



BOLIVIA

WATER SUPPLY AND SANITATION FOR THE LOCAL COMMUNITIES OF BUSTILLO (LLALLAGUA, SIGLO XX AND CATAVI)



Client Public Water and Wastewater Utility – EPSA Bustillo

Financing Kreditanstalt für Wiederaufbau (KfW), European Community (EC)

Duration of Services 01/2004 – 03/2014

Cost of Implementation 6.9 Mio. Euro

Scope of Services

- Detailed design of works:
 - Water intakes: Surface water intakes, filter galleries, etc.
 - Water conveyance system
 - Water purification and wastewater treatment plants, water distribution network and wastewater collectors
 - Escalera Dam (RCC-Dam)
- Preparation of tender documents and assistance during tendering and evaluation
- Construction supervision

Brief Project Description

The project area is located in the northern part of the Department of Potosí, a traditional mining area, characterized by a cold and dry climate without almost any precipitation for 7 month of the year.

The project area forms part of the Bolivian “Altiplano”. Its settlements originate from mining villages of the nineteen twenties, the period of highest tin production. The poverty level is generally higher than in other zones of the “Altiplano”.

The city’s water supply infrastructure is about 70 years old; over the past it suffered from considerable lack of maintenance with the consequences of ever increasing water losses. Actually the urban area can be supplied with potable water only every 2 day for about 2 hours.

The quality of the water is precarious as there is no disinfection and purification of the raw waters which even have to be considered as contaminated by the effluents for the adjacent mining fields.

The sewer network is of limited extension and it is also characterised by the lack of treatment facilities.

The present water supply and sanitation project for the community Bustillo is co-financed by the German KfW Development Bank (according to the economical cooperation between Bolivia and Germany) and by the European Community (PASAAS programme).

The main objective of the project is the substantial improvement of living and health conditions, while concurrently favouring the sustainable use of the water resources.

The immediate and specific measures comprise the improvement and extension of the existing infrastructure of the water supply systems as well as of the wastewater collection networks of the villages of Llallagua, Siglo XX and Catavi; in detail these are:

- Rehabilitation and construction of water intake structures
- Complete rehabilitation of the existing water conveyance system (Quinua Mayu storage) and the construction of new mains to connect to new water sources
- Construction of water treatment plants to improve the quality of drinking water
- Rehabilitation of the installations and valve system of the water storage reservoirs
- Complete renovation of water network system in Llallagua, Siglo XX, Catavi
- Rehabilitation of wastewater network in Llallagua (phase 1) and of the main sewer connecting to the wastewater treatment plant
- Construction of a wastewater treatment plant (WWTP) (phase 1, pre-treatment)



Overview of Project Area with General Layout of Water Supply and Wastewater Collection Schemes

The Detailed Design of the works, their tendering and construction supervision are carried out by the consortium of CES Consulting Engineers Salzgitter (80%) and the national consultant CGL – Galindo Consultants Ltda. (20%).

Potable Water System

The water supply scheme is designed as a gravity system, comprising 3 main water sources (Umajalata, Escalera River, Athata River) and an additional emergency/backup source (Castilla), from where the raw water is conveyed by feeder lines to 2 water treatment plants (Filtration in multiple stages). The purified water is managed by storage reservoirs, from where it is feed into the distribution networks to supply the 3 localities of Llallagua, Siglo XX and Catavi.

A basic requirement of the project is to assure the continuous, i.e. 24h water supply for the Bustillo Communities under consideration of the demand (volume and pressure) of the year 2030 marking the planning horizon.

Water Sources:

Umajalata – Surface water intake (existing)
 Athata River – Quinua Mayu Dam (existing)
 Escalera River – Escalera Dam- RCC (new)
 Projected yield: 71 l/s (year 2030)

Conveyance System:

Length of conveyance: 29.4 km – PVC
 GRP diametres: 100, 200 and 300 mm

Water treatment plant:

Capacity: 55.4 and 20 l/s
 Type of plant: Multi-filter system with fast and slow filters

Storage Tanks:

Number of storage tanks: 8 units
 Total net-capacity: 3 014 m³

Distribution Network:

Length of the network: 77 km
 No. of house connections: 5 323

Sanitary System

The layout of the projected wastewater system is characterised by the centralised treatment of the sewerage collected from the municipalities of Llallagua and Siglo XX. This concept requires the following provisions:

- Sewer system for Llallagua, comprising the collector network, the main interceptor, which connects the wastewater network of Siglo XX (implemented by a previous Neighbourhood Improvement Programme and the main sewer connecting to the wastewater treatment plant.
- Wastewater treatment plant for Llallagua and Siglo XX.

Sewer System:

Length of network, phase 1:: L= 30.6 km
 Length of network, phase 2: L= 15.0 km
 Length of main sewer to WWTP L= 1.1 km
 No. of house connections 3 477