

IT enabled online monitoring systems for scheduled septic tank desludging in Maharashtra, India

Dhruv Bhavsar, Dr. Meera Mehta,
Dr. Dinesh Mehta, Aasim Mansuri

Center for Water and Sanitation,
CEPT University

Demand Desludging

v/s

Scheduled Desludging

- Desludging is done on-call basis
Desludging frequency – 8-10 Years
- Desludging services treated as a complaint redressal system
- Not all HHs receives services and often pay very high charges
- Low frequency of desludging leads to increase pollutant load
- Difficult to monitor private informal providers.

- Septic tanks desludged once in three years on scheduled basis
- Service provision + regulations to ensure scheduled desludging
- Equitable and affordable: Citywide coverage and levied sanitation tax
- Likely reduction in pollutant loads and coliform in septic tank effluent
- Regulated and monitored by ULB through service contract

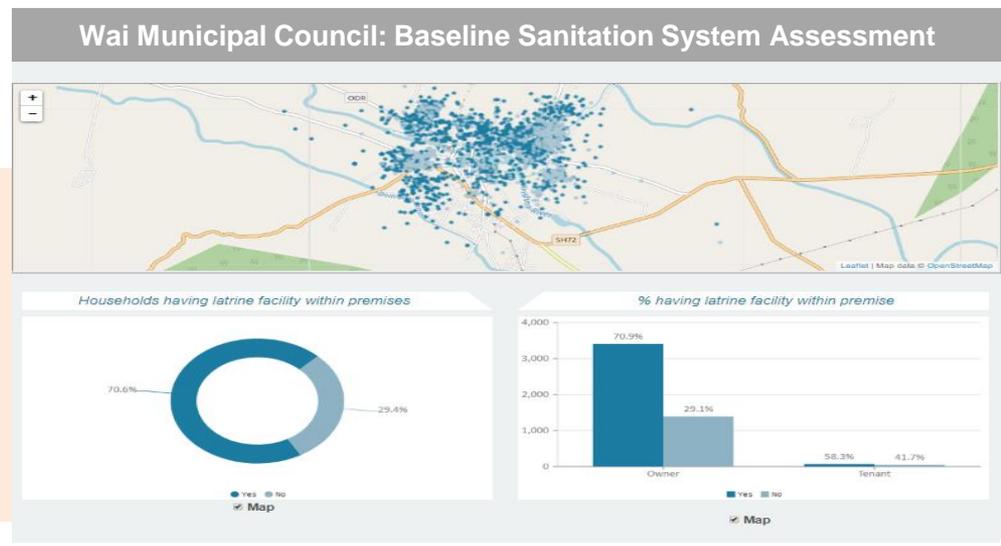
Wai & Sinnar: **1st** cities to implement scheduled desludging services in India

- **Wai & Sinnar – Located near Mumbai**
 - Population - Sinnar ~70,000
Wai ~40,000
- **Pioneer Indian cities in FSM**
 - **1st city** - Performance linked annuity model for scheduled desludging in India
 - **1st city** - Levying a sanitation tax for FSM
 - **1st city (Sinnar)**- Setting up FSTP on DBO model
(Fully funded by local government)

