Preliminary Study FSSM Interventions at *Prayagraj* (Allahabad) Nagar Nigam & Adjoining Areas

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Background of the Study area:

The population breakup of Prayagraj District (2011 Census) is given below:

District Prayagraj	**Population (in Lakhs)**
Rural (3053 villages)	44.8
Urban (25 towns)	14.7
Total	59.5

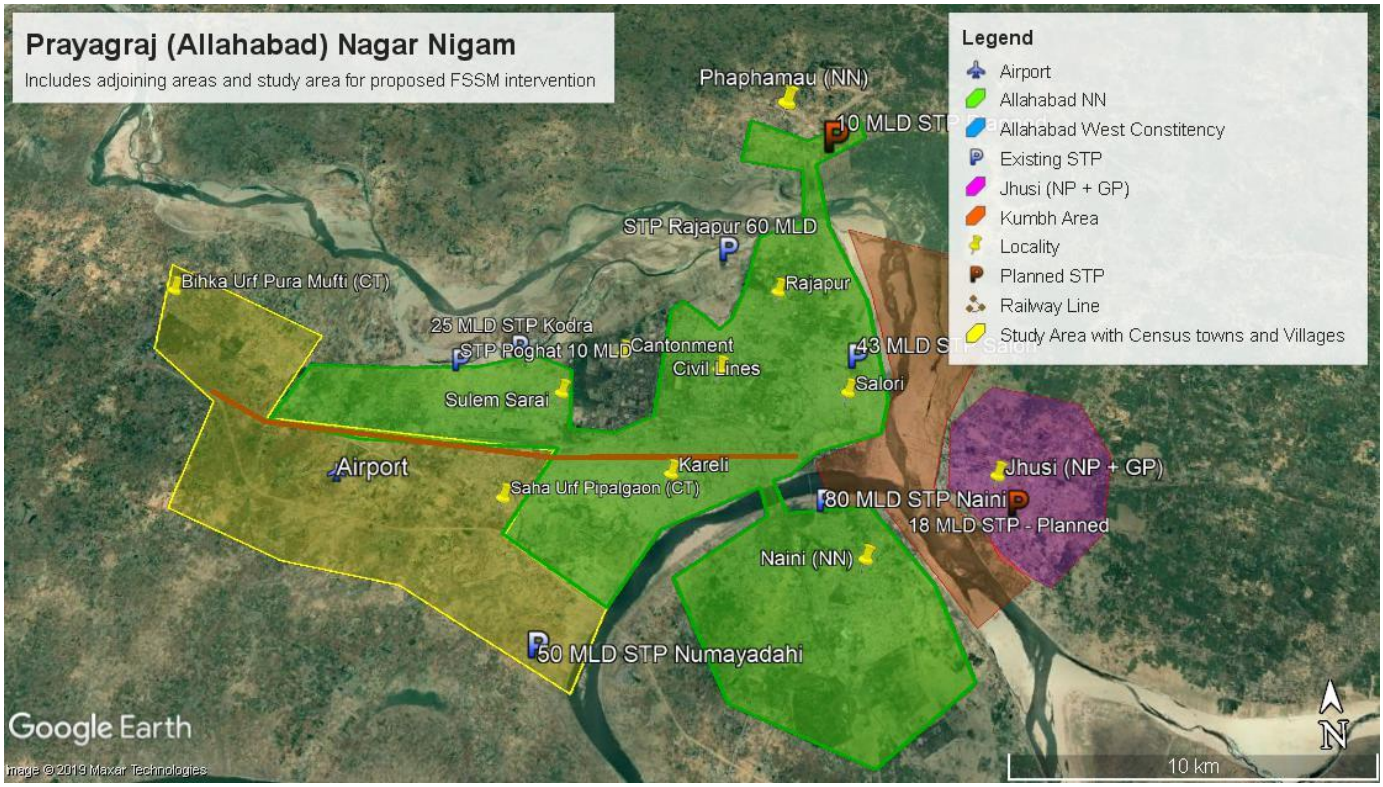
The population breakup of Urban Areas in Prayagraj District (2011 Census) is given below:

District Prayagraj - Urban	**Population (in Lakhs)**
Allahabad Nagar Nigam	11.6
9 No. Nagar Panchayats	1.7
14 No. Census Towns	1.1
1 No. Cantonment Board	0.2
Total	14.7

The population breakup of Prayagraj (Allahabad) Tehsil (2011 census)

Prayagraj Tehsil	**Population (in Lakhs)**
Allahabad Nagar Nigam	11.6
2 No. Census Towns	0.20
1 No. Cantonment Board	0.27
99 No. Villages	1.8
Total	13.9

The Prayagraj Nagar Nigam area is shown below (**coloured in green**).



There are 6 STPs are located in Prayagraj Nagar Nigam and 3 STPs proposed (includes STP proposed in Jhusi Nagar Panchayat). The Details are given below:

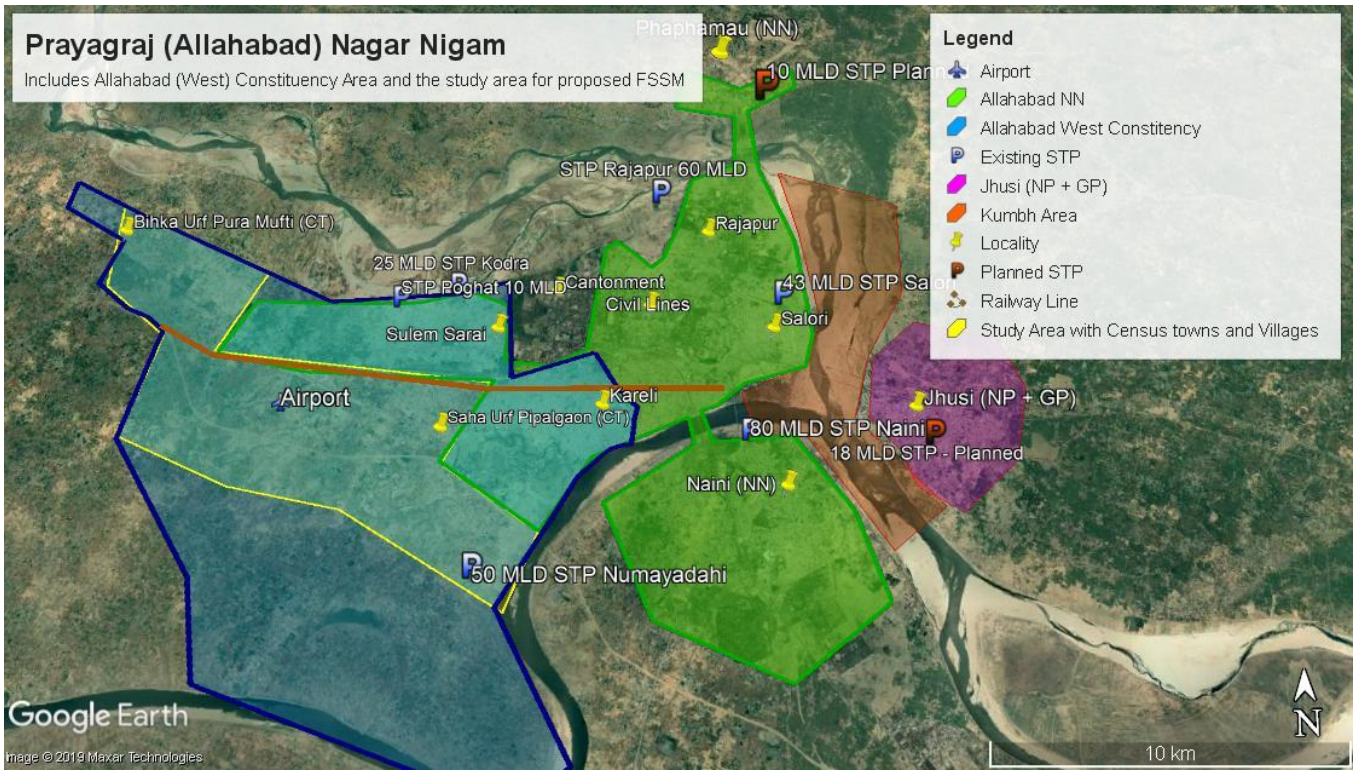
S No	STPs in Prayagraj	Capacity (MLD)
1	Naini (2 Units)	60 + 20 = 80
2	Rajapur	60
3	Salori (2 Units)	29+14 = 43
4	Kodra	25
5	Poghat	10
6	Numayadahi	50
7	Allahpur	11.62
	Total	**279.62**
1	Jhusi (Proposed)	18
2	Phaphamau (Proposed)	10
3	Naini (Propose)	35
	Total (Incl. proposed)	**342.62**

