



Lake Bard Water Filtration Plant

The Lake Bard Water Filtration Plant (LBWFP) incorporates advanced, state-of-the-art water treatment technologies to assure Calleguas Municipal Water District's customers of a pure, safe, reliable supply of high quality supplemental water.

The LBWFP produces water that meets or exceeds all current and anticipated water treatment regulations. It incorporates filtration, disinfection, and other treatment processes to meet turbidity

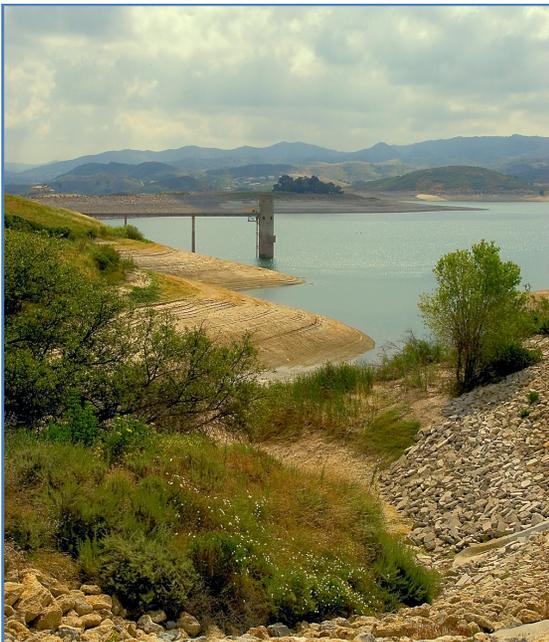


goals and protect against microbiological contaminants and undesirable disinfection by-products. Originally constructed in 1995, and expanded in 2004, the LBWFP has a treatment capacity of 65 million gallons per day.

The LBWFP filters and disinfects water from Lake Bard, a 10,000 acre-foot open reservoir supplied with treated water from the Metropolitan Water District of Southern California. The water from Lake Bard supplies water to Calleguas' customers when imported water supplies are curtailed. Lake Bard's watershed is completely fenced off to restrict human and animal contact. Protection of the water supply limits the possibility of

protozoan, viral, or other microbiological contaminants entering the water.

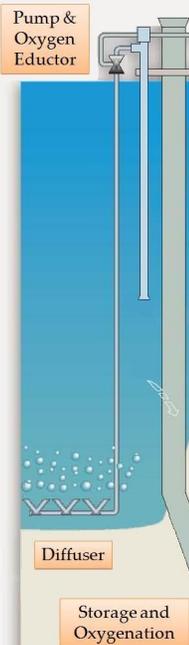
The LBWFP is designed to blend with the aesthetics of the community. Curved slope cuts with native materials soften the appearance of a bench cut into the hillside. The clearwell has been integrated with the environment by building berms up the sides, landscaping the perimeters, and covering the top with a patterned deck. The overall design that unifies the site draws heavily on the Post-Modern Spanish-influenced architecture that is common to southern California. Process units are housed separately in a spacious, campus-like setting.



Step 1 – Lake Oxygenation

Small quantities of oxygen are injected into the cool depths of the lake to improve the taste and treatability of the water.

Step 1

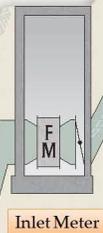


Step 2 – Zooplankton Screens

Water flows from the lake outlet tower and then through fine screens which remove zooplankton such as copepods and daphnia.

Step 2

Zooplankton Screens

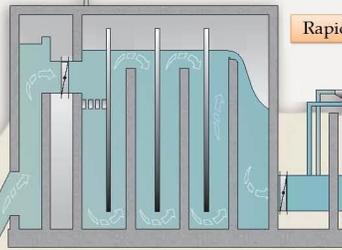


Step 3 – Ozone Disinfection

Ozone is applied to the water at the beginning of the treatment process. A powerful oxidant and disinfectant, ozone is used to oxidize and destroy pathogenic micro-organisms in the water. Ozone used at the plant is created onsite in two ozone generators using electricity and high-purity oxygen gas. Hydrogen peroxide may also be added for taste and odor control.

Step 3

Pre-Ozone Contactor



Step 4 – Coagulation

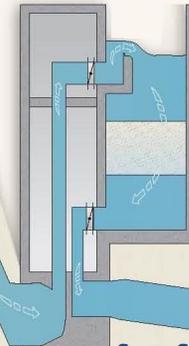
After the water is oxidized, it enters a rapid mix unit where coagulant and polymer are dispersed into the water to condition small suspended solids for filtration. The chemicals allow the microscopic particles to attach and form larger, filterable particles called "floc."

Step 4

Rapid Mix Pump

Hydraulic Flocculator

Step 5

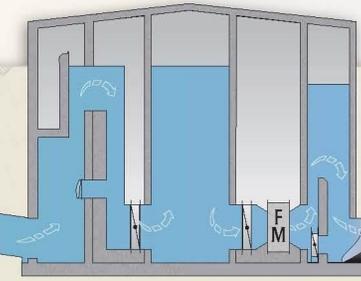


Step 5 – Flocculation

The conditioned water enters two hydraulic flocculation pipelines. Here the water is gently mixed as it flows past vertical plates (baffles) placed at intervals in the pipes specifically designed for this purpose. The hydraulic energy of water passing through the pipes causes small suspended particles to collide and form filterable floc.

Step 7

Clearwells



Step 6 – Filtration

Water then flows through deep-bed gravity filters that capture and remove the flocculated solids. Each filter contains 72 inches of anthracite and 3 inches of gravel. The filters are backwashed periodically to remove accumulated solids.

Step 6

Filter Building

Wastewater Recovery

Backwash water generated from cleaning the filters flows to the washwater recovery basins where solids are allowed to settle. As they settle, solids are removed by a vacuum system and pumped to drying beds. The clarified water is returned to Lake Bard. Settled solids collected in drying beds are allowed to dry before disposal.

SCADA Control System

Plant control is provided by a supervisory control and data acquisition (SCADA) system that integrates monitoring and control of the plant facilities. Programmable logic controllers located throughout the plant are monitored by a supervisory personal computer at the Control Building to provide operational control and reporting.

Water Quality Monitoring

Water is routed to an on-site laboratory from nine locations throughout the plant so that quality may be monitored routinely. Water quality is measured continuously by on-line analyzers, supplemented every four hours by operators who take samples at key points in the treatment process.

Step 7 – Disinfection

The plant can employ three disinfectants: ozone, chlorine, and chloramines. Ozone is added at the beginning of treatment. To provide final disinfection, chlorine or chloramines are added in the clearwells where treated water is held before entering the distribution system.