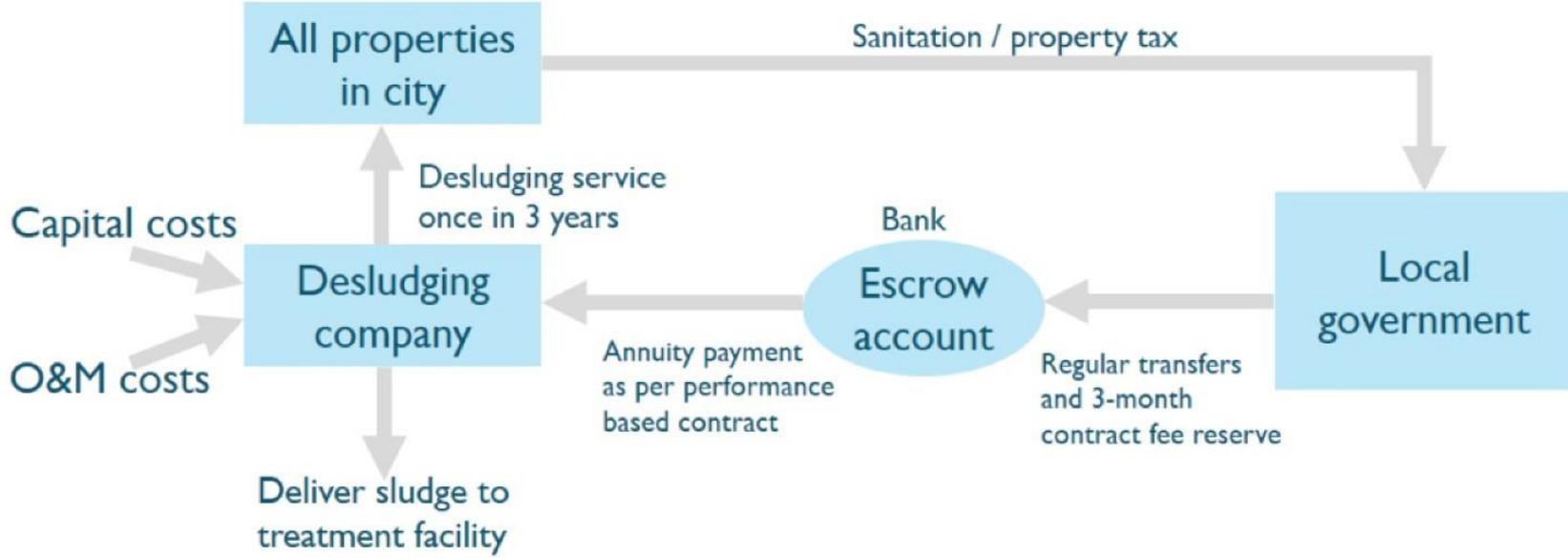


SaniTab

- Android-based tool for sanitation survey
- Citywide digital data collection tool
- Capture household / property level data
- Creating onsite sanitation database



Performance linked annuity model for scheduled desludging . . .



Scheduled septic tank desludging services started from June, 2018

Performance linked Monitoring Mechanism of desludging service

Existing paper based monitoring system to Online Monitoring System

LG's copy

Property holder's copy

Treatment plant's copy

Private operator's copy

Collection and transport record form Serial No: _____

i. Details of Waste Generator

- Name : _____
- Phone Number: _____
- Address : _____
- Property Tax Number : _____
- Type of building : Individual house / Apartment / Commercial complex / Other (specify) _____
- Was the Septic tank cover open (Yes / No) _____

ii. Identification of Waste:

- Volume _____ liters
- Type : _____ Septic Tank _____ Others _____
- Source : Residential/Commercial/Restaurant/Others _____
- Septic tank cover placed back on Septic tank : Yes / No _____
- Septic tank emptied : Yes / No _____
- Any kind of deficiencies, missing pipes or fittings, improper manholes or access covers, any other cracks or damage observed : _____

The undersigned being duly authorized does hereby certify to the accuracy of the source and type of Fecal Sludge and septage collected and transported.

Date: _____, Time: _____, Name and Signature – Property owner: _____

iii) Details of Sumeet Facilities Operator

- Name of Driver : _____
- Permit : _____
- Vehicle License no : _____
- Truck Capacity : _____
- Pump Out Date : _____
- No. of trips taken to empty the septic tank: _____

The above described wastewater was picked up and hauled by me to the disposal facility named below and was discharged. I certify that the foregoing is true and correct:

Name and Signature of authorized transport agent and title: _____

iv) Acceptance by Wai Municipality's authorized FSTP

The above transporter delivered the described Fecal sludge and Septage to this treatment facility and it was accepted.