Prayagraj (West) Constituency Area

The Prayagraj (West) constituency consists for **western portion of Prayagraj Nagar Nigam and 2 no. Census Towns, cantonment board and 99 Villages** located in Prayagraj (Allahabad) Tehsil (Sub-District). The population breakup is given below:

Name	Population (in Lakhs)
Allahabad Nagar Nigam (approx. 1/3rd)	3.87
2 No. Census Towns	0.20
1 No. Cantonment Board	0.27
99 No. Villages	1.8
Total	6.14

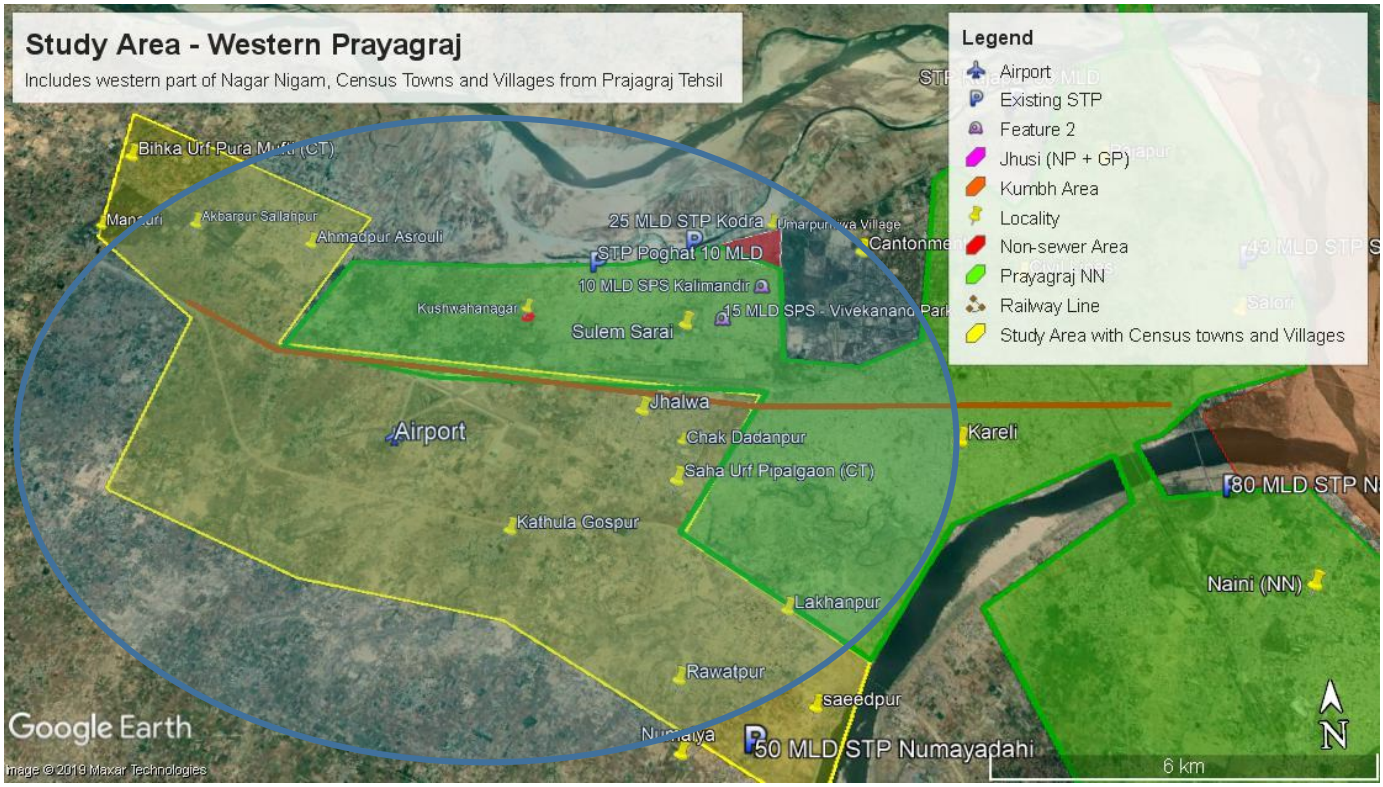
The constituency area is shown in the figure below **(coloured in blue).**



