Operationalizing Septage Management in Jhansi

Date: 29th May, 2023
An Overview & City Profile

Located in Bundelkhand area, Jhansi is the historic city of Uttar Pradesh.

Jhansi’s terrain is dominated by rocky strata making it difficult to lay underground sewerage network.

The city is dependent on (oversized) septic tanks. Emptying cycle 5-10-15 years.

The property tax collection rate is around 90 per cent.

<table>
<thead>
<tr>
<th>Population (As per - 2011 Census)</th>
<th>505693 (current 6,60,000 approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area</td>
<td>159 Sq. Km.</td>
</tr>
<tr>
<td>Total Ward</td>
<td>60</td>
</tr>
<tr>
<td>Literacy Rate</td>
<td>75.05</td>
</tr>
<tr>
<td>No Of Household</td>
<td>1,24,359 Approx.</td>
</tr>
<tr>
<td>No of Household Toilets</td>
<td>1,05,706 Approx.</td>
</tr>
<tr>
<td>No. of CT/PT Toilet</td>
<td>57</td>
</tr>
</tbody>
</table>
Jhansi adopted a unique, incremental approach towards septage management, (6+12 & 32) KLD.
Sludge Treatment Plant (6+12 KLD), Jhansi
Nature Based Treatment System

1. Collection
2. Transportation
3. PLANTED DRYING BEDS
4. Dewats
5. Planted Gravel Filter
6. Polishing Pond
City-Level Desludging Operations

Inansi practices demand-based desludging.

Before 2015, desludging services were provided by the government. Till 2014–15, desludging services were provided by JNN at Rs 700 per trip. The emptied sludge was dumped into open lands outside city limits.

After 2015, desludging operations have been contracted out to a single private operator for better services. After 2015, desludging operations have been contracted out to a single private operator for better services. The private operator (Purna Pro Enviro) provides the services through government owned vehicles (6 KL & 2 KL) and his own new vehicles of 4KL capacities, and one vehicle of 1KL capacity have also been added in 2023 through his own funds. Since the completion of the FSTP in 2018, the emptied sludge from septic tanks is being taken to the treatment plant by the private operator.

The private desludging operator also operates and maintains the (6+12) KLD FSTP.
User registers the desludging service either by calling at the toll-free number 14420 or by booking a request at the Nagar Nigam office.

Desludging operator’s office at the Nagar Nigam

Booking receipt for desludging services

Application form for booking desludging services
City-Level Desludging Operations

Capacity: 2000 liters (2KL)
Desludging fee: 1500 Rupees per trip

Capacity: 6000 liters (2KL)
Desludging fee: 3000 Rupees per trip
# Desludging of Desludging Services

## Desludging summary sheet for the month of February 2023

<table>
<thead>
<tr>
<th>Period of 01 Feb 2023 to 28 Feb 2023 of Plant 06Kld</th>
<th>Summary Sheet of 01 Feb 2023 to 28 Feb 2023 of Faecal Sludge Treatment Plant 12Kld</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fees By Small Vacuum Truck</td>
<td>Agreement Period: 15.04.2021 To 14.04.2026</td>
</tr>
<tr>
<td>Fees By Large Vacuum Truck (upto 6000Ltd)</td>
<td>Spetic Tank Cleaning Fees By Large Vacuum Truck (upto 6000Ltd): 3000/-</td>
</tr>
<tr>
<td>Small Vacuum Truck: from Public</td>
<td>Collection from Small Vacuum Truck from Public: 0*1500/- = 0/-</td>
</tr>
<tr>
<td>Govt/VIP/Person Septic Tank Cleaning:</td>
<td>Collection From Large Vacuum Truck From Public: 44*3000/- = 132000/-</td>
</tr>
<tr>
<td>Months of Feb 2023:</td>
<td>Collection From Govt/VIP/Person Septic Tank Cleaning: 0</td>
</tr>
<tr>
<td>Total Collection in The Months of Feb 2023:</td>
<td>Total Faecal Sludge Desludge In Plant: (60*6000)= 360000 Lts</td>
</tr>
<tr>
<td>Nos Of Public Septic Tank Clean By Small Vacuum Truck</td>
<td>Treated Water (Approx 90%): 324000 Lts</td>
</tr>
<tr>
<td>Nos of Public Septic Tank Clean By Large Vacuum Truck: 44 Trip</td>
<td>Compost Genrate (Approx 10%/10: 36000/10)= 3600Kgs</td>
</tr>
</tbody>
</table>

- Septic tanks emptied
- Revenues:
  - Public:
    - 72 Trips
    - Revenue: 1.74 Lakhs
  - Govt:
    - 25 Trips
    - Revenue: 1.74 Lakhs

Utilization rate of Feb 2023: 93%
Activities for Regular Desludging of Septic Tanks
Private desludging operator also operate and maintains the (6+12) KLD FSTP.