The waste was contaminated with solid waste or other kinds of waste: YES / No _____

Details (if yes): _____

No of trips received at the FSTP for this form: _____

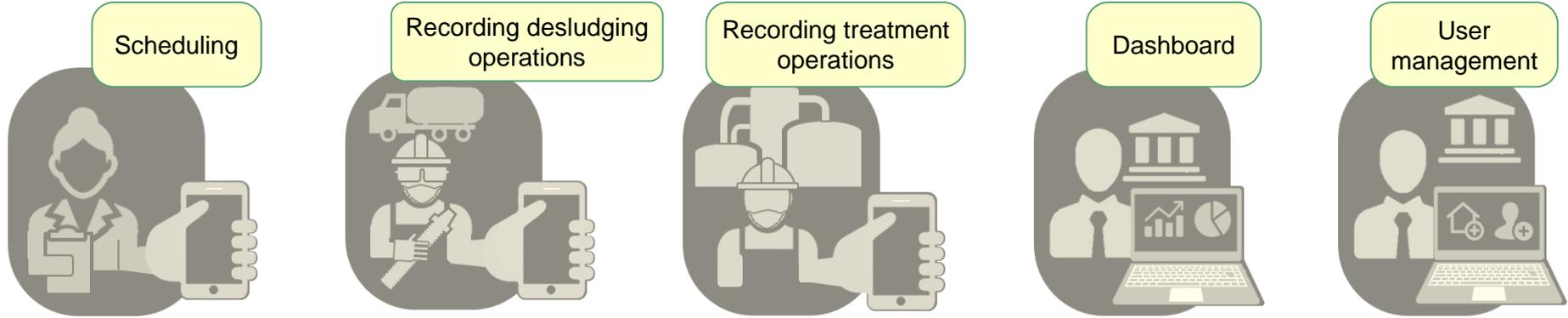
Septage received at treatment plant: Date: _____, Time : _____, Volume : _____ liters

Name and Signature of authorized treatment plant operator signatory and title: _____