Study Area for potential FSSM interventions

The study area for potential FSSM interventions include the western areas of Nagar Nigam which includes Sulem Saraim, Kareli etc, 2 census towns in the vicinity i.e. Saha Urf Pipalgaon and Bihka Urf Pura Mufti, and villages with 3-4 kilometers of the nagar nigam boundary with population in the range of 1000 to 5000. Some of these villages include Umarpurniwa, Kathula Gospur, Dadanpur, Akbarpur Sallahpur, Lakhanpur, Numaiya, Karaheda etc

The Study Area (i.e. Sulam Sarai & Kareli) shown in the map below (**Area beyond Nagar Nigam limits is coloured in yellow)**.



CSE Field Visits to the Study Area:

CSE team undertook 2 visits to Prayagraj (Allahabad) Nagar Nigam to study the feasibility for interventions relating to FSSM in the study area as well as explore other interventions in the region as a whole (i.e. areas adjoining Prayagraj Nagar Nigam).

Visit-1: 21-23 August 2019

Team: 2 CSE Members - Rahul Mankotia and Bhavik Gupta

Objective of the Visit:

- A quick recce visit of the city to understand the existing situation for feasibility of interventions related to Faecal Sludge and Septage Management.
- Studying and identifying non-sewered areas in the western Allahabad Nagar Nigam region as well as understanding the status of the sewered areas with respect to the household connections.
- Visiting STPs in the western region to see potential for Co-Treatment and Co-location of FSTP.

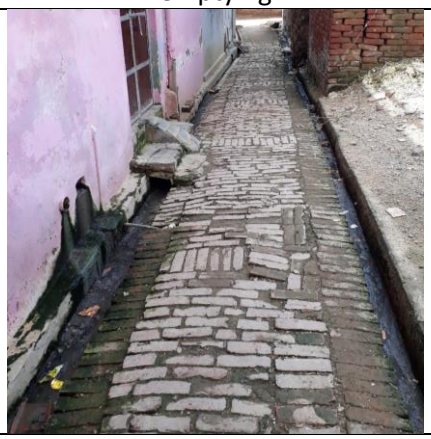
We interacted with the following stakeholders during our visit:

- GM UP Jal Nigam (Govt. agency responsible for sewerage system) to understand the existing status of the sewerage projects in Allahabad,
- GM Jal Kal Vibhag and concerned Executive Engineer to understand the issues relating to existing demand for emptying septic tanks in the area
- M/s EMS Infracon pvt ltd, the Contractor responsible for laying of sewer lines and providing household connections. A representative of the contractor accompanied us to show areas where sewer lines could not be laid.

