Wai
CityWide Inclusive Sanitation
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October 2019
Wai Municipal Council
Center for Water and Sanitation
CRDF, CEPT University, Ahmedabad
Wai is representative of more than 7,400 small and medium towns of India, including 3600 Urban Local Governments and 3800 Census Towns. Approximately 40% of India urban population – 150 million people – live in these towns.

Like all other small and medium towns in India, the city of Wai has faced the same sanitation issues – open defecation, untreated disposal of faecal waste, financial constraints and growing environmental pollution.

Wai has overcome these problems and has emerged as a model for other cities in sanitation planning.

This city has shown that it is possible for a small town to deliver high quality, affordable, equitable and inclusive sanitation services to its citizens.
In 2012, CEPT, through a BMGF grant, was working on a making a case for non-networked sustainable sanitation for small and medium towns. The city of Wai was chosen as one of four cities, where City Sanitation Plans would be prepared. This was done in consultation with Water Supply and Sanitation Department (WSSD) of the State Government of Maharashtra and Maharashtra Jeevan Pradhikaran (MJP).

In 2013, after a consultative process, the CSP was prepared and the city government came forward to ask CEPT for implementation support. Based on the city’s priorities, two main proposals were selected and the city set about making itself Open Defecation Free with safety managed faecal sludge.

The ODF campaign received a push with the launch of Swachh Bharat Mission, for which CEPT provided implementation and monitoring support to the local government. It was declared ODF in 2016 and has since then sustained this status according to regular revalidations.

With the implementation of the Integrated Faecal Sludge Management plan, the city became the first in India to implement scheduled desludging of septic tanks and one of the very few to have a Faecal Sludge Treatment Plant. The city was now been declared ODF++. Lessons in sanitation planning from this small city were disseminated across all urban centres across the state of Maharashtra, under the Swachh Maharashtra Mission for Urban Areas.

In 2018, Wai was chosen as one of eight cities across the globe for the CityWide Inclusive Sanitation Programme funded by the BMGF. With this, the city continues its journey in proving itself to be a model city in the sanitation sector.
Government of India in 2014 has launched Swachh Bharat Mission (SBM) to make India “open defecation free” (ODF) by 2019. Under SBM, emphasis has been put towards toilet construction. These toilets will be connected either to sewer networks or onsite sanitation systems. So while toilets are an essential part of overcoming the sanitation challenge, they are the means not the end. They will only deliver the results we want if coupled with measures to reduce the amount of untreated waste. Government of Maharashtra aims to move towards improved sanitation by encouraging access to own toilets with safe management of faecal waste, for which they have developed a concept of ODF, ODF+ and ODF++ cities for the first time. Later on this concept was adopted by the Government of India for the whole country. The state has also introduced an incentive scheme wherein the cities that are declared ODF are provided incentive grant based on the size of city. The cities can use this fund for attaining ODF+/++ status.

**Mission Objectives**

- Elimination of open defecation
- Eradication of Manual Scavenging
- Modern and Scientific Municipal Solid Waste Management
- Behavioral change regarding healthy sanitation practices
- Awareness about sanitation and its linkage with public health
- ULB capacity for enabling private sector participation

**Key reforms**

- Framework for ODF, ODF+/++ cities with three tiered validation mechanism
- Incentive funds for performance.
- Convergence of funds with 14th FC grants
- Demand driven, beneficiary led toilet construction. Emphasis on good quality.
- Sustainability Charter and ‘Mission OD Watch’ to restrict slippage back to OD
- Unique, decentralized institutional setup for implementation and robust monitoring
- Moving beyond toilets with safe and sustainable management of septage and wastewater
- Guidelines for ODF, Sustainability and FSSM Planning. Capacity building workshops for cities
- FSSM strategy for achieving complete treatment across all cities. Adopting co-treatment as a solution
- Vetting of technologies for FSTPs.
- Funds for DPR preparation
Ceremony for declaration of Urban Maharashtra as ODF in presence of Hon. President of India
2nd Oct 2017
A state of urban sanitation, where all members of the city have access to adequate and affordable sanitation services through appropriate centralized and decentralized systems, without any contamination to the environment along the sanitation value chain.

EQUITABLE SAFE SANITATION
Everyone in an urban area, including the urban poor, benefits from equitable safe sanitation services.

GENDER AND SOCIAL EQUITY are designed into planning, management, and monitoring.

