Suitable and sustainable sanitation network for rural communities

Scope of the sub-system:

To build a sewerage system for a rural community with a population upto 2000. It should also be sustainable for period of around 25 years.

Purpose:

In most rural areas the waste water generated by the household including the waste water form the cattle shed flows into open surface drains leading to stagnation in the lanes. Without adequate arrangement for treatment and disposal the waste water often seeps into handpumps, open dug wells and pipelines and the water quality of the village pond deteriorated. Due to the poor sanitation several diseases like diarrhoea , malaria ,typhoid are mostly found in rural areas. To prevent these diseases and improve the quality of water we need a proper sewerage system which is sustainable and manageable.

System overview:

The subsystem deals with planning a proper sanitation network in rural areas. To collect the sewerage from each household in a rural area in a hygienic way without causing stagnation or coming into contact with open areas\roads \other pipelines and take it to a sewerage treatment plant.

Referenced documents:

Requirements:

System entity definition:

**Sewage** is water-carried waste, in solution or suspension, that is intended to be removed from a community. Also known as wastewater it is more than 99% water and is characterized by volume or rate of flow, physical condition, chemical constituents and the bacteriological organisms that it contains.

**Sewerage** refers to the infrastructure that conveys sewage. It encompasses components such as receiving drains, manholes, pumping station and screening chambers of the sanitary sewer. Sewerage ends at the entry to a sewage treatment plant or at the point of discharge into the environment.

System mission:

The sewer system collects and carries the waste and fluids from toilets, baths, washing, cooking from homes and other structures to the sewage treatment plant.

Phases of operation:

**Pre-Mission Phase Operational Capabilities:**

Current population distribution pattern and future plans of growth data is collected from the site.

Social and cultural acceptability of the scheme.

Discussion with local authorities.

Location details, land use patterns and drainage patterns of the area:

Availability of land, Land use patterns and drainage of water are collected from the site. Detailed plan showing buildings, population ,cultivation land and roads layout of rural area drawn to a scale of 1:1000 for showing the details of the area.

Water supply and zoning details:

This includes the quantity, pattern and schedule of water supplied to the village .This whole data has to be collected from the site. General topography of the village has to be studied . Required elevation details has to be collected from the village.

Draw all possible sewer lines with due consideration that flow should be gravity assisted.

**Mission phase operation capabilities:**

Design all sewer systems for population of about 2000 with a design period of 25 years

Design new sewer lines on the basis of average daily flow less than 135 litres per person per day in small rural communities.

Estimate the number of present and future connections each line will serve.

Estimate future water flow by multiplying the projected population 25 years in the future by the estimated flow rate per capita per day.

Using 8 inch diameter should be sufficient for each sewer line.

Plan for installation of manholes.

**Post-Mission Phase Operational Capabilities:**

The sewer system should collect sewage directly from each house.

The sewage should maintain high control over the flow of materials.

It should withstand the current sewage wastes and also the wastage possible in the future.

Detection of blocks\breakages:

Positive displacement flow meters can be used to measure the sewage material flow in a given direction. This greatly reduces the blockage/breakage spot identification efforts and hence the repair time.

Mission reliability: