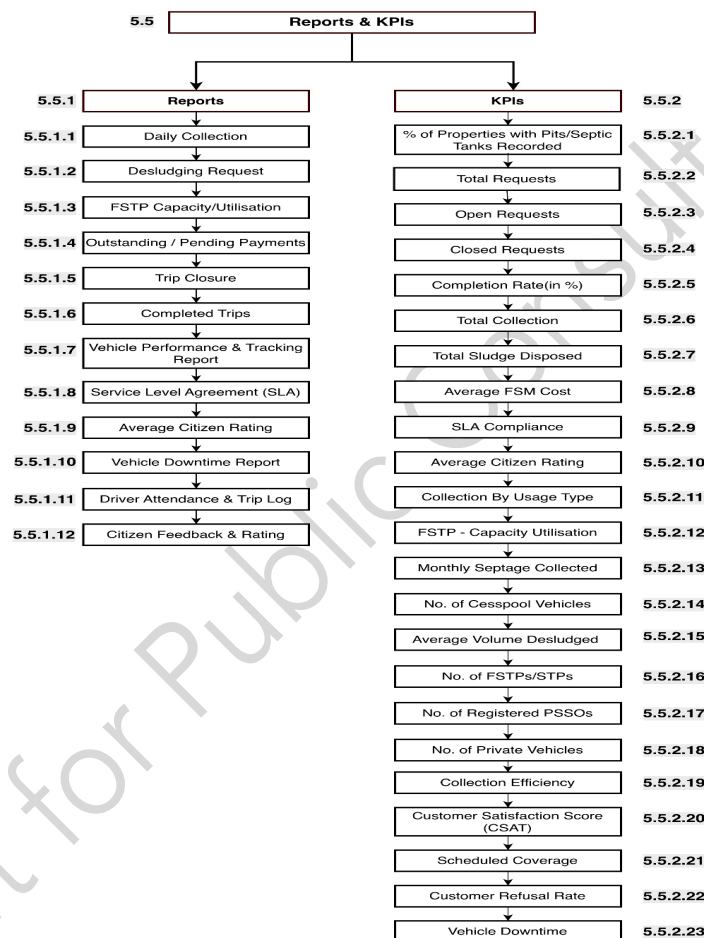


FIG 8. TAXONOMY OF REPORTS & KPIs

5.5.1 Reports

FSM reports are designed to provide actionable insights to Urban Local Bodies (ULBs), supervisory officials, and policymakers. These reports capture operational, financial, service quality, and infrastructure performance

data in a structured and auditable manner.

5.5.1.1 Daily Collection Report

The Daily Collection Report presents a consolidated view of desludging activities conducted within a given day. It includes details such as the number

of trips executed, volume of sludge collected, service locations, and associated service operators. This report supports daily operational monitoring and enables ULB officials to track service coverage and workforce deployment in real time.

5.5.1.2 Desludging Request Report

This report provides a comprehensive overview of all desludging requests received during a defined period, categorised by status such as submitted, approved, in progress, or completed. It helps identify service demand patterns, processing efficiency, and backlog trends, enabling better resource planning and administrative oversight.

5.5.1.3 FSTP Utilisation and Capacity Report

The FSTP Utilisation and Capacity Report tracks the volume of sludge received and treated at each FSTP or STP against its designed capacity. This report is critical for infrastructure planning, identifying over-utilisation or under-utilisation of treatment facilities, and ensuring that disposal practices remain within permissible limits.

5.5.1.4 Outstanding / Pending Payments Report

This report lists all service requests with pending or overdue payments, along with the associated amounts and duration of delay. It supports financial reconciliation, revenue tracking, and follow-up actions by the ULB to minimise revenue leakage and improve payment compliance.

5.5.1.5 Trip Closure Report

The Trip Closure Report captures trips that have been executed but not formally closed in the system. It highlights gaps such as missing disposal proof, incomplete logs, or pending verifications, enabling corrective actions and ensuring complete service lifecycle closure.

5.5.1.6 Completed Trips Report

This report summarises all trips successfully completed within a specified period, including desludging execution and confirmed safe disposal. It serves as an official operational record and supports performance assessment of service operators and drivers.

5.5.1.7 Vehicle Performance & Tracking Report

The Vehicle Performance & Tracking Report provides insights into vehicle movement, trip frequency, distance travelled, idle time, and route adherence. It helps assess vehicle efficiency, identify operational inefficiencies, and monitor compliance with authorised transport routes.