SAFE MANAGEMENT
Human waste is safely managed along the sanitation service chain, starting with containment.

MUNICIPAL ACCOUNTABILITY
Authorities operate with a clear, inclusive mandate, performance targets, resources, and accountability.

RANGE OF OPTIONS
Authorities deploy a range of funding, business, and hardware approaches—sewered/non-sewered—to meet goals.

COMPREHENSIVE LONG-TERM PLANNING fosters demand for innovation and is informed by analysis of needs and resources.

POLITICAL WILL AND ACCOUNTABILITY systems incentivize service improvements in planning, capacity, and leadership.

Adapted from: Citywide inclusive sanitation (CWIS) principles, Sakshi Gudwani, BMGF
Wai - A small town in the Satara district of Maharashtra . . .

95km south of Pune; 35km from Satara

River Krishna

43,000 population
4% slum population

8,991 households

3.54 sqkm

81% literacy

- Pilgrimage town – “Dakshin Kashi”
- 250 temples and famous ghats
- Bollywood movie shooting location

Bar chart showing population growth:
- 1981: 24,661
- 1991: 26,289
- 2001: 31,110
- 2011: 36,025
- 2019: 43,000

Population growth rate of +1% annually.
Sanitation situation in 2012

**Access**
- Pour flush toilets – individual or community
- Open Defecation

**Collection**
- Septic tanks & Pits
- Soak pits in some parts of new town
- Limited conveyance in new town
- Open/covered drains in old town

**Conveyance**
- Irregular emptying by emptier truck
- No treatment facility

**Treatment**
- No treatment facility
- Dumped at solid waste site
- Into river or natural drain

**Disposal/Reuse**
- Septage disposed off on dumping site without treatment
- Drain water going into river

- 2% open defecation
- Majority of toilets are connected to septic tank
- Septic tanks 2-3 chambered
- Septic tanks were oversized and only few had access covers
- Only 2-4% of septic tanks cleaned annually
- ULB provided emptying services on demand basis
- Levy user charges from 400 – 1000 / trip for emptying
- No facility for treatment of fecal sludge or drain wastewater
- 2% open defecation
- High dependency on community toilets
- Community toilets non-functional
- Septage disposed off on dumping site without treatment
- Drain water going into river
Initial wastewater flow assessment

User interface

- Bathrooms (80%)
- Kitchens (80%)
- Community toilets (60%)
- Open defecation (20%)

Containment

- Septic tanks (17.8%)
- Drains (11.1%)
- Safe emptying (6.3%)

Conveyance

- Pit toilets (1.9%)
- Reuse as compost (1.9%)

Treatment

- Septage (0.4%)
- Effluent (0.4%)

Reuse / Disposal

- Land or water bodies
- Solid waste dump site
- Remains in Tank
- Groundwater

Source: City Sanitation Plan of Wai, PAS Project – CEPT University
City sanitation plan for Wai

In 2012, the Government of Maharashtra via the Water Supply and Sanitation Department (WSSD) and the Maharashtra Jeevan Pradhikaran (MJP) chose the city of Wai along with 3 other cities for developing City Sanitation Plans (CSPs) with support from CEPT University and AIILSG.

The aim was to prepare a City Sanitation Plan which focused on universal access to sanitation through outcome based options rather than technology based options. Further, the proposals had to be financially feasible for the ULBs of the two cities.

Development of the plan was accompanied by 18 months of stakeholder engagement with the WSSD, MJP and the local city government.

After a thorough assessment process and development of multiple sanitation options, the city government focused on 2 main solutions based on its priorities. As further support, CEPT remained a partner to the WMC for implementation of the project.
### Proposals and solutions

<table>
<thead>
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<td>Own Toilets + Septic Tanks</td>
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<td>Construction of own toilets, individual or shared by 2-4 households, along with attached septic tanks</td>
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<td>Septage Management</td>
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<tr>
<td>Regular (in a 3-year cycle) collection and disposal of septage from septic tanks, along with necessary refurbishment of septic tanks, construction of a treatment facility for septage and the reuse of treated septage</td>
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However, based on local priorities, in 2013 WMC decided to focus on two high potential solutions in the near term

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**Access**
- Pour flush toilets
- Open defecation through “Own Toilet scheme”
- Refurbished Community/public toilets