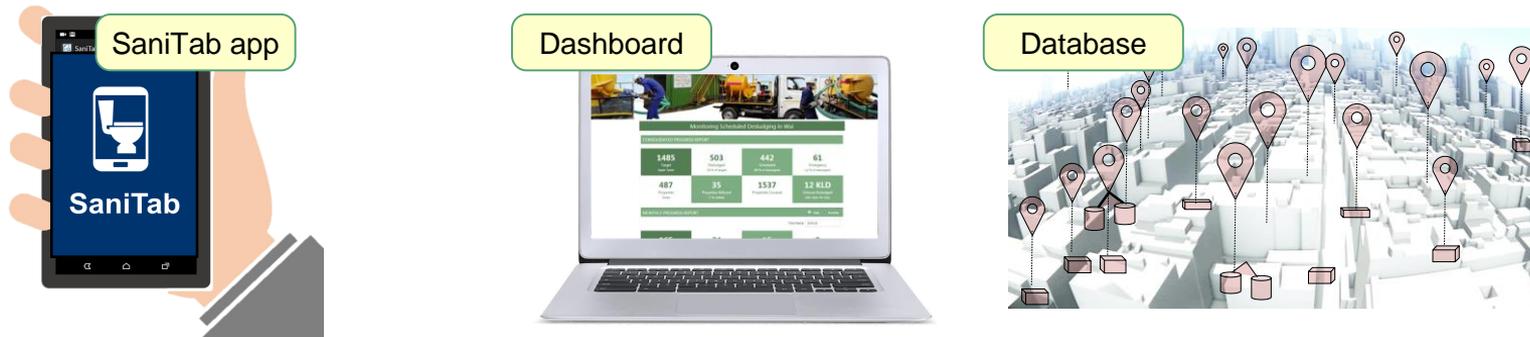
NOTE: SUBJECT TO THE TERMS AND CONDITIONS OF WAI MUNICIPALITY

IT enabled systems

Online monitoring system for scheduled desludging

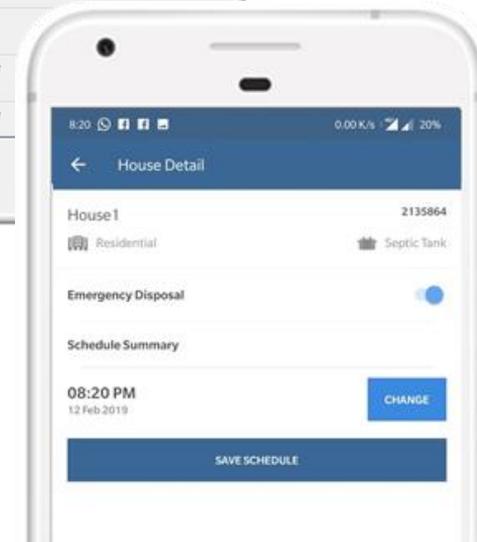
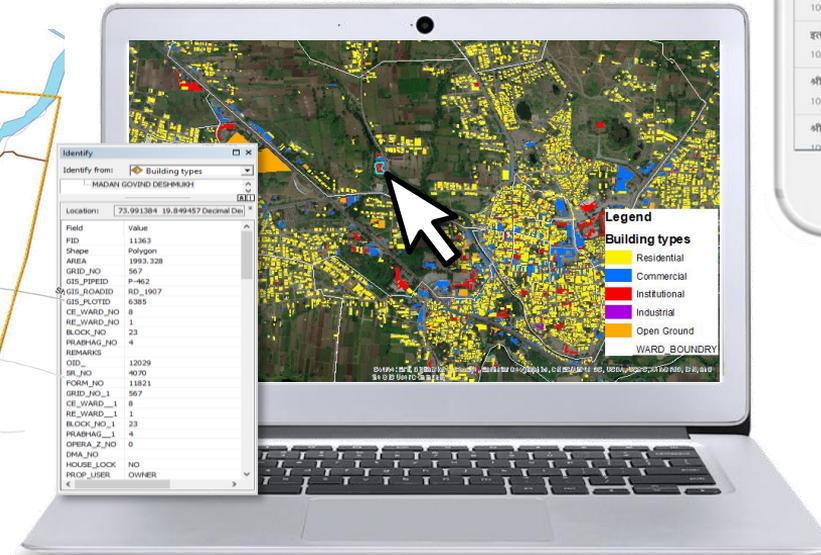
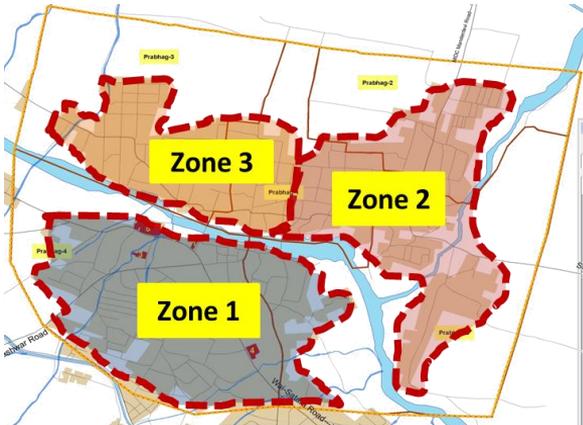


Monitoring and database creation system



Module for desludging schedule

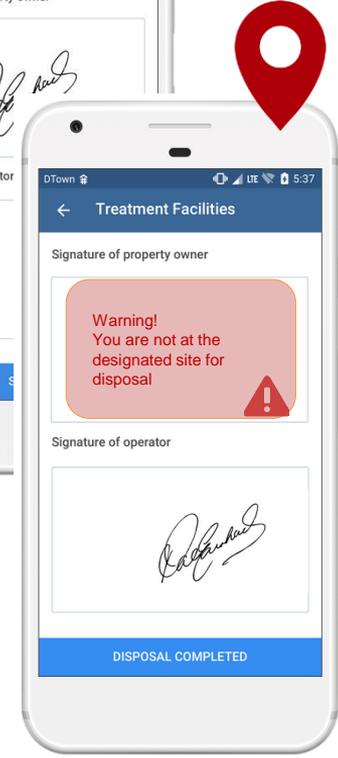
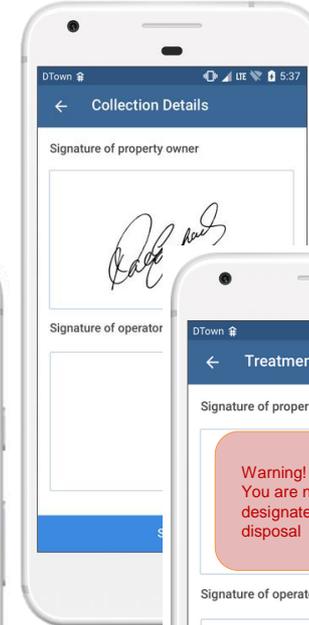
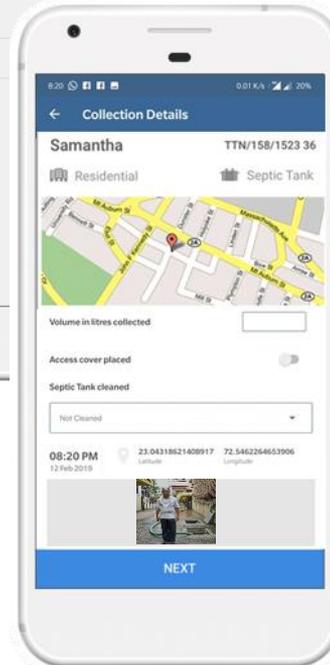
- City divided into 3 zones to be covered each year
- GIS linked property tax data - Basis for desludging scheduling / route mapping
- Prepare septic tank desludging schedule