5.5.1.8 Service Level Agreement (SLA) Report

The SLA Report evaluates service delivery performance against defined service timelines and quality benchmarks. It highlights cases of SLA adherence and violations, enabling ULBs to enforce contractual obligations and improve overall service reliability.

5.5.1.9 Average Citizen Rating Report

This report aggregates citizen ratings received after service completion and presents average scores by operator, vehicle, or zone. It serves as a qualitative indicator of service quality and citizen satisfaction.

5.5.1.10 Vehicle Downtime Report

The Vehicle Downtime Report tracks periods during which desludging vehicles are unavailable due to maintenance, breakdowns, or other reasons. This report supports fleet management, preventive maintenance planning, and capacity optimisation.

5.5.1.11 Driver Attendance & Trip Log Report

This report records driver attendance, assigned trips, and completed trips over a defined period. It ensures workforce accountability, supports payroll verification, and helps identify training or performance gaps.

5.5.1.12 Citizen Feedback & Rating Report

The Citizen Feedback & Rating Report compiles qualitative feedback and structured ratings provided by applicants. It provides insights into service quality, behavioural aspects, and operational issues from the citizen's perspective.

5.5.2 Key Performance Indicators (KPIs)

KPIs are measurable indicators used to evaluate the effectiveness and efficiency of desludging services.

These indicators support performance monitoring, benchmarking across ULBs, and evidence-based decision-making. ([refer to KPIs \(5.5.2\)](#))

5.5.2.1 % of Properties with Pits/Septic Tanks Recorded

This indicator represents the percentage of total city properties for which on-site containment details (pit or septic tank) have been recorded in the system, enabling planning for scheduled desludging and monitoring sanitation coverage

5.5.2.2 Total Requests

This indicator represents the total number of desludging service requests received within a defined reporting period. It reflects overall demand for FSM services in the jurisdiction and serves as a baseline metric for understanding service uptake, coverage requirements, and seasonal demand variations.

5.5.2.3 Open Requests

Open Requests indicate the number of desludging applications that are currently active and have not yet completed the service lifecycle. This KPI helps assess operational backlog and provides insight into service delays, capacity constraints, or process bottlenecks.

5.5.2.4 Closed Requests

Closed Requests represent the number of service applications that have been fully processed, including desludging, transportation, safe disposal, and formal closure in the system. This KPI reflects service

throughput and administrative completeness.

5.5.2.5 Completion Rate (in %)

Completion Rate is calculated as the percentage of total requests that are successfully closed within the reporting period. This indicator measures the overall effectiveness of service delivery and the ability of the system to respond to citizen demand in a timely manner.

5.5.2.6 Total Collection

Total Collection captures the aggregate volume of faecal sludge collected through desludging operations over a specified period. This KPI is essential for understanding service scale, planning treatment capacity, and estimating environmental load.

5.5.2.7 Total Sludge Disposed

This indicator measures the total volume of sludge safely delivered and disposed of at authorised FSTP or STP facilities. It is a critical compliance metric that ensures desludged waste is treated in accordance with environmental and public health regulations.

5.5.2.8 Average FSM Cost

Average FSM Cost represents the mean cost incurred per desludging service, calculated based on service charges, operational expenses, or payments made to service providers. This KPI supports financial planning,

tariff rationalisation, and cost-efficiency analysis.

5.5.2.9 SLA Compliance

SLA Compliance measures the percentage of desludging services delivered within the prescribed service timelines as defined by Service Level Agreements. It reflects service reliability, operational discipline, and adherence to citizen service commitments.

5.5.2.10 Average Citizen Rating

This indicator represents the average rating provided by citizens upon completion of desludging services. It offers a qualitative assessment of service quality from the user's perspective and helps identify areas for service improvement.

5.5.2.11 Collection by Usage Type

Collection by Usage Type categorises desludging volumes based on property usage such as residential, commercial, institutional, or mixed-use. This KPI supports demand segmentation, targeted interventions, and differentiated service planning.

5.5.2.12 FSTP – Capacity Utilisation

FSTP Capacity Utilisation measures the proportion of treatment facility capacity used over a defined period. This indicator is critical for infrastructure planning, identifying underutilised or overstressed facilities, and guiding future investments.