**Collection**
- Improved septic tanks
- Rehab of drains (Phase 1) & Settled sewer (Phase 2)
- Suction emptier truck (Phase 1)
- Waste water treatment facility
- Fecal sludge treatment facility (Phase 1)
- Safe disposal or reuse of treated septage
- Reuse of treated septage

**Conveyance**
- 100% coverage of conveyance system
- 100% Treatment of septage and grey water
- Safe disposal or reuse of waste

**Treatment**
- Adequate primary treatment through improved septic tanks
- 100% Treatment of septage and grey water
- Safe disposal or reuse of waste

**Disposal/Reuse**
- Universal access to toilets
- Repaired links in the value chain
- Improvements through new investment
Making Wai Open Defecation Free
Initially only 68% of households in Wai had access to individual toilets

- Open defecation
  - Community toilets: 2% (30% overall)
  - Individual toilets: 68% (55% overall)

- Non Slum HH: 7,124
- Slum HH: 456
- Overall: 7,580

Lack of availability of finance, space constraints and legal clearances are cited as the main barriers to adoption of individual toilets.

As a result, even non-slum households rely on community toilets.

High Dependency on community toilets which were poorly maintained

- Have 4-5 seats, built side by side with no electricity supply in older blocks
- Lack water supply within the toilet. Water is supplied outside the toilet
- However newly constructed toilet blocks were adequately equipped
WMC launched “Own toilet scheme”
Later aligned with Swachh Bharat Mission

A resolution was passed by the city council which pledged to make available a subsidy of Rs 5000 for households without toilets. Wai was the first city to pass such a resolution.

Funds for this subsidy were to be sourced from ULB’s 14th FC grants.

This received further support when the Swachh Bharat Mission was launched and households received further subsidies from the center and state governments.

Processing applications for toilet subsidy

1. SMS to targeted individuals inviting applications for subsidy. Forms distributed through various channels.
2. Application submission.
3. Online processing of applications and offline database.
4. Site inspection.
5. SMS about progress and approval of application, invitation to collect work orders.
6. First instalment of subsidy to beneficiary bank account.
7. Toilet construction.
8. On ground inspection of completed toilet.
9. Second instalment of subsidy to beneficiary bank account.

Swachh Bharat Mission
Subsidy : INR 4,000

Swachh Maharashtra Abhiyan
Subsidy : INR 8,000

Urban Local Body
Subsidy : INR 10,000

Total Subsidy for toilet
INR 22,000

Online processing of applications and offline database
On ground inspection of completed toilet
Second instalment of subsidy to beneficiary bank account
Ensuring success through strong communications and monitoring

Generating awareness about the subsidy scheme, benefits of individual toilets, and ill effects of open defecation

1. Posters designed to share scheme information, displayed prominently across the city - near temples, in residential areas, at road crossings and in market places.

2. Day and night announcements and jingles on rickshaw hired to go around the city.
3. Handouts and subsidy application forms given to targeted households

4. Local radio and TV spots for animated movies and jingles

5. Movies, talks and presentations during festival gatherings like Ganpati Utsav
6. Newspaper coverage

9. Providing architectural design solutions for identified households with space constraints

10. Encouraging group toilets where 2-3 neighbors construct a common toilet for themselves

11. School activities – drawing competition, form distribution, presentation to parents and teachers

12. Good Morning Pathak – monitoring squads for common OD spots in the city during morning and evening hours. Those “caught” were not punished made to understand the importance of using a toilet over open defecation and given toilet subsidy forms

7. Community and ward level meetings with elected representatives leading the meetings to encourage households to opt for own toilets

8. Household level group discussions and surveys
Wai was declared ODF in 2016

Wai was 1st declared ODF by the State Govt. followed by ODF declaration at National level by QCI in August 2016 & Revalidated ODF in September 2017 and April 2018

The city received a sum of Rs 1 crore as incentive funds after becoming ODF which was to be used towards becoming ODF+

Next step: Ensuring sustainability of the ODF status according to Govt of Maharashtra’s charter

Sustainability Charter

We are committed towards the vision of Swachh Bharat. We shall ensure ODF sustainability in Maharashtra by:

#1. Achieving universal access to Individual Household Level Latrines (IHHL), which is a leading development priority.

#2. Ensuring adequate, clean and reliable access to public/community toilets across urban Maharashtra, wherever IHHL is not possible.

#3. Ensuring ODF sustainability through effective participation of government, elected representatives, schools, donors, NGOs, SHGs and the communities.