- Corporator (Ward-25) to understand the issues faced by households in connection of sewer line.
- Private Desludger to understand the demand of emptying of septic tanks

Observations and field visit:

- Sewerage network has been laid in 90% of the area and approximate 60% households have been connected in Prayagraj Nagar Nigam (including Jhusi NP). The laying of balance sewerage network and providing balance households connection is under progress with M/S EMS Infracon Pvt Ltd.
- There are existing 7 STP in the city with a total treatment capacity of 268 MLD. M/s Adani Water has got the contract in June to operate all the existing STP and to construct 2 additional STPs. All the STP have been handed over to Adani Water except 1 unit in Salori of 14 MLD which is being operated by M/s Toshiba Water Solution Private Limited.
- We visited 2 STPs i.e. Kodra and Numayadahi) located along the banks of Ganga and Yamuna respectively. Both were in shutdown since 18th August due the flooding due to rise in the level of the respective river.
- Majority of the households have connected the outlet of the septic tank to the sewerage network.
- During our interaction with the Corporator of Ward-25 i.e. locality around Kushwaha Basti, it was found that households are keen to get their households directly connected to the sewerage network to avoid having to desludge the septic tanks periodically.
- During interaction with Jal Kal Vibhag, it was informed that Allahabad Nagar Nigam has 8 desludging vehicles. On an average they get 10 to 12 requests for emptying of septic tank in a month. Out of which 2 – 3 are from Western part of Allahabad Nagar Nigam (i.e. Sulem Sarai, Kareli etc). Majority of this demand is one time request to empty the septic tank so that the households can directly connect with the sewerage network.
- During our interaction with private desludgers, it was found that the majority of the work comes from dewatering of flooded drains and other assignments from the Nagar Nigam. Emptying request from households is around 1-2 requests a month.
- We located a some non sewered localities :
    - Khushwaha Basti of around 60 – 80 households unsewered because of approvals pending from Airforce Authority for excavation on the adjacent lane.
    - Umarpurniwa Village (Gram Panchayat) with around 500 to 600 Households is located adjoining the Nagar Nigam. The Sewerage network is not possible here due to topography and the fact it is surrounded by Ganga and a large drain from 3 sides.

	
Approach Road for Kodra STP	Septic Tank outlet connected to sewerage system
	
Umarpurniwa – narrow lanes filled with wastewater	Umarpurniwa – septic tanks which would need emptying
	
Septic Tanks constructed below toilets – Khushwaha Basti	Umarpurniwa – septic tanks constructed below house not emptied for 10 years

Visit-2: 5-7 September 2019

Team: 2 CSE Staff (Rahul Mankotia and Sarim Ansari) and 2 CDD Stafff (Praveen and Sakthi)

Objective:

- Feasibility for various options for interventions in FSSM.
- Visit nearby Census towns and villages to see if clustering is feasible for FSSM
- Visit all the STPs and other locations in Prayagraj Nagar Nigam where sewerage network is under-construction to check for feasibility of FSSM.

Field Visits undertaken:

- Visit to Villages and Census Towns in the Study Area i.e. Saha Urf Pipalgaon (CT), Kareheda, Numayia, Umarpurniwa. This was done to see the type of containment systems and the demand for faecal sludge emptying.
- Visited to all 6 locations of working STPs (i.e. total 8 STPs with Salori and Naini having 2 STPs each at the same location) to explore Co-Treatment of FS or Co-location of FSTP for other areas on Prayagraj Nagar Nigam.
- Visit localities in other parts of the Prayagraj Nagar Nigam like Phaphamau, Salori, Rajapur to see the status of sewerage connections and possibility of FSSM intervention.

Observations:

- During visit to the balance areas of Prayagraj Nagar Nigam, Sewerage Network has been laid in 90% of the areas in Salori, Rajapur and Naini. Work is in progress for laying of Sewerage system in Phaphamau and Jhusi (20-30% laid).
- In Rural Prayagraj, containment systems constructed at almost 25 to 30 feets deep which does not get emptied for 20 to 30 years. It is possible that they resort to manual scavenging.
- There were toilets observed in Saha Urf Pipal Gaon and Umarpurniwa which are connected to septic tanks which would need emptying (approx. 20 to 30% of the population have access to such toilets).
- Interaction with locals in Rural Prayagraj indicated that access to toilets are a concern, i.e. households do not have individual toilets or access to community/public toilets. Even households which had individual toilets, often its members practiced open defecation.
- Desludging of onsite containment units in villages and census towns near the Nagar Nigam boundary was carried by trucks belonging to UP Jal Nigam or private sector. However, the practice of desludging was very uncommon among households.
- Grey water discharged by the households flows through network of small and medium drains and ends up in the river Ganga and Yamuna at various outfalls. These drains often are filled with solid waste, blocking the flow and creating stagnation points. It is a common sight to see mosquitoes breeding, pigs and other rodents in and around such stagnated areas.