5.5.2.13 Monthly Septage Collected

This KPI tracks the total volume of septage collected on a monthly basis. It enables trend analysis, seasonal demand assessment, and long-term planning for treatment and disposal infrastructure.

5.5.2.14 Number of Cesspool Vehicles

This indicator represents the total number of active cesspool vehicles registered and available for desludging operations. It reflects fleet capacity and directly influences service reach and response times.

5.5.2.15 Average Volume Desludged

Average Volume Desludged measures the mean quantity of sludge removed per service request. This KPI supports standardisation of service norms and helps identify atypical containment sizes or operational anomalies.

5.5.2.16 Number of FSTPs / STPs

Reflects the available treatment infrastructure for safe disposal of collected sludge and supports infrastructure adequacy assessment

5.5.2.17 Number of Registered PSSOs

Indicates the strength of the authorised service provider network and supports regulatory oversight and competitive service delivery

5.5.2.18 No. of Private Vehicles

Represents the available private fleet capacity contributing to desludging service

delivery and enables monitoring of regulated private participation

5.5.2.19 Collection Efficiency

Collection Efficiency evaluates the ratio of completed desludging services against scheduled or expected collections. It reflects operational effectiveness, route planning efficiency, and workforce utilisation.

5.5.2.20 Customer Satisfaction Score (CSAT)

CSAT is a consolidated satisfaction metric derived from citizen feedback and ratings. It provides a holistic view of user experience and serves as an outcome indicator for service quality initiatives.

5.5.2.21 Scheduled Coverage

Scheduled Coverage measures the proportion of planned or scheduled desludging services that are successfully delivered within the designated timeframe. This KPI is particularly relevant for scheduled or periodic desludging programmes.

5.5.2.22 Customer Refusal Rate (Scheduled)

Customer Refusal Rate captures the percentage of scheduled desludging services that are declined or not permitted by the applicant. This indicator helps identify issues related to communication, scheduling practices, or citizen awareness.

5.5.2.23 Vehicle Downtime

Vehicle Downtime measures the duration for which desludging vehicles remain non-operational due to maintenance, breakdowns, or administrative reasons. This KPI directly impacts service capacity and response time and is critical for fleet management.

Key Performance Indicators (KPIs)

S.No.	Service Stage	Indicative Indicator	How it is Measured (Methodology)	Description	Formula
1	Property Documentation / Mapping	% of Properties with Pits/Septic Tanks Recorded	Data captured through system-integrated pit/septic tank survey module: photographs, road width, distance from road, and accessibility status	Percentage of total city properties for which on-site containment details (pit or septic tank) have been recorded in the system, enabling planning for scheduled desludging and monitoring sanitation coverage	$\text{Pit/Septic Details Coverage (\%)} = \frac{\text{Number of properties with pits/septic tanks recorded}}{\text{Total number of properties in city}} \times 100$
2	Service Demand & Intake	Total Requests	Count of all desludging service applications registered on UPYOG during the reporting period	Represents the total demand for FSM services within the ULB and serves as the primary workload indicator	$\text{Total Requests} = \text{Count of all registered FSM applications}$
3	Service Processing	Open Requests	Count of applications that have not reached final system closure as on the reporting date	Indicates the number of pending or in-progress service requests and reflects service backlog	$\text{Open Requests} = \text{Total Requests} - \text{Closed Requests}$
4	Service Completion	Closed Requests	Count of applications where desludging, disposal, and	Measures the number of services delivered end-to-end within the FSM system	$\text{Closed Requests} = \text{Count of applications marked as "Closed"}$