#4. Continuing and institutionalizing rigorous ODF validation and monitoring process through “OD Watch” and “ODF Sustainability Tracker”.

#5. Encouraging development of OD spots into usable public spaces.

#6. Recognizing and awarding ULBs for their sustained performance.

#7. Moving towards ODF+/++ by ensuring effective collection and adequate treatment of human faecal waste.

Shri. Devendra Fadnavis
Chief Minister, Maharashtra
ODF sustainability

Moving towards universal coverage by mobilizing more applications for individual toilet subsidy

1. Exploring sanitation credit and the role of self help groups.

After achieving 85% individual toilet coverage, the city decided to move towards universal access to toilets by mobilizing applications and facilitating access to loans for those with financial constraints even after subsidy.

2. Awareness activities for encouraging sanitation credit for individual toilets. Jingle and video at local event. Pamphlets giving information about sanitation credit.

3. Toilet and lender fair to bring together potential applicants, financial lenders, sanitation technology providers and sanitary-ware vendors.
Cleaning and developing old OD spots into beautiful public spaces to discourage reverting to old habits

Form of development: Level the spot, plant trees, lay paving blocks, illuminate the spot, put benches and protect the area with fence.

Assessment and upgradation of Community and Public Toilets

- CT/PT audit across the city
- Refurbishments according to CSP recommendations
- One new PT constructed at strategic location which can serve main temple visitors as well as the nearby slum
- Contract with Nirmal Bharat foundation for toilet maintenance
- Refurbishments according to Swachh Sarvekshan requirements and ODF++ compliance

School sanitation investment requirement

<table>
<thead>
<tr>
<th>12 Public Schools</th>
<th>14 Private Schools</th>
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</thead>
<tbody>
<tr>
<td>Girls- 1247</td>
<td>Girls- 3157</td>
</tr>
<tr>
<td>Toilets- 11</td>
<td>Toilets- 36</td>
</tr>
<tr>
<td>Urinals- 47</td>
<td>Urinals- 75</td>
</tr>
<tr>
<td>Boys- 1479</td>
<td>Boys- 3406</td>
</tr>
<tr>
<td>Toilets- 12</td>
<td>Toilets- 24</td>
</tr>
<tr>
<td>Urinals- 59</td>
<td>Urinals- 82</td>
</tr>
<tr>
<td>Staff - 96</td>
<td>Staff - 251</td>
</tr>
<tr>
<td>New toilets</td>
<td></td>
</tr>
<tr>
<td>Rs 17 Lakhs</td>
<td>INR 55 Lakhs</td>
</tr>
<tr>
<td>(44 Toilets + 38 Urinals)</td>
<td>(103 Toilets + 192 Urinals)</td>
</tr>
<tr>
<td>Refurbishment</td>
<td></td>
</tr>
<tr>
<td>Rs 6 Lakhs</td>
<td>INR 12 Lakhs</td>
</tr>
<tr>
<td>Annual O&amp;M</td>
<td>INR 7.8 Lakhs</td>
</tr>
<tr>
<td>Rs 3.2 Lakhs</td>
<td></td>
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12 Public Schools

- Girls: 1247
- Toilets: 11
- Urinals: 47
- Boys: 1479
- Toilets: 12
- Urinals: 59
- Staff: 96

New Toilets: Rs 17 Lakhs
- (44 Toilets + 38 Urinals)

Refurbishment: Rs 6 Lakhs
- Annual O&M: Rs 3.2 Lakhs

14 Private Schools

- Girls: 3157
- Toilets: 36
- Urinals: 75
- Boys: 3406
- Toilets: 24
- Urinals: 82
- Staff: 251

New Toilets: INR 55 Lakhs
- (103 Toilets + 192 Urinals)

Refurbishment: INR 12 Lakhs
- INR 7.8 Lakhs
Safe Management of Faecal Sludge
Wai Council signed a resolution to implement an integrated FSSM plan

Wai was the first city in India to have passed such a resolution.

The resolution covered aspects like:
- Citywide FSSM
- Involving Private sector
- Scheduled cleaning
- Land for treatment facility
- Taxes to be levied

- All septic tanks in the city emptied regularly. Affordable and inclusive emptying service.
- All human faecal waste treated and made safe for disposal. A dedicated treatment facility for Wai.
- Reuse of treated water and sludge.