Amazon delivery like app for desludging service operations



- Selects from 'scheduled' list
- Displays key property information
- Records desludging volume, status of access cover, photo of property
- Customer's & operator's signature – like Amazon delivery app
- Looping to collect from multiple properties in one trip or multiple trips for one property
- FSTP operator signature at disposal
- In-built validation checks



GPS enabled live desludging vehicle tracking system



Live vehicle tracking

- Route tracking
- Speed tracking
- Odometer tracking
- Engine on-off tracking

Dashboard

- Vehicle status report
- Vehicle performance report
- Drive summary report
- Spatial view

The dashboard is titled 'Abell Technologies' and 'Welcome to COSINNAR!'. It features a top navigation bar with 'Map', 'Live Tracking', 'Vehicles', 'Reports', and 'COSINNAR'. Below this is a status summary: All 7, Running 0, Waiting 0, Idle 6, Other 0, Inactive 1.

The main section is 'Dashboard | My Vehicle Status'. It shows a table with columns: Type, Vehicle No, Status, ODO (kms), Digital Status, Checkin, Address, and Map. The first entry is for vehicle MH15AB4253, which is 'Idle 2 Hours 39 Mins' with an ODO of 183441.57 and a digital status of 'Ignition Off'. The address is 'Gondeshwar Temple Road, Khadakpura, Sinnar, Maharashtra 422103, India'.

Below the table is a 'Vehicle Performance Report' section with filters for Start (07-Feb-2019 06:00) and End (07-Feb-2019 23:59). A 'Go' button is present.

The 'Drive Summary' table has columns: Drive No, Start Location, End Location, StartTime, EndTime, Duration, Kms Travelled, and Ideal Time. It lists four drives, with the first one starting at 'Gondeshwar Temple Road, Khadakpura, Sinnar, Maharashtra 422103, India' and ending at 'Vinar nagar, Devi Rd, Khadakpura, Ganesh Society, Sinnar, Maharashtra 422103, India'.

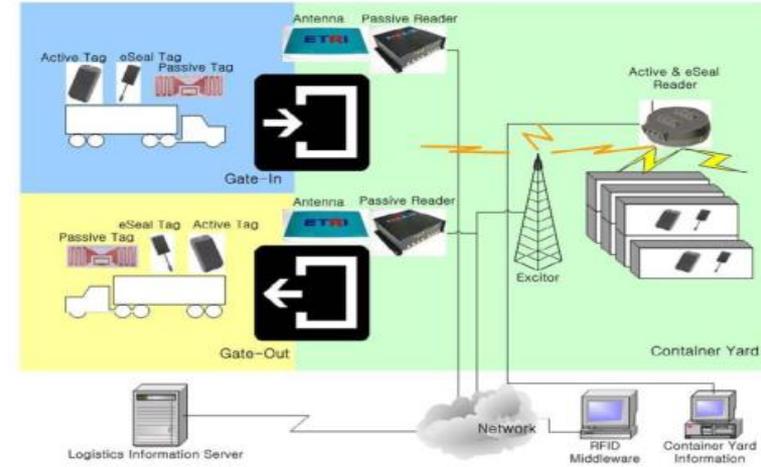
The 'Vehicle Map' section shows a map with a red line indicating the vehicle's route. It includes controls for 'Group Map', 'Hide Full Screen', 'Refresh', 'Start Replay', and 'Show Geofence'. A search bar is also present.