	
Saha Urf Pipalgaon (Village in Study Area) – septic tank under construction which would need emptying	Saha Urf Pipalgaon (Village in Study Area) – septic tanks with access problem
	
Phaphamau (Nagar Nigam Area not in Study Area) – sewer lines laid in narrow lanes	Phaphamau (Nagar Nigam Area not in Study Area) – Sewer lines being laid
	
Containment under construction in Karehada Village near Numayadahi STP (In Study Area). More than 25 feet deep. Emptying frequency more than 15 years	Sewer Network laid in Salori (including Narrow lanes).

	
Households connected to sewerage Network in Rajapur Area near STP	Wastewater (Grey + Black) from households contaminating local ponds

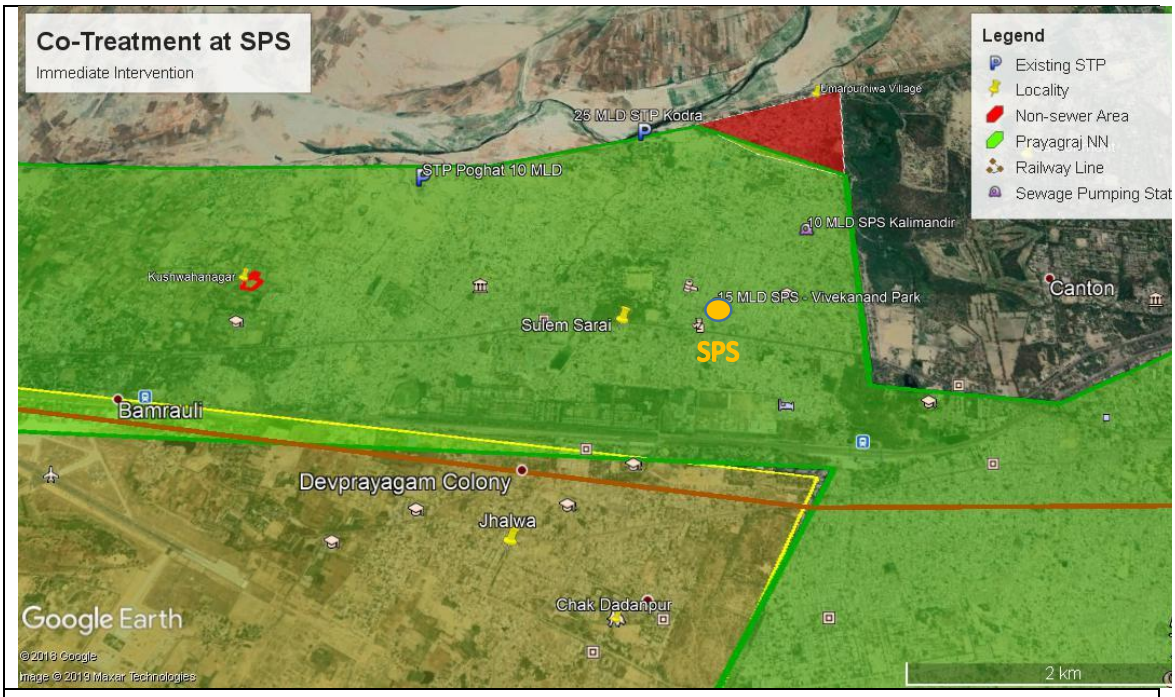
Possible interventions:

1. **Co-Treatment at an SPS:**

   As an immediate intervention, in order to safely dispose the Faecal Sludge emptied from existing septic tanks in the Nagar Nigam Area, Co-Treatment can be done at Sewage Pumping Station at Vivekanad Park. A simple inlet pipe (receiving Station) can be constructed near the boundary wall and discharged at the Pumping Station Sump. The Pumping Station has a capacity of 15 MLD and can easily dilute 6 KLD or less Faecal Sludge from the tanker.