- All toilets connected to safe collection and disposal systems. Septic tanks built according to standards.
- Safe disposal of treated waste. No pollution of soil or water due to open dumping of untreated septage from emptier trucks.
- River is clean. Septic tanks function efficiently, drain effluent is of better quality.
Citywide assessments across the service chain

Property level database of toilets and septic tanks

Assessment captures the following aspects:
- Toilet availability
- Where is the toilet connected to
- Size and shape of septic tank
- Access covers to septic tanks
- Accessibility of septic tanks
- When was the septic tank last emptied
- Desludging frequency of septic tanks
- Problems encountered while desludging
- Reasons for emptying septic tanks

SaniTab - app and dashboard

A mobile app was developed for this purpose which was then used to do a 100% survey of households across the city. Data from the app plugs into a customized dashboard with charts and maps.

SaniTab allows for customized questionnaires and has since then been used for various surveys in Wai and other cities.

City level assessment using performance indicators

- Coverage of individual toilets in the city and especially in the slums
- Coverage of adequate sanitation system including sewage network and onsite systems
- Collection efficiency of the sanitation system
- Adequacy of treatment capacity
- Quality of treatment
- Extent of reuse and recycling
- Efficiency in redressal of customer complaints
- Extent of cost recovery
- Efficiency in collection of charges

Septic tank study

A detailed technical assessment was undertaken for sample properties in terms of design, construction, influent and effluent wastewater quality. The study also gave various design recommendations for well-functioning septic tank.
Safe containment
**Major dependency on septic tanks**

- Most personal toilets connected to septic tanks
- Septic tanks usually 2-3 chambered with properly constructed bases
- Access issues for some septic tanks
- Oversized tanks according to standards prescribed in IS codes and CPHEEO1 manual

<table>
<thead>
<tr>
<th>Type</th>
<th>Overall</th>
<th>Slum HH</th>
<th>Non-slum HH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septic tanks</td>
<td>86%</td>
<td>96%</td>
<td>86%</td>
</tr>
<tr>
<td>Pit latrines</td>
<td>4%</td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>Others</td>
<td>10%</td>
<td>3%</td>
<td>10%</td>
</tr>
</tbody>
</table>

- Personal toilet septic tanks
  - As per standards
    - Oversized: 70%
    - Undersized: 25%
    - Oversized: 5%

- Community toilet septic tanks
  - Oversized: 78%
  - Undersized: 22%
  - Oversized: 0%

- Most personal toilets connected to septic tanks
- Inaccessible septic tanks with sealed tops and no access covers
- Septic tanks located near drains
- In old community toilets, septic tanks are behind the block making them difficult to access
1. Guidelines for proper construction of toilets and septic tank shared with toilet subsidy applicants along with the work order and at the Toilet and Lender fair
2. Training of local contractors for good construction practices for toilets and septic tanks. Illustrated guidebook in English and Marathi
Safe conveyance of septage
Average desludging frequency was more than 8-10 years

WMC owned 1 suction emptier truck of 5kL capacity for the cleaning of all septic tanks in the town.

Desludging of household tanks was demand based and chargeable at INR 1,000/ trip. Households called the ULB truck when their tanks overflowed.

This amounted to a desludging frequency of 8-10 years (or even more) instead of the 3 year CPHEEO standard.

The truck was also responsible for desludging septic tanks connected to all community and public toilets once a week.

“Yearly desludging of septic tank is desirable, but if it is not feasible or economical, then septic tanks should be cleaned at least once in two - three years, provided the tank is not overloaded due to use by more than the number of persons for which it is designed” - Pg 9-22, CPHEEO Manual

Effluent from septic tanks

Effluent was generally released into the city’s roadside drain network along with greywater from bathrooms and kitchens and was ultimately being let out into River Krishna. Very few septic tanks were connected to soak pits.

When tanks are not desludged regularly, the efficiency of digesting faecal matter goes down over time leading to the release of untreated faecal matter from tank outlets. Similarly when septic tanks are not emptied before they overflow, untreated faecal matter goes into the drains as it has not been retained in the tank for the required amount of time.

