

Faecal Sludge Treatment Plant (FSTP), Leh



FSTP under construction

BACKGROUND

Leh, a high altitude cold desert at 12,000 feet in Jammu & Kashmir, India, has become a popular tourist destination with 250,000 visitors annually. The city is building a sewerage system that in the near future will connect about 40% of the city, but today, households, hotels and guesthouses use septic tanks and soak pits for on-site containment of sewage.

As most of the septic tanks are poorly designed and the underground water table is high (only 30 feet in some places), the risk of water contamination is very high. Borewells are extensively used for drinking water, therefore water pollution can have serious health and economic consequences.

Therefore, the Municipal Committee of Leh (MCL) has ordered that septic tanks are to be made water tight and mandatorily desludged every year. The town needs a FSTP to safely treat and reuse the sludge.

The FSTP must handle both the challenges of high altitude and extreme climatic conditions, as well as highly variable sludge inflow as activities will be minimal in the winter.

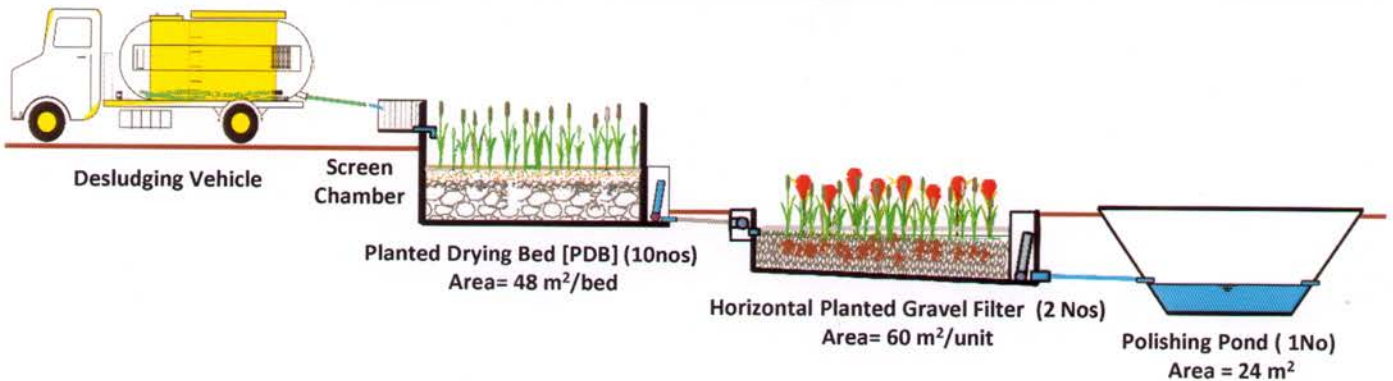
This plant is designed by BORDA and CDD Society and executed by MCL and Blue Water Company, a sanitation service company that will provide end-to-end Faecal Sludge Management Services to make Leh the first ODF++ city in India.

FEATURES AND BENEFITS

- Planted Drying Bed Technology used in India for first time—robust and flexible for extreme conditions
- No direct human contact with faecal sludge
- Minimal odour during entire process and aesthetically designed to locate it near habitation
- Gravity-based system, based on natural and biological treatment with no use of chemicals or electricity – green and ecofriendly system
- Minimal and simple operations with no skilled operator required – minimizing O&M costs
- Greening of Leh as a nursery will be set-up and operated using the treated wastewater and sludge

SPECIFICATIONS

Construction Period	7 weeks
Construction Cost	Rs. 52 lakhs (Rs. 4.33 lakhs/m ³)
Total Area	~ 60 m ² /m ³
Population served	~30,000
Design capacity	12 m ³ /day
Sludge Loading Rate	100 kgTS/m ² /Yr
Effluent quality	BOD < 30 mg/l



PRIMARY MODULES

The system is designed for simple and robust O&M.

1. Planted Drying Bed (10 units)

Solid-liquid separation and digestion of solid fraction
Capacity : 12 m³/day/bed | Area : 48 m²/bed

2. Horizontal Planted Gravel Filter (2 units)

Treat liquid fraction using plants and controlled flow
Area : 60 m²/unit

3. Polishing Pond (1 unit)

Ultraviolet disinfection of water and storage
Area : 24 m²

Filter material used : Graded Gravel, Sand

Plants used : *Phragmites karka*, *Canna indica* 1

SUITABILITY AND OPTIONS TO IMPROVE

The FSTP is designed to operate optimally in Leh's climatic conditions—low temperatures, dry climate with strong sunshine through the year.

The capacity can be increased easily by building PDB modules.

Greenhouses can be built on the PDBs to further improve and speed up the treatment process.

OPERATIONS AND MAINTENANCE

Operations: Each day, one bed of the PDB is filled with sludge and allowed to dry. The excess water percolates and is treated as it flows through the HGPF, and is collected in the polishing pond where sunlight provides further disinfection. The plants and direct sunlight assist in the digestion and disinfection. Once the sludge accumulates to a height of about 0.9m in the PDB (in 3-4 years), it is removed and can be used as an organic soil conditioner.

Maintenance: Weekly maintenance involves checking pipes and clearing blockages, trimming plants and cleaning the screen chamber.

REUSE OPTIONS

A plant nursery will be developed on-site where the treated percolate water will be used to grow plants, which can be sold to help make Leh more green. The dried and treated compost will also be used as a soil conditioner for the nursery.

Supporting Agencies :

NFFSM Alliance; Bill and Melinda Gates Foundation; Ladakh Autonomous Hill Development Council (LAHDC); Federal Ministry for Economic Cooperation and Development, Germany (BMZ); Tourism Development Authority, J&K Govt.; All Ladakh Hotel and Guest House Association; Public Works Department, Leh; J&K Bank; Ladakh Ecological Development Group; LhaRiSa Resorts

Executing Agencies :

Municipal Committee of Leh; Ladakh Development Authority; Blue Water Company; Ladakh Environment and Health Organisation; Dorjey Tsering Construction Company; CDD Society; BORDA