   This Co-Treatment intervention can easily cater to the demand from Nagam Nigam above the railway track including areas like Sulem Sarai, Poghat, Transport Nagar, Kushwaha Basti as well as Umarpurniwa village (Gram Panchayat).

A Receiving Unit near the SPS Sump can be proposed for Co-Treatment

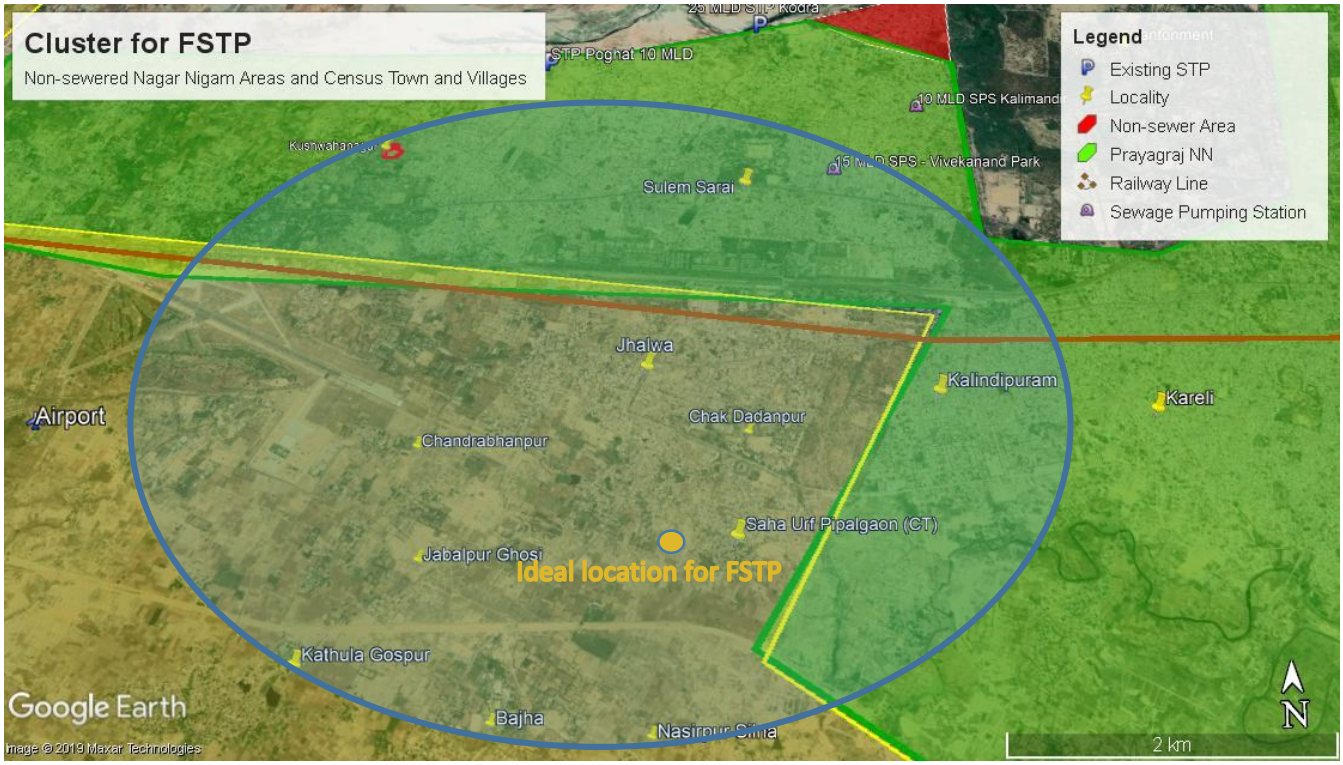


The SPS is optimally located to cater to the FS demand from Nagar Nigam Area above railway track

