An excreta flow diagram (or Shit) Flow Diagram presents a clear picture of how excreta flows are managed within the city. The diagram clearly depicts how excreta flows from user interface to the final disposal. It has the following stages:

### Containment

- **According to the field-based research conducted during October 2016, it is revealed that no functional sewer network present in the city. Mostly the population is dependent on on-site sanitation systems (OSS) like septic tank and pit latrines (Interview with Sanitary Inspector). Households deprived of toilets, uses community toilets or practice open defecation.**

### Septic Tanks

- **Population dependent on septic tank has a share of about 80% (as per sanitary inspector, primary survey, Census 2011 & 7 nischay survey), effluent from septic tanks discharges into an open drain/storm water drain located adjacent to the plot boundary. Lower absorption capacity of soil is the key reason for preferring septic tanks over pits. Larger sizes of septic tank are preferred at the household level to get rid of frequent emptying. The average size of a septic tank as per household survey is 10 ft x 4 ft x 7 ft (LBH) with two or three chambers.**

- **According to field research, 89% population is dependent on OSS. SN generated from the**

### SFD Description

**Muzaffarpur, Bihar, India**

<table>
<thead>
<tr>
<th>Containment</th>
<th>Emptying</th>
<th>Transport</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite sanitation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN not contained: 44%</td>
<td>FS contained: 22%</td>
<td>FS contained – emptied: 20%</td>
<td>FS delivered to treatment: 18%</td>
</tr>
<tr>
<td>FS not contained: 22%</td>
<td>FS not contained: 25%</td>
<td>FS not contained – emptied: 20%</td>
<td></td>
</tr>
<tr>
<td>Open defecation</td>
<td>11%</td>
<td>3%</td>
<td>30% FS not delivered to treatment</td>
</tr>
<tr>
<td>2% FS contained – not emptied</td>
<td>8% FS treated</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>2% FS not treated</td>
<td>90%</td>
<td>30% FS not delivered to treatment</td>
<td></td>
</tr>
</tbody>
</table>

Key: WW: Wastewater, FS: Faecal Sludge, SN: Supernatant

- **Figure 1: Septic tank of community toilet.**
- **Figure 2: Septic tank of an ongoing construction of**
OSS is 44% of the population (This includes 22% from Septic tank connected to open drain and 22% from lined tank connected to open drain).

Pit Latrines

- These containment systems are only observed in slums where the toilets are constructed under Swachh Bharat Mission. These pits are constructed using rings made of concrete. Each ring measures 3 feet in diameter and 10 inches in height. It was also found during slum visit that despite being provided individual toilets by ULB under national mission SBM, it is not in use. The reason behind is fear of frequent emptying of the pit which is constructed of 3 ft in depth only, thus open defecation is prevalent.

Open defecation

- Few slum dwellers do have submitted an application under SBM to the concerned department at the corporation since last 1 year, but open defecation is still prevalent.

Sewerage Network

- According to census 2011 and 7Nischay data, households connected to sewerage network have a share of 9% and 0.3% respectively. But as per field based research and Key Informant Interview (KII) with the city officials, only a few households had sewer connections earlier which are now dilapidated and are no more functional.

Emptying

- Emptying services provided by both public and private operators. Details for both are given below:
Application process
1. A resident has to write an application to the commissioner stating about the no of trips required for desludging and provide his address
2. Hand over the application to the accountant and submit the required amount (Rs. 500/trip) and receive cash receipt from the counter
3. Within a week emptying service is provided
4. Entry for the same is made in record book of the concerned department
5. Two vacuum tankers are owned by ULB
6. Capacity of vacuum tankers is 3000 litres

Private operators
- There are 2 private emptiers functioning within the corporation area. The emptiers advertise and market their services in local newspapers and distribution of business cards to the households.

Emptying process
- Emptying of different containment systems is carried out mechanically and there is no manual emptying. Generally emptying is carried out by two operators (one driver and one labor). Emptyers do not use personal protective equipments while emptying therefore working with bare hands is a common practice making the job more prone to diseases and extreme threat to health. FS not contained and emptied is attributed to be from 20% (includes 19% FS from lined tank with impermeable walls and open bottom and 1% FS from Lined pit with semi permeable walls and open bottom)
- FS contained and emptied is attributed to be from 20% population who use septic tank connected to open drain and the remaining 3% population is attributed to FS not contained not emptied.

Transportation
- Tractor mounted with tanker is the vehicle used for emptying of different type of onsite containment system. According to KII with the driver and labor, the average distance traveled...
for each trip is 3 km. There are only 2 successful trips made per day where the time taken to complete one desludging is near to 2 hours. A 5 HP pump is attached to the vehicle is used for suction. The capacity of each tanker is 3000 liters. The supernatant from the septic tank conveyed through open drains finds its way to ponds, open ground and/or River Burhi Gandak.

- FS of 10% population is safely delivered to the treatment plant.

**Treatment**

There is no treatment of septage which is carried by government vehicles whereas there is treatment in case of septage collected by private operators. As per KII, one of the private operators entered into emptying business to get raw material for his fertilizer company.

**Disposal**

Unlike the private emptiers, the ULB has no disposal facility. The ULB emptiers discharge septage into storm water drains, open fields, nallas and agricultural fields. On a large scale, septage is disposed at river Burhi Gandak and the canals/nullahs reaching Ganges.

Discharge of septage by ULB at neighborhood has led to brawls with local residents (KII with municipal staff, 2016).

FS and SN generated within the city, i.e. disposed of without treatment is attributed to be from 90% of the population.

Therefore, FS of 10% population is safely managed and FS of 90% is not safely managed.