Six staff members; four guards, one supervisor and one service engineer for maintenance.

&M cost of the desludging services generated by the operator through desludging fees/charges.

&M cost of the FSTP is borne the Nagar Nigam.

Periodic testing of the treated end products.

<table>
<thead>
<tr>
<th>Physico-chemical Parameters</th>
<th>Septage (6 KLD &amp; 12 KLD FSTP, JHANSI)</th>
<th>Suggested Design Values CPHEDO-2013</th>
<th>Final Outlet of 6 KLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>8.0</td>
<td>6.0</td>
<td>7.4</td>
</tr>
<tr>
<td>TSS (mg/L)</td>
<td>16346</td>
<td>15,000</td>
<td>13</td>
</tr>
<tr>
<td>VSS (mg/L)</td>
<td>10535</td>
<td>10,000</td>
<td>8</td>
</tr>
<tr>
<td>BOD (mg/L)</td>
<td>16737</td>
<td>7000</td>
<td>14</td>
</tr>
<tr>
<td>COD (mg/L)</td>
<td>24822</td>
<td>15000</td>
<td>61</td>
</tr>
<tr>
<td>TKN (mg/L)</td>
<td>331</td>
<td>700</td>
<td>31</td>
</tr>
<tr>
<td>NH₄-N (mg/L)</td>
<td>258</td>
<td>150</td>
<td>23</td>
</tr>
<tr>
<td>T-P (mg/L)</td>
<td>127</td>
<td>250</td>
<td>22</td>
</tr>
</tbody>
</table>

Microbiological Parameters

<table>
<thead>
<tr>
<th>Microbiological Parameters</th>
<th>FC (MPN/100mL)</th>
<th>E.coli (CFU/100mL)</th>
<th>Salmonella species (CFU/100mL)</th>
<th>Shigella species (CFU/100mL)</th>
<th>Helminthes eggs (number/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC (MPN/100mL)</td>
<td>9.3 x 10⁶</td>
<td>10⁶ - 10⁸</td>
<td>2300</td>
<td>2300</td>
<td>7000</td>
</tr>
<tr>
<td>E.coli (CFU/100mL)</td>
<td>7.9 x 10⁵</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Salmonella species (CFU/100mL)</td>
<td>7800</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shigella species (CFU/100mL)</td>
<td>5100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Helminthes eggs (number/L)</td>
<td>7000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

FSTP effluent testing report
installed a crusher machine in 2022, for converting the dried bio-solids into a fine powder.

NN partnered with an NGO (National Jan Kalyan Trust) for the sale of bio-solids at the rate of 32 paisa per kg.

- The treated water from the plant is being used for road cleaning purpose through mechanical road cleaning vehicles.
- The excess treated water is used for gardening at the FSTP premise.

**Reuse of Bio-solids**

**Reuse of treated Water**
Partial Model of Septage Management in Jhansi

Desludging fees from public

Desludging Service

Cost of desludging from government institution is compensated from FSTP O&M funds

Private Operator (Purna Pro Enviro)

FSTP

Sale of compost

4.62 Lakhs/month for O&M, through own funds

Revenue from sale of compost @32 paisa/Kg

Jhansi Nagar Nigam

Financial flow

Service flow
Challenges and Way Forward

**Affordable desludging fees:** Working towards affordable desludging fee for the urban poor to ensure equitable and accessible sanitation services for all.

**Concentrated in congested areas:** 25-35% area of Jhansi is very congested and unserviceable with available desludging vehicle. Jhansi is planning to develop/procure a smaller vehicle to provide service in households of narrow street. Also, exploring the possibility of low sewers.

**Optimizing the plant utilization:** Low incoming of septage in newly constructed FSTP of LD. JNN is planning to focus on regular desludging from:
- Community/Public Toilets
- Institutional Buildings
- Government Housing Colonies
- Regular IEC campaigns

Also, signed MoUs with nearby four ULBs for the treatment of their septage without any tipping fees.
In March 2019, the plant was given the “Best Innovation Award in Swachh Survekshan 2019”. It helped to get Jhansi city ODF ++ ULB and secured 3rd Position In Swachh Survekshan 2018 in Uttar Pradesh.
House of Workshops & Visits

Shri Durga Shanker Mishra, Chief Secretary, Government of Uttar Pradesh

Shri Manoj Kumar, Principal Secretary, Uttar Pradesh

Shri Mritunjay Singh, Additional Director, SBM, Uttar Pradesh

Commissioner of Gwalior Municipal Corporation

TERI Team Visit & Training at FSTP Jhansi

Workshop by National Institute of Urban Affairs
Thank you

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