Wastewater samples were tested from 7 locations across Wai and checked for the levels of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Faecal Coliform and pH level. Results showed that the quality of effluent was beyond the prescribed norms.
## Innovative concept of scheduled emptying of septic tanks

### Benefits of moving from complaint redressal on-demand system to regular scheduled service

#### Desludging frequency

<table>
<thead>
<tr>
<th>Schedule Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-demand</td>
<td>Service on receiving call by HHs, who do not see the need for regular cleaning. Usually only when septic tank overflows in 8-10 years (2% annually).</td>
</tr>
<tr>
<td>Scheduled</td>
<td>Desludging done for all septic tanks on a fixed cycle of 3 years and predetermined schedule (33% annually) based on city zoning.</td>
</tr>
</tbody>
</table>

#### Infrastructure optimization, Efficiency, Equity and affordability

<table>
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<th>Benefit Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULB</td>
<td>ULB has one truck for desludging individual as well as CT/PT septic tanks.</td>
</tr>
<tr>
<td>Emptying charge</td>
<td>Emptying charge of Rs 1000/trip levied by the ULB to cover the cost of operations. This was a high price to pay in an emergency situation for households.</td>
</tr>
<tr>
<td>Future treatment facility</td>
<td>Any future treatment facility would receive septage of varying quality. Also cannot predict quantity of daily load.</td>
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#### Regulation and monitoring

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<tr>
<td>No monitoring</td>
<td>No monitoring mechanism and regulation esp. of private informal providers. Manual labour is needed as sludge hardens in tank due to not being emptied for a long time.</td>
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<tr>
<td>ULB monitoring</td>
<td>Regulated and monitored by ULB. Payments to private operator linked to performance and adherence to standards. No need for manual labour due to regular emptying.</td>
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#### Environmental benefits

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<td>Low frequency of desludging</td>
<td>Likely reduction in BOD and coliform in septic tank effluent due to better efficiency of tank. Also avoids solid overflow.</td>
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<tr>
<td>Overflow before emptying</td>
<td>Likely reduction in BOD and coliform in septic tank effluent due to better efficiency of tank. Also avoids solid overflow.</td>
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Operational requirements

1. Zones of Emptying cycle
   • The city was divided into 3 zones as per the citywide database on toilets and septic tanks.

2. Emptying Truck: Number and capacity
   • 2 trucks to desludge ~ 2000 septic tanks annually. 300 days per year. Visits between 7am-5pm per working day.

3. Route planning
   • Deciding the truck movement within the zone.

Engaging a private contractor

1. Consultations with various players to gauge interest. Landscape assessment of players. Assessing ULB capacity and processes.

2. Designing an appropriate contract document. Each contract option along with draft tender clauses was discussed with the private sector and ULB to understand their concern and requirements. The document was also vetted by legal firms.

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Balancing LG and Private interest

1. Bundled or Unbundled contract?
2. Operational role of the private contractor
3. Source of revenue
4. Payment structure
5. Contract length and value
6. Risk mitigation and allocation

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Revenue stream enough to meet private players’ return expectations?

Who should invest in capital assets?

What is the appropriate contract duration for private and LG?
An e-tender was floated on the State government’s MahaTenders website for a competitive bidding process.

Out of all bids received, Sumeet Facilitates Private Ltd. was selected and awarded the contract for 3 years.

Performance linked payments

The contract is ‘performance based’ i.e. it specifies what the service provider must deliver in order to get paid, and not the inputs or material used. In order to receive full monthly payments, the private operator is required to produce proof (through signed forms) of having emptied the required number of tanks and safe discharge at the designated FSTP site. Thus each desludging is accompanied by a form with signatures from the truck operator and septic tank owner for proof of emptying and FSTP operator and truck operator for proof of safe unloading at designated treatment site. Four copies of this form are made – each for the records of the Household, Desludging company, FSTP and WMC.

Clauses in the contract enforce performance standards and safety compliance for septic tanks emptying such as the prohibition of manual scavenging, requirement of personal protective equipment for workers, quality of suction trucks, cleaning up of spillage and assigning responsibility for damage to septic tanks.

Desludging form

Emptying –
- Septic tank owner
- Truck Operator

Unloading at FSTP –
- FSTP operator
- Truck operator
PLAM - Performance Linked Annuity Model for scheduled emptying

This model helps to mobilize capex for conveyance as well as day to day operations management from the private sector. Wai government signed an exclusive contract with the service provider where payments are done on annuity basis - in Wai’s case monthly. This OpEx is backed by sanitation tax and property tax levied by the government on the citizens and thus is a sustainable model of finance. Payments are linked to performance – based on number of septic tanks emptied and adherence to standards. As no permit is given to another private operator, there will be an assured market. On the other hand, households are also willing to get their tanks emptied as no user charge is paid at the time of emptying.