			formal closure have been completed		
5	Overall Service Performance	Completion Rate (%)	Ratio of closed requests to total requests in the reporting period	Reflects overall operational efficiency and responsiveness of service delivery	Completion Rate (%) = (Closed Requests ÷ Total Requests) × 100
6	Desludging & Collection	Total Collection	Aggregation of sludge volumes recorded for all completed desludging trips	Quantifies the total volume of faecal sludge collected and supports capacity planning	Total Collection (KL) = Σ Volume collected across all trips
7	Transport & Disposal	Total Sludge Disposed	Aggregation of sludge volumes confirmed as delivered to authorised FSTP/STP facilities	Ensures compliance with safe disposal and environmental regulations	Total Sludge Disposed (KL) = Σ Volume received at FSTP/STP
8	Financial Performance	Average FSM Cost	Division of total FSM operational expenditure by number of closed requests	Indicates average cost incurred per desludging service and supports tariff analysis	Average FSM Cost = Total FSM Expenditure ÷ Closed Requests
9	Service Quality	SLA Compliance (%)	Proportion of services completed within prescribed SLA timelines	Measures adherence to service delivery timelines committed by the ULB	SLA Compliance (%) = (Requests completed within SLA ÷ Closed Requests) × 100
10	Citizen Experience	Average Citizen Rating	Arithmetic mean of ratings submitted by citizens after service completion	Reflects perceived service quality from the citizen's perspective	Average Rating = Σ Citizen Ratings ÷ Number of Ratings Received
11	Demand Analysis	Collection by Usage Type	Segregation of collected sludge volume by property usage category	Enables demand assessment across residential, commercial, and institutional sectors	Volume by Usage Type = Σ Volume per property category

12	Treatment Infrastructure	FSTP Capacity Utilisation (%)	Ratio of actual sludge received to the designed treatment capacity	Assesses utilisation levels and operational load on treatment facilities	Capacity Utilisation (%) = $(\text{Actual Volume Treated} \div \text{Designed Capacity}) \times 100$
13	Operational Trend Monitoring	Monthly Septage Collected	Aggregation of sludge volume collected within a calendar month	Supports trend analysis, seasonal planning, and monthly reporting	Monthly Septage Collected (KL) = Σ Monthly collected volume
14	Fleet Capacity	Number of Cesspool Vehicles	Count of registered and operational desludging vehicles	Indicates fleet availability for service delivery	No. of Vehicles = Count of active cesspool vehicles
15	Service Efficiency	Average Volume Deslugged	Division of total collected volume by number of desludging trips	Helps standardise service norms and identify atypical containment sizes	Average Volume (KL/trip) = $\text{Total Collection} \div \text{Total Trips}$
16	Treatment Infrastructure Planning	% of Properties with Pits/Septic Tanks Recorded	Count of all authorised and operational Faecal Sludge Treatment Plants (FSTPs) and Sewage Treatment Plants (STPs) designated for septage receipt within the ULB jurisdiction	Reflects the available treatment infrastructure for safe disposal of collected sludge and supports infrastructure adequacy assessment	No. of FSTPs/STPs = Count of authorised and operational treatment facilities registered in the system
17	Service Provider Management	Number of Registered PSSOs	Count of all Private Septage Service Operators (PSSOs) formally registered and approved by the ULB for desludging operations	Indicates the strength of the authorised service provider network and supports regulatory oversight and competitive service delivery	No. of Registered PSSOs = Count of approved and active PSSOs in the registry
18	Fleet Capacity & Regulation	Number of Private Vehicles	Count of privately owned cesspool/desludging vehicles registered under authorised PSSOs and permitted to operate within the jurisdiction	Represents the available private fleet capacity contributing to desludging service delivery and enables monitoring of regulated private participation	No. of Private Vehicles = Count of active privately owned desludging vehicles registered in the system

19	Operational Effectiveness	Collection Efficiency (%)	Comparison of completed services against scheduled services	Measures effectiveness of service planning and execution	Collection Efficiency (%) = $(\text{Completed Services} \div \text{Scheduled Services}) \times 100$
20	Outcome Quality	Customer Satisfaction Score (CSAT) (%)	Percentage of positive satisfaction responses received	Provides a consolidated measure of citizen satisfaction	CSAT (%) = $(\text{Positive Responses} \div \text{Total Responses}) \times 100$
21	Planned Service Delivery	Scheduled Coverage (%)	Ratio of scheduled services successfully delivered within the planned timeframe	Evaluates performance of scheduled desludging programmes	Scheduled Coverage (%) = $(\text{Scheduled Services Delivered} \div \text{Total Scheduled Services}) \times 100$
22	Service Acceptance	Customer Refusal Rate (Scheduled) (%)	Ratio of refused scheduled services to total scheduled services	Identifies gaps in communication, awareness, or scheduling	Refusal Rate (%) = $(\text{Refused Scheduled Services} \div \text{Total Scheduled Services}) \times 100$
23	Fleet Management	Vehicle Downtime	Aggregation of time vehicles remain non-operational due to breakdowns or maintenance	Directly impacts service availability and response time	Vehicle Downtime = Σ Non-operational time (hours/days)

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