A Sanitation (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**

The city of Katihar has an area of 33.46 sqkm that includes out growth. The core of the city is densely populated. Whereas the households in peripheral area of the city have rural settlements which are primarily dependent on agriculture and are considerably lower income settlements.

As per primary survey conducted in November 2016, the city has three different types of containment systems that vary on the basis of income of the households.

- Septic tank with an outlet connected to open drain or soak pit is the most common type of containment system within the central wards of the city. According to key informant interview (KII) with the municipal corporation’s sanitary inspector the percentage of effluent discharged into open drain and soak pit is 50% each
  - Lower income settlements like slums and squatter settlements have pit latrines as containment. Pits are constructed using concrete rings, each measuring 3 feet in diameter and 8 inches in height. Semi permeable walls with open bottom (honey comb) as containment structures is also observed in few settlements during field based study. People staying in the peri-urban areas are generally practicing open defecation due to no access to toilets
  - Most of the septic tanks were found to be well designed with three separation chambers along
  - Other land uses like commercial, public and semi-public units have septic tank as containment systems with an outlet connected to open drains or soak pit
  - Due to no clear differenciation between the volume

**SFD Description**
of the effluent and solid FS generated from the containment, it is assumed to be 50% each to reduce maximum error

- FS contained or not is dependent on the system polluting the groundwater. Depth of groundwater table <10m from the sanitation system is considered to pose a significant risk
- FS not contained is attributed to be from 42% population (includes 28% population who use unlined pit with no overflow and 14% population who use septic tank connected to soak pit)
- FS contained is attributed to 15% population who use septic tank connected to open drain.

<table>
<thead>
<tr>
<th>Containment type</th>
<th>Population dependency in percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septic tank connected to soak pit</td>
<td>14</td>
</tr>
<tr>
<td>Septic tank connected to open drain</td>
<td>30</td>
</tr>
<tr>
<td>Unlined pit with no overflow</td>
<td>28</td>
</tr>
<tr>
<td>Open defecation</td>
<td>28</td>
</tr>
</tbody>
</table>

Emptying

- The emptying service is only provided by the municipal corporation, and there are no private players in this business
- Emptying service is only provided to households who pay property tax. Tax is also applicable on agricultural lands
- The corporation owns 3 vacuum tankers, out of which, two tankers have 3500 litres capacity each and one has 9000 litres capacity
- In order to avail the service, a resident has to submit an application to the in-charge of sanitary department & cashier and attach a copy of the property tax along with it.

Following is the share of population dependent on type of containment systems:

![Figure 1: A pit latrine toilet constructed under housing scheme of PMAY in ward no 1](image1)

![Figure 2: Pit latrine system in slum of ward 22 and a septic tank connected to open drain in central area of city](image2)
A record is maintained on a daily basis by the sanitary department.

- It is also learned during a KII that around 50% of the trips are off the records as the higher authorities and influential people directly contact the sanitary inspector and avail the service.
- Usually, a driver is accompanied by two laborers, and it takes around 10-15 minutes to empty 3000 litres capacity containment, depending upon the type of containment.
- Emptiers do not use any safety gears during the emptying service.
- The corporation charges Rs.750 and Rs.2,500 per trip for the 3,000 litres and 9,000 litres capacity vacuum tankers respectively and pays monthly remuneration of Rs.7,700 to the driver and Rs.7,000 to the laborers. On an average, the vacuum trucks make 2-3 trips per day. Monthly maintenance of a vacuum tanker costs Rs.5,000 to the corporation.
- Manual emptying is practiced in households with narrow lanes where the septic tanks are inaccessible. Lower caste community is engaged in manual scavenging, residing in peri-urban areas.

- FS contained- emptied is attributed to 13% population who use septic tank connected to open drain (assuming 90% population empties their systems).
- FS contained- not emptied is attributed to 2% population who use septic tank connected to open drain. This FS remains in the tank and is never emptied.
- FS not contained- emptied is attributed to 19% population (includes 6% from septic tank connected to soakpit and 13% from unlined pit with no overflow).
- FS not contained- not emptied is attributed to 23% population (includes 1% FS which remains in the tank & 7% infiltrate from septic tank connected to soak pit and 1% FS which remains in the tank and 14% infiltrate from unlined pit with no overflow).
Transportation

- Vacuum tanker is tractor mounted assembled by Kam Avida Company based in Pune.
- The emptiers take about three to four trips per day for which they travel a distance of 12 to 13 kilometers per emptying.
- SN not contained is attributed to 15% population who use septic tank connected to open drain.

Treatment and Disposal

- The sample survey of the city revealed that the city has a bowl-shaped topography, the wastewater generated within the city keeps flowing in the drains till it reaches a low-lying area.
- There is no treatment of sewage and septage generated in the city; and the faecal sludge collected by the vacuum tankers is disposed of at an insanitary landfill located at Udama Rakha in Ward 45.

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Figure 5: Waste water disposed at lower lying areas in ward 45

Figure 6: Waste water from nearby areas collected in ward 22 and septage dumped at municipal trenching site