



CEDRIG
Light

Construction of a water treatment plant and sewer system for the Guaqui town, Department of La Paz / Municipality of Guaqui

Roberto Méndez, Daniel Maselli
June 2018

CEDRIG is a tool developed and offered by



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC

Overview

General Information

Contributors	Roberto Méndez, COSUDE-Ayuda Humanitaria, Bolivia Daniel Maselli, Swiss Agency for Development and Cooperation SDC, Switzerland Tobias Sommer, SDC, Switzerland Michael Fink, Swisscontact GENTIANE SCHWARZER, SDC - DRR Network, Switzerland nadia benani, SDC, Switzerland
Overall goal	Improve the current living conditions of Guaqui's inhabitants through the implementation of an appropriate sewage system, benefiting the overall population (perspective for the next 20 years)
Country	Bolivia
Budget	Bs. 7.000.000 (approximately USD 1'000'000)
Duration	September 2016 - July 2017 (approximately 10 months)

Summary

Description	Due to the absence of a wastewater treatment plant in the Guaqui town, wastewater is discharged directly to Titicaca Lake, causing serious water pollution. Through the construction of a sewage treatment plant, the water pollution will be reduced along with an improvement of the living conditions of the local population. However, as a result of frequent lake level fluctuations, the sewage treatment plant might suffer negative impacts from flooding. In addition, frosts during the cold winter months can affect the plant's main components such as (i) sewage collection network and sewer manhole, (ii) emissary, (iii) pumping sump, (iv) pumping line, (v) treatment plant, (vi) infiltration ditches.
Keywords	Wastewater treatment system sewage collection network emissary pump stations lake contamination Bolivia Floods frosts

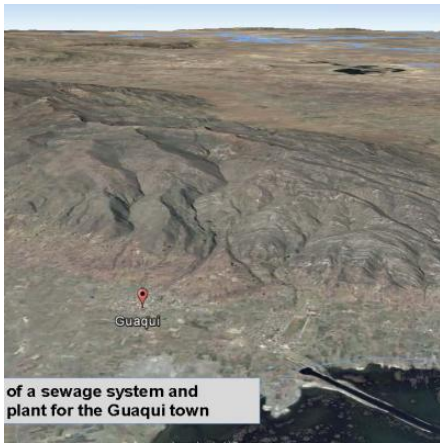
Sectors of Intervention

Health	Tourism
Water and sanitation	

Documents

Project information (pdf, 4.97 MB)

Images

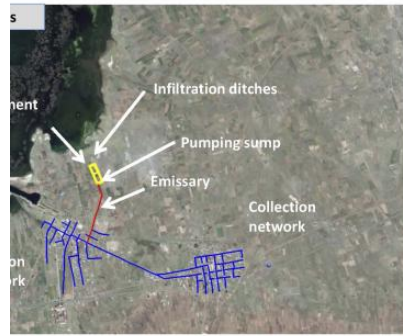


Project Information:
 Town of Guaqui
 Municipality of Guaqui
 Department of La Paz
 Autonomous Municipal Government of Guaqui
 EMAGUA (Executing Agency for Environment and Water)
 USD 1'000'000
 USD 901'344
 USD 47'050
 USD 8'100
 USD 48'500
 Sept 2016 – July 2017
 Water and Sanitation
 3'822 inhabitants
 224 ha

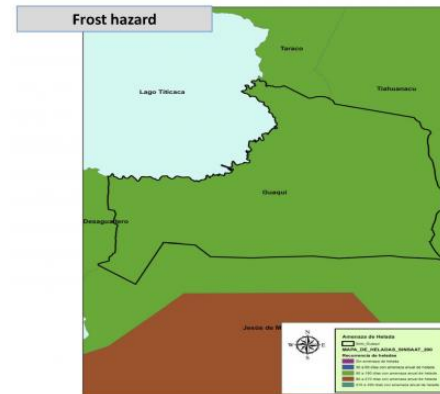
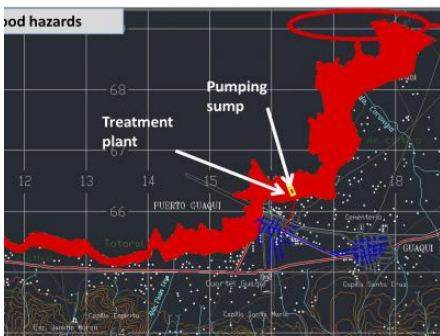
Objective: Improve the current sewerage system for Guaqui's inhabitants through the implementation of an appropriate sewerage system and a treatment plant, benefiting the overall population for the next 20 years.



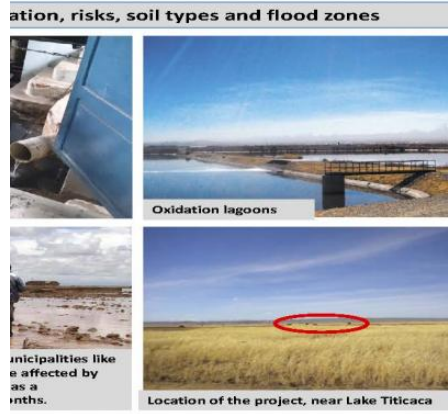
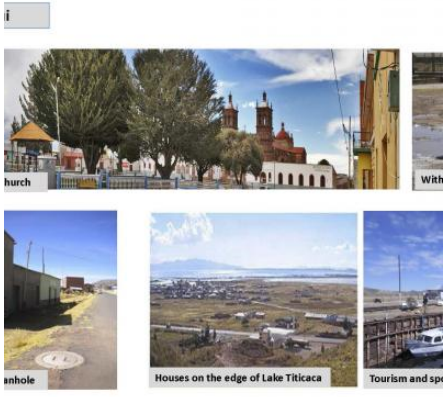
Components: Sewage collection network, Emissary, Pumping sump, Pumping line, Treatment plant, Infiltration ditch



Current sewerage system layout



Consequences	Vulnerability
<ul style="list-style-type: none"> Does not have a Risk Management Unit Damage to pumping sump equipment Flooding of the sand trap Collapse of oxidation lagoons Efficiency reduction of stabilization lagoons due to periods with low temperatures 	<ul style="list-style-type: none"> High quality infrastructure Strong institutional capacity Community organization and representation Major urban infrastructure



○ Risk perspective

Hazards arising from environmental degradation

Hazard name **Water pollution (surface and subterranean)**

Exposure Not sure

Comments Domestic sewage is untreated and are discharged into the fields/grounds and lake

Consequence **Laminar erosion of contaminated soils and effluent infiltration could result in contamination of surface and groundwaters to the detriment of uncovered populations**

Likelihood	Extent	Risk Level
Unlikely	Harmful	Low risk

Hazard name **Degradation (land, soil, ecosystems, biodiversity)**

Exposure Yes

Comments Altiplano zone with various erosional processes caused by wind (60%) and water (40%), relief with slopes between 2 and 10%.

Consequence **Silting of network, pumping sump and treatment plant**

Likelihood	Extent	Risk Level
Likely	Slightly harmful	Low risk

Natural hazards (hydro-meteorological and geological)

Hazard name **Flash floods, floods**

Exposure Yes

Comments According to the local hazard map, the water treatment plant is located in a flood prone area. Flood events occurred in 1986, 2002 and 2012. Approximately every 15 years.

Consequence **Damage of the wastewater treatment plant components such as pumping sump. Overflow of stabilization lagoons would contaminate crops near the plant**

Likelihood	Extent	Risk Level
Very likely	Extremely harmful	High risk

Consequence

Damage to crops