



Lavasa's Integrated Water & Waste Water Management

CASE STUDY



3.4 MLD WATER TREATMENT PLANT



2.4 MLD SEWAGE TREATMENT PLANT

Summary

Integrated Water Management (IWM) is a strategy that brings together all facets of the water cycle — water supply, water treatment, storm water management and sewage management. In Lavasa; City Management Services mainly focuses on the different aspects of Water and Waste Water Management to ensure continuous supply of high quality potable water on 24 x 7 basis with effective sanitation system to protect and maintain the health and hygiene of citizens.

Objective of Intervention

Water Supply Scheme has been considered with the provision of one dam in village Dasve. The DVD 1 has a capacity of 66 Mft³ (1.8Mm³) with full reservoir level RL 640 m. The Water Treatment Plant in Dasve (DV – WTP – 1) village is designed in such a way, that it caters the drinking water needs to a total population of 25,500 citizens (includes fixed & floating).



Sewerage system is classified as sanitary sewers which are designed to receive domestic sewage excluding storm water. Separate sanitary sewers are provided, primarily to carry the used water of different zones of urban area. The estimation of flow is based upon the contributory population and the per capita flow of sewage.

Initially as the city was in construction phase the amount of sewage generated was very less and the sewage management was not formal. Gradually, permanent centralized sewer network and Sewage Treatment Plant was constructed for collection, treatment & recycle / reuse of treated sewage effluent.

Type of Intervention and Location

Water Management

The Division of Water Management is responsible for the effective production, filtration, and quality control of water for the City of Lavasa. The Division's responsibility starts at the source of raw water and extends throughout the treatment & distribution process. This Division operates and maintains the raw water pumping stations, water treatment plant having a capacity of 3400 cum /day& distribution system (gravity& pumping lines – 50 Kms). The Water management system is designed in such a way that every system within the plant can be isolated for maintenance or repairs without affecting the flow or quality of the water produced. The Lavasa Water Treatment Plant is known not only for quantity and quality of water produced, but also for its staff's innovation of implementing various improvements in testing, treatment and distribution of water.

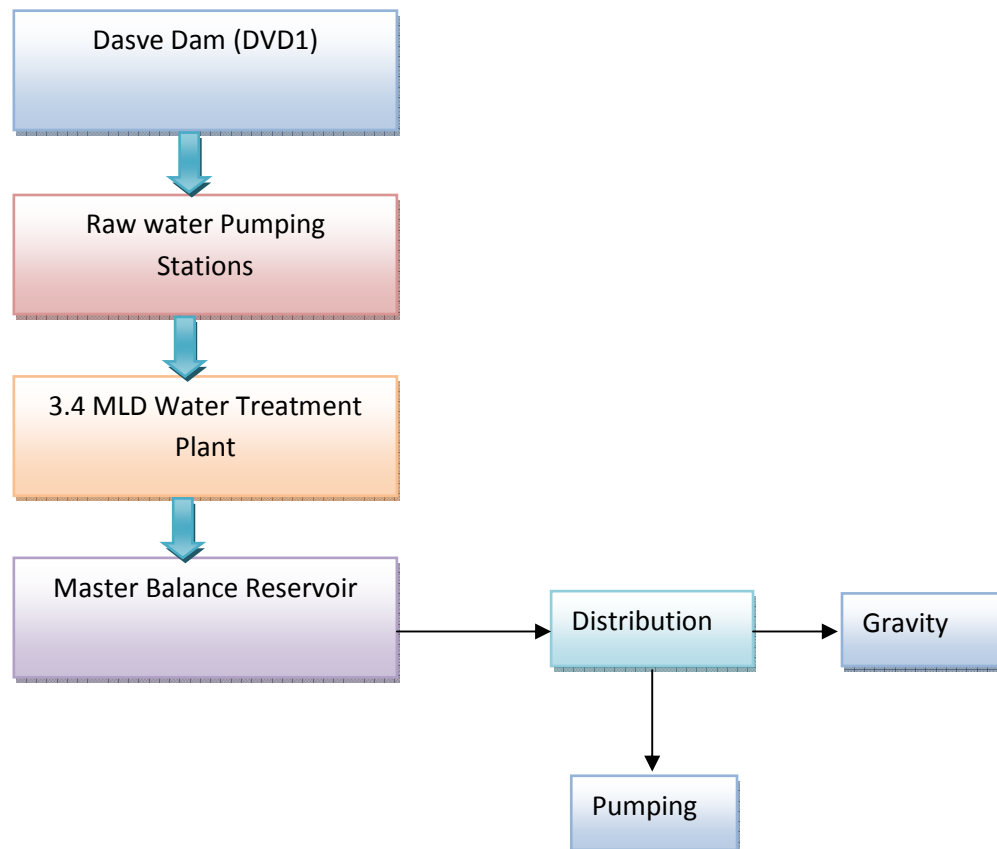
Waste Water Management

The department of Waste Water Management is responsible for collecting, managing and treating wastewater generated throughout our Lavasa community. The system has a capacity of 2400 cum / day and is designed to protect local water resources, including groundwater and surface waters, like the catchment of Dasve dam.



Description of Intervention

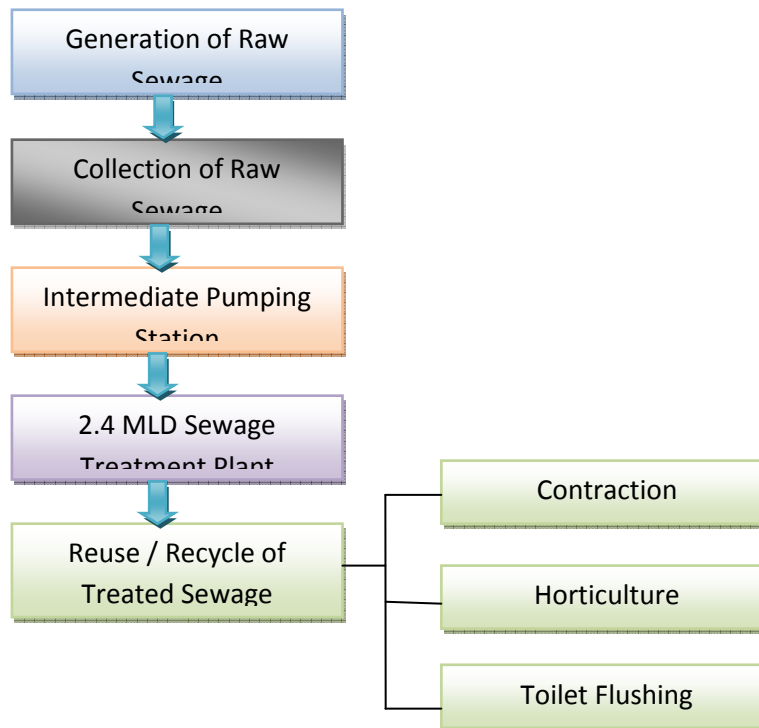
WATER TREATMENT PLANT



The raw water is pumped from Intake well through rising mains. First stage is removal of dissolved gases with the help of aeration fountain. Odour free water then passes through the flash mixer where addition of process chemicals like PAC, Lime & PE takes place for uniform mixing. The chemical mixed water is allowed to settle in the tube settler for removal of turbidity and fine particles. Further the water is pre chlorinated with a gas chlorination system and then conveyed to Rapid Sand gravity Filter for the removal of fine particles. After filtration the water passes through a final disinfection stage i.e. post chlorination and a high quality potable water is ready for distribution (both gravity & pumping System)



SEWAGE TREATMENT PLANT :



The waste water is generated from various sources like residential and commercial and is being collected in respective pumping stations located in different areas of Dasve through gravity. There are total five pumping stations ranging from PS 1 to PS 5. Waste water is collected at Pumping Station and is pumped to a centralized pumping station i.e. Intermediate Pumping Station from where it is again transferred to Sewage Treatment Plant for treatment.

Sewage Treatment Plant is designed to treat waste water based on the principles of Extended Aeration Technology. The system mainly consists of Primary Treatment which includes screening, grit removal and de-nitrification. Secondary Treatment involves removal of organic load by diffused aeration, removal of solids by secondary clarification and intermediate holding system. Tertiary Treatment is focused on chemical treatment for removal of fine particles, filtration i.e. Rapid Sand Gravity Filter and disinfection with ultra modern technology i.e. Ultra Violet, Ozone system. The qualities of outlet parameters are very stringent as compared to local government bodies and are maintained throughout the year. The treated sewage is 100 % reused / recycled and used for construction, horticulture and flushing purposes.



Intangible or Tangible Benefit

Water Management

Extent of Treatment (Potable Water Quality)

Water Management at Lavasa ensures that citizens are provided with crystal clear water of the highest quality. Testing of the water is performed 24 x 7 basis, periodically. This testing gives our operational personnel timely information, so that any adjustments can be made to the treatment process to ensure consistent water quality is met as per standards. The plant has a quality control laboratory in which analysis is performed on raw and treated water. The information from the Chemist's analysis is communicated to the Senior Control Room Operators who make appropriate chemical adjustments required for the proper treatment of water. The process of filtering the water is monitored and tested continuously by a highly trained staff of professionals. Monitoring, like the production process, is also a 24 hour day job.

Water Quality Assurance

The Water Quality Laboratories are responsible for the collection and analysis of samples, which ensure that the water distributed meets the criteria of the Safe Drinking Water Standards. Compliance reports are sent to the Management monthly with the analytical results. This is accomplished by the annual collection and analysis of 1095 water samples from the water plant and over 840 samples from the distribution network.

Apart from the in-house Laboratory; third party monitoring is being conducted by MoEF approved agency and the reports are submitted to government agency on half yearly basis.

Results: Maintained the quality as per IS 10500:2012 throughout the year.

Uninterrupted Supply of potable Water (24 / 7 x 365 days)

The supply of water in Indian towns and cities may be provided for just a few hours daily or every other day; it could be even less in certain locations. But in Lavasa; we provide 24/7 x 365 days uninterrupted supply of high quality potable water. This is possible due to preventive & predicative maintenance strategies of water network and proactive alternative arrangements in case of breakdowns in the system being adopted.

Results: Lavasa citizens are getting hassle free water supply throughout the year. Water availability has increased from 99.48% to 99.79%.



Water Conservation

Water conservation is the beneficial reduction in water use, waste, and loss. Conservation is the most economical and environmentally protective resource management tool, helping Lavasa to meet many challenges of water supply management. Few initiatives which have taken towards water conservation are rigorous patrolling of water network to identify leakages; ensuring the metering at all consumers points; water audits for commercial establishments; implementation of cutting edge technology to avoid the overflow and internal recycling of used process water.

Results: Reduction in water loss by 0.2% as compared to last year 2013-14, and improved revenue standard.

Customer Satisfaction:

24x7 operation of a customer service desk with a required seven-day response time for new connections; 12-hour response time for complaints; resolution within 12 hours when dealing with issues of low pressure or poor water quality; 24-hour response time with seven-day resolution for other complaints (Internal plumbing issues) and reported surface leaks repaired within 12 hours.

A half yearly survey is carried out at the residential & commercial establishments to understand satisfaction level of citizens and ensure appropriate improvements.

Results: Customer satisfaction has improved to 7% as compared to last year – 2013-14

Optimization of Operational Cost:

Water Management has taken many initiatives such as optimization of process chemicals, rationalization of operational crew, energy conservation (Implementation of APFC Panel, Level Sensors based operation) and reduction in breakdown maintenance.

Result: Operational Cost reduced by 10% as compared to last year – 2013-14

Details of Water

Description	UOM	2012-2013	2013-2014	2014-2015
Water Quality as per IS 10500 Standards	%	100	100	100
Water Loss	%	10.6	8.8	8.6
Customer Satisfaction	%	-	89	96
Water Cost	Rs/Cum	31.48	27.59	24.84



Waste Water Management

Extent of Treatment (Treated Sewage Quality)

Waste Water Management at Lavasa ensures that quality of Treated Sewage is maintained as per standards which are stringent as compared to local government authorities. Testing of Sewage is performed 24 hours a day x 365 days per year. This testing gives our operational personnel timely information, so that adjustments can be made to the treatment process to ensure constant treated sewage quality is met. The plant has a quality control laboratory in which analysis is performed on raw and treated Sewage. The information from the Chemist's analysis is communicated to the Senior Control Room Operators who make appropriate chemical adjustments required for the proper treatment of sewage. The process of aeration, sedimentation & filtration are monitored and tested continuously by highly trained staff of professionals. Monitoring, like the production process, is also a 24 hour day activity.

Treated Sewage Quality Assurance

In-house Laboratories are responsible for the collection and analysis of samples, which ensure that the Treated Sewage is being reused / recycled; meets and exceeds the criteria of the Maharashtra Pollution Control Board Standard. Compliance reports are sent to the Management monthly with the analytical results. This is accomplished by the annual collection and analysis of 730 Sewage samples from the plant. Apart from the in-house Laboratory; third party monitoring is being conducted by MoEF approved agency and the reports are submitted to Government authorities on half yearly basis.

Reuse of Treated Sewage:

One of the major environmental concerns is safe disposal of treated sewage; Lavasa has laid around 8.5 km of 250 mm Ductile Iron Pipeline to cater to the needs of horticulture areas. Waste Water Management encourages the use of treated sewage for construction , horticulture and flushing purposes and ensures 100% reuse of treated sewage. This also accomplishes the environmental compliances and leads to reduction in potable water demand.

Results: 100% reuse of Treated Sewage



Optimization of Operational Cost:

Waste Water Management has taken many initiatives such as optimization of process chemicals, rationalization of operational crew, energy conservation (Implementation of APFC Panel, Level Sensors based operation) and effective preventive maintenance leads to reduction in breakdown maintenance.

Waste Water Management is also working on cutting edge technologies for energy conservation like incorporation of Variable Frequency drive for Air Blower.

Details of Waste Water Management, Lavasa

Description	UOM	Lavasa Standard	2012–2013	2013 -2014	2014 -2015
Treated Sewage Quality	%	100	100	100	100
Reuse of Treated Sewage during dry weather	%	100	100	100	100
Treatment Cost	Rs/Cum	-	95.8	83.1	87.6

About Lavasa

Lavasa is free India's First Hill City. Lavasa set amidst 7 hills and a 60 km lake front in Sahyadri Ranges of Western Ghats. Lavasa is first 'planned' hill city led by a private sector and the development spans over 18,000 acres of picturesque landscape. It is a hill city located roughly between 2,000ft to 3,000ft above Mean Sea Level. The annual average rainfall in the city ranges from 3,500mm in one valley to around 8,500mm at the end of another valley. The place is currently a "mixed deciduous, wet temperate and reverie forest".