Sanitation Tax

The Maharashtra Municipal Councils, Nagar Panchayats and Industrial Townships Act of 1965 allows for a ‘special sanitary tax’. WMC also levied a sanitation tax to ensure adequate funds for OpEx.

In this arrangement, property owners pay a yearly sanitation tax to the government as a part of their property tax bills, as against current system of paying a charge/fee at the time of emptying services.

WMC also decided to use surplus from property tax collection for this purpose to keep the sanitation tax low. The citizens currently pay Rs60 annually as sanitation tax in addition to their property tax.

Escrow mechanism

In consultations with the private sector, it was found that the biggest risk they report in signing contracts with local governments is of delayed payments. To protect against this an Escrow mechanism was set up which is basically a tripartite agreement between WMC, the private contractor and an independent bank.

An account was opened with the bank where WMC will put funds to create a Contract Fees Reserve Fund (CFRF) at the start of the Escrow arrangement. WMC is to maintain a minimum balance of three months’ payment to the contractor via transfers from property tax and sanitation tax every month.
Scheduled emptying for your septic tank is due on 18/11/2018. Please be ready at home. For more info call: Phone number. Help us in making Wai a clean and healthy city.
4. Pamphlet distributed to households explaining what to expect on the scheduled day of service.

5. Short animated movie explaining the process was circulated on Whatsapp. The movie also contained a message from the Chief Officer of WMC.
4 Treatment and safe disposal
Earlier, sludge was being disposed off at the city’s solid waste dump site without treatment.
New Faecal Sludge Treatment Plant set up in Wai

Through a grant by Bill and Mellinda Gates foundation, an Indian company, Tide technocrats set up a septage treatment facility of 70,000 litre capacity on land allocated by WMC for this purpose. Both Capex and Opex for 2 year to be provided by Tide technocrats

The FSTP was inaugurated on the 30th of May 2018, along with the scheduled emptying service.

The plant first dewater the sludge and then converts sludge comprising of 30-35% solids to Biochar using a thermal process. Wastewater removed from the sludge is then treated separately through Phytorid and MBBR technologies to meet CPCB norms.

The plant is also energy efficient such that the heat generated in the thermal process is put back into the system and used for further drying and power generation.

Source: Tide Technocrats
Thermal FSTP - Pyrolysis plant

Input: Faecal Sludge and Septage (Excreta + Flush water + Urine + Anal cleansing water)

Output: Treated Water and Biochar

Capacity: 70 kilolitre daily

In the de-watering unit, polymer is added to the sludge which coagulates solids and separates it from the liquid.

Suction truck delivers septage to the plant.

At the receiving station it passes through a screen to remove plastic wrappers, sanitary napkins etc.

Sludge is then stored in holding tanks.

Biochar

In the Pyrolysis unit dried sludge is burned in controlled oxygen. This completely removes moisture and kills all pathogens.

Finally, UV treatment produces fully treated and safe water for disposal or reuse.

Sand filters and activated carbon filters remove more impurities.

In the Phytorid unit liquid is applied to a system filled with gravel, grit and soil. Plants present on this system remove Nitrogen from the wastewater.

Mechanical dryer further dries the solids on a conveyor belt through contact with hot air.

Treated water
Developing FSTP as a Resource Park

Field visits

Resource center building
Resource recovery and reuse

**Biochar:**
Exploring uses in agriculture / building materials / filters

**Thermal Energy:**
Being used internally for pasteurization / Drying / Power generation

**Treated water:**
Gardening and greening public places in the city: Landscaping at garden near vermicompost shed, on the road to FSTP and SWM site, at FSTP site, and local Smashan Bhumi

Demonstration in using water for fire fighting at SWM site
Safe management of effluent and greywater in drains
In the long term, the city is interested in settled sewers as a low cost option to provide safe conveyance of waste water

- Small bore sewer system to convey wastewater from bathrooms, kitchens and septic tank effluent which will be treated through MBBR plants – one on the north half of the city and one on the south
- Sewer systems with a minimum diameter of 100 mm are proposed to be constructed over a period of 5 years.
- Detailed project report was prepared by a consultant in 2017
It is expected that regular desludging services and safe disposal at the FSTP will eventually improve the quality of effluents flowing in drains and therefore the quality of both river and groundwater.