Integrated with existing system on SWM

Module on FSTP operations

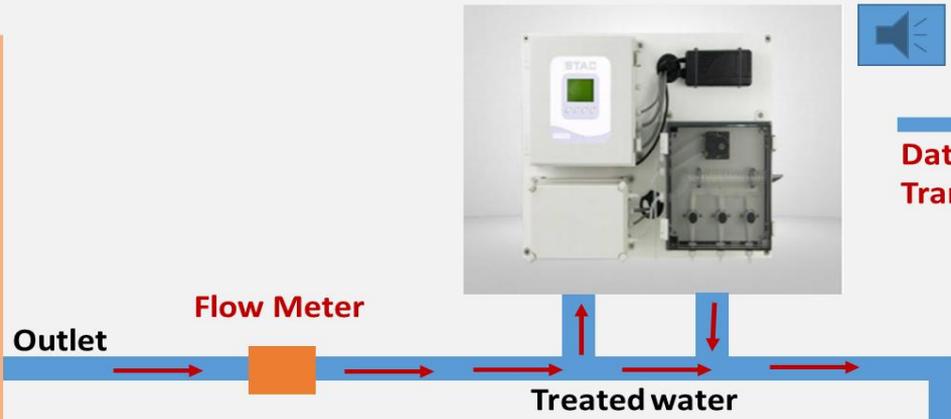
- Captures safe unloading of collected sludge
- Interface to capture daily volume treated, quality testing results
- Alerts on web dashboard if results exceed permitted water quality levels

Radio-Frequency Identification (RFID) System @ FSTP



Online real time monitoring: Treated water quality discharge (multi parameter)

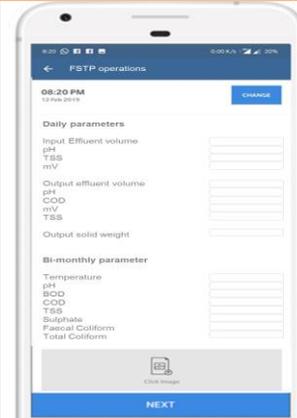
FSTP



Data Transfer

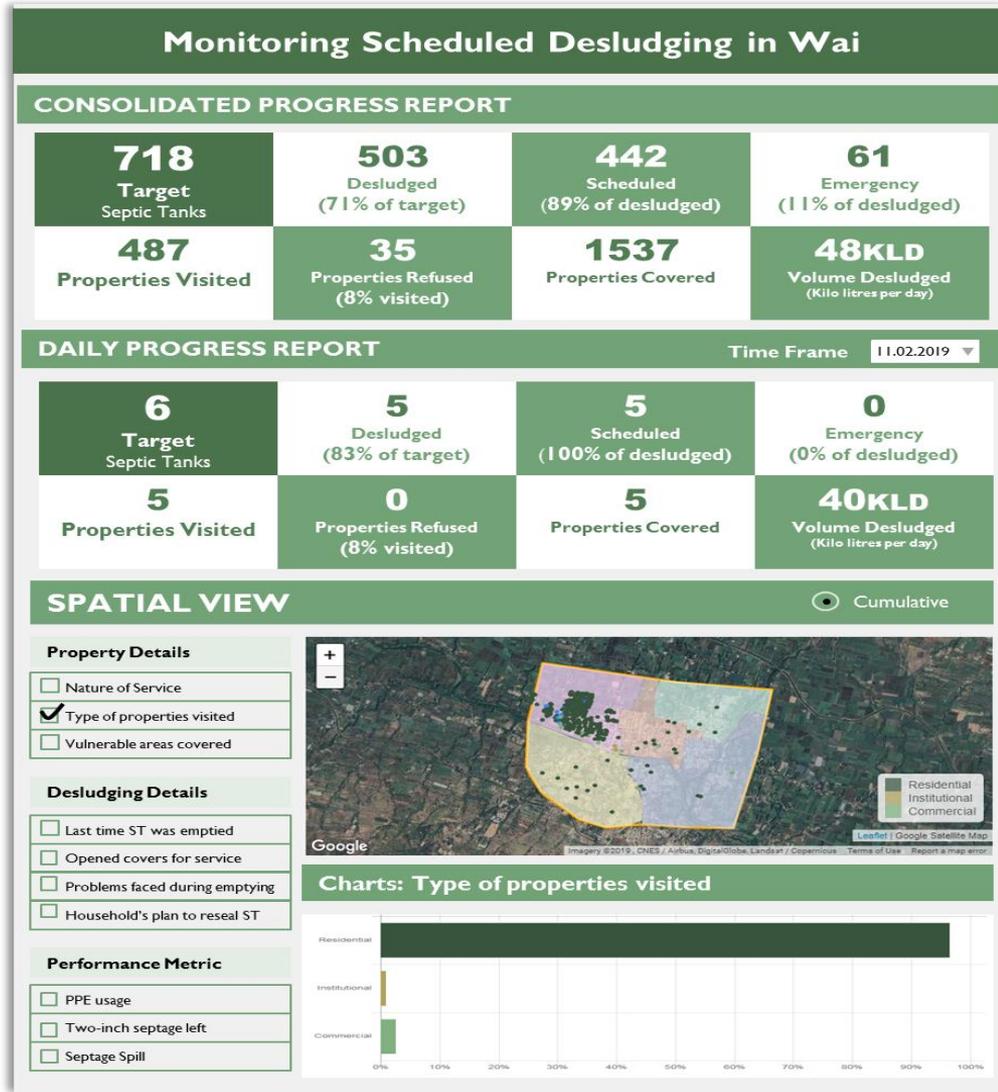
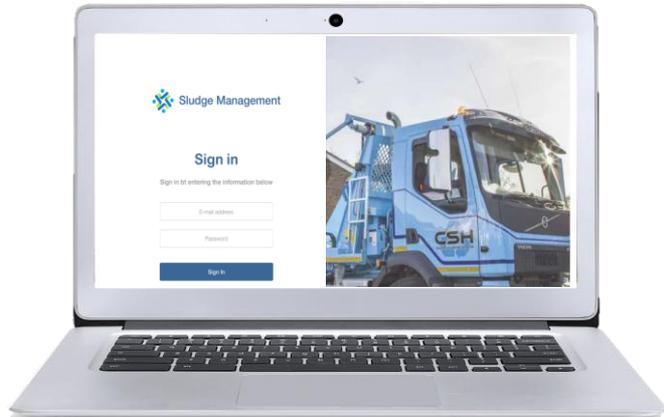


Client data viewer



Web module – Dashboard

- Login for different user types
- Dashboard to show real time progress
- Enables spatial information view
- Dashboard captures CWIS principles

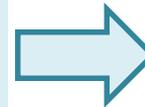


Downloadable MIS Results

Download: Reports, Database and Media files

Form	Scheduled Emptying	Filter	none	Visualize	Export	Publish						
Save	Save As	Delete	Previous	Scheduled Emptying	Next							
Submissions per page	100	Filters Applied										
+	Add Filter											
Display Metadata												
✖	guest1	2019-02-08 10:33.13.003	2019-02-08 13:52:52.517	358410093162955	417	1	6	गणपती झाडी	423	prop_open	empt	yes
✖	guest1	2019-02-08 13:16:39.99	2019-02-08 14:09:21.172	358410093162955	418	1	7	गंगापुत्री	161	prop_open	empt	yes
✖	guest1	2019-02-08 16:38:54.905	2019-02-08 17:46:23.567	358410093162955	419	1	5	गणपती झाडी	449	prop_open	empt	yes
✖	guest1	2019-02-09 17:18:45.933	2019-02-11 17:50:19.161	358410093162955	423	1	5	गणपती झाडी	612	prop_open	empt	yes
✖	guest1	2019-02-11 11:46:07.383	2019-02-11 17:50:05.525	358410093162955	424	1	5	गणपती झाडी	448	prop_open	empt	yes
✖	guest1	2019-02-11 13:50:48.469	2019-02-12 10:38:31.202	368865033580421	425	1	5	गणपती झाडी	448	prop_open	empt	yes
✖	guest1	2019-02-11 17:18:05.758	2019-02-12 10:38:21.783	368865033580421	226	1	5	गणपती झाडी	453	prop_open	empt	yes
✖	guest1	2019-02-12 16:15:45.457	2019-02-12 16:09:43.429	358410093162955	427	1	5	गणपती झाडी	451	prop_open	empt	yes