2. **A Cluster for FSTP:**

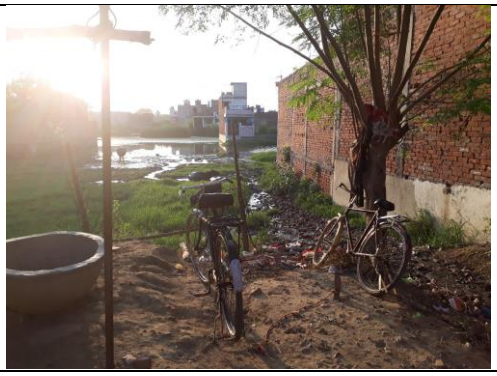
A small FSTP of 6 KLD can be proposed near Saha Urf Pipalgaon (Census Town). This FSTP would cater to the Faecal Sludge Emptied from a cluster which can include Prayagraj Nagar Nigam area south of railway line like Kareli, Kalindipuram and areas like Sulem Sarai, poghat close to the Kanpur Highway, Saha Urf Pipalgaon (Census Town) and villages in the vicinity like Kathula Gospur, Jabalpur Ghosi, Nasirpur Silna etc.

The capacity of the FSTP could cater to 1 – 2 truck load a week. The technology can be such that it can easily be expanded in case the Faecal Sludge load increases. A Site can be identified optimally located to cater to demand for this cluster.



3. Grey Water Management at a Pilot Scale.

The grey water in many location is a matter of concern since it creates conditions for mosquito breeding, fouls smell and public health concern. Options for technologies can be reviewed for a pilot level intervention. Possible locations for this can be Umarpurniwa (where improper grey water management has a big public health concern) or Saha Urf Pipalgaon where in addition to public health concern, the grey water is contaminating a local pond.

	
Public Health concerns relating to Wastewater at Umarpurniwa.	Wastewater being discharged at a local water body at Saha Urf Pipalgaon

Timeline for FSSM interventions in the study area:

Immediate Measure (1 – 3 months)

- FS collected from households could be mandated to be discharged at designated SPS and STPs, this will arrest FS being disposed directly to water bodies and start monitoring performance of STPs – monthly.
- Identify land (1 acre approx.) for FSTP for the identified cluster and preparation of Detailed Project Report for implementation.
- Develop plan for Grey Water Management pilot project at either Umarpurniwa or Saha Urf Pipalgaon and preparation of Detailed Project Report.
- Households with no access to toilets and which do not have containment units be identified and provision made to construct these under SBM.
- Solid waste in drains be cleaned and encroachments removed to establish the flow.

Medium Term measures (3 – 18 months)

- STPs monitored quarterly and studied for the impact of co-treatment and thereby undertake necessary course correction to improve their performance.
- Identify hot spots for water stagnation in drains and develop solutions for better conveyance, through simplified sewers or closed drains. Identify key outfalls into the river and plan for interception, diversion and treatment.
- Identify other possible clusters for FSTP interventions and Grey Water Management in areas in and adjoining Allahabad Nagar Nigam.
- Establish an FSSM cell for Allahabad Nagar Nigam and adjoining areas, managed by UP Jal Nigam in co-ordination with Allahabad Nagar Nigam, for improving the service quality of desludging and also increasing demand among households

Next Steps:

- Detailed Proposal for Co-treatment / Disposal of FS at SPS or STPs with UP Jal Nigam and STP operators – CSE PSU.
- Identify sites for standalone Faecal Sludge Treatment Plant after meetings with the local bodies / DM and prepare Detailed Project Report – CDD (with CSE PSU).
- Develop detailed plan for Grey Water Management pilot at either Umarpurniwa or Saha Urf Pipalgaon in consultation with Local Bodies / DM – CDD (with CSE PSU).