To track this impact, a monitoring plan is in action wherein quality tests are being conducted for river water, groundwater, effluent flowing in drains and from septic tanks and septage. A baseline analysis was carried out in the first year. In the second and third year trendline monitoring and analysis will be done.

The monitoring regime developed for this identifies sampling locations, quality parameters to be tested and sampling procedure for collecting the samples based on the guidelines provided by the central pollution control board (CPCB) and the Maharashtra state pollution control board.
Sanitation worker safety

Contract with private sector reiterates prohibition on manual scavenging

Frequent emptying will remove need to human intervention in cases where sludge has hardened

Safety gear specified in contract and mandatory at all times

Developing guidelines for PPE and workplace safety

Initial assessment in progress for worker perception of PPE and their requirements

Training workshop cum medical camp for SanWorkers across all aspects of the service chain
Smart monitoring systems
Need to monitor FSSM systems

1. Desludging at regular intervals
2. Safe desludging following necessary protocol
3. Conveyance to designated treatment site
4. Treatment as per standards
5. Safe disposal/reuse
6. Performance linked payments where private sector is involved.

Benefits of SMART systems for monitoring

- "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

Tools developed

- SaniTrack
- SaniTab

Photo stamping, Geo stamping, Signatures

Unique database
SaniTab - Creating a citywide database with desludging operations

Mobile app for initial citywide survey now used for monitoring safe desludging operations with customized form

Scheduled emptying as an opportunity to create a unique and detailed database of all onsite systems in the city as every septic tank is visited once in the cycle

Dashboard to show real time progress on CWIS principles

Municipal staff being trained to use the app themselves. Dashboard introduced to city managers.
Amazon like delivery app to **monitor** desludging operations-
- service at property end
- safe decanting at FSTP
- treatment quality at FSTP

Can handle both scheduled emptying as well as demand based operations

Payment linked Mechanism
- Payment can be linked to results from this system.
- Payments can be done as per automatically generated reports.

Can also used as database creation tool.

Modules catering to every stakeholder – truck operators, ULB Officials, administrators etc.

Integrated with quality monitoring hardware at FSTP for realtime quality data
Setting up a “City Swachhata Kosh” to capture CSR or funds from the local donors

City Sanitation Fund mechanism will enable local industrialists and other donors to effectively contribute to development of improved and universal sanitation in the city.

Account opened in April 2015 started receiving funds from July 2015.

City leaders and local industrialists/donors willing to contribute to the fund

Waste Shedder Machine
Donated by Garware Wallropes

Plastic Baling Machine

Corporate / local onors

CEPT

Municipal Council (MCI)

CSF Committee

Households / private contractor

City Sanitation Fund / City Swachhata Kosh

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6
What has been achieved in Wai city*

100% access to toilets
85% coverage of individual toilets
645 scheduled service visits
464 scheduled desludgings
1921 properties in the city covered
108 emergency desludgings
28 Community toilets serviced weekly

Unique database of 572 septic tanks in the city
85% prepared with access covers open
~5.5 Million litres of septage delivered safely to treatment facility

As on September 24th 2019 Wai Municipality was declared as Open Defecation Free++.

* Numbers as of Sept 1st, 2019
URBAN MAHARASHTRA
Scaling up in Maharashtra

- Experiences and lessons from Wai have been translated into policies and guidelines at State and National level
- Concept of scheduled emptying is in process of being adopted statewide with a government strategy
- Training of first set of 130 ULBs selected from Maharashtra for developing FSSM plans – 90% cities report plans to take up same model to become ODF++
- Resource materials developed is readily available for other cities to use
  - Model tender documents for scheduled emptying and FSTP DBOT
  - IFSM assessment and planning toolkit
  - Toolkit for engagement of private operators
  - Case studies of Wai
  - Awareness materials for FSSM and ODF
  - Monitoring tool being prepared
City partners

C-WAS | CENTER FOR WATER AND SANITATION

CRDF | CEPT RESEARCH AND DEVELOPMENT FOUNDATION

CEPT UNIVERSITY

Government of Maharashtra

BILL & MELINDA GATES FOUNDATION

DEPARTMENT FOR INTERNATIONAL DEVELOPMENT

SUMEET FACILITIES

RCUES MUMBAI

TECH

TIDE TECHNOCRATS

CHF INTERNATIONAL INDIA

Dalberg

URCON CONSULTANTS
ODF++ Wai