Payment for deslugger linked to submission of the septic tank desludging report



Septic Tank Desludging Report



Scheduled Emptying of Septic Tanks



Collection and transport record

Activity no: 14/02/19/01

Property details



Prop no: 07-1432-00
 Type: Residential - Apartment
 Address: समर्थ नगर, नाशिक पुना रोड, सिन्नर - 422103
 Owner: श्री नितीन चंपालालचोरडीया
 Phone no: 9873456234
 Type of system: Septic tank

Emptier details



Truck ID: Sumit truck #1
 Driver: Raju.lal
 Vehicle license no: 434/13/12345
 Truck capacity: 3000 L



Service details



Access cover open on arrival ✓
 Volume collected: 4560 L ✓
 Access cover replaced after emptying ✓
 Emptier use proper safety gear ✓
 Number of trips taken to empty: 2

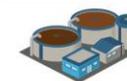
Emptying Date: 14/02/2019

Property owner

Emptier

Emptying Time: 14:20

Acceptance at treatment site and safe disposal



FSTP name: Sinnar FSTP and resource center
 Disposal Date: 14/02/2019
 Disposal Time: 14:50
 FSTP operator:

Emptier

Key Salient features

- Real time monitoring of schedule emptying service performance
- Online signature – like Amazon delivery app
- Real time stamping – start and end of operation
- Photo stamping – Capture property/ septic tank details
- Ensure safe disposal at FSTP through multiple checks
 - Online – Real time water quality monitoring
 - Installation of RFID tag @ trucks and @ FSTP
 - Real time truck running monitoring (GPS enabled trucks)
 - In-build validation checks in mobile application

Key Benefits - Program efficiency for FSM services

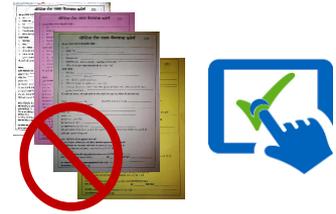
Integrated monitoring system – Across FSM service chain



“Real time” monitoring
No need to process data for results



Easy to Operate,
Reduce paper work,
Minimize human error



Can view progress easily
and process payments



Citizen awareness about
emptying procedures



Inclusive – supports
vernacular language



Partnerships and Collaboration

BILL & MELINDA
GATES *foundation*



Government of
Maharashtra

HSBC 



CWAS
CENTER FOR WATER
AND SANITATION

CEPT
UNIVERSITY




**SUMEET
FACILITIES**


TECH
enable empower

 **Transerve**

Points to remember....

- A simple, user friendly integrated online FSM monitoring system
- Robust and integrated MIS/ Dashboard to track the real time progress
- Payment to be linked to online monitoring system (with multiple checks)
- SaniTab – Database creation of onsite sanitation for 85,000+ properties
- User guides and training modules are available for use of SaniTab tool

Thank you

An aerial photograph of a two-lane asphalt road winding through a green, rural landscape. The road has white dashed lines in the center and solid lines on the edges. A yellow water tanker is driving towards the viewer in the left lane. A blue and red truck is driving away in the right lane. Several motorcycles are also on the road. The background shows a small village with white buildings and trees under a cloudy sky. A large blue banner with the text 'Thank you' is overlaid on the top left of the image.

cwas@cept.ac.in
cwas.org.in

About us

The Center for Water and Sanitation (C-WAS) at CEPT University carries out various activities – action research, training, advocacy to enable state and local governments to improve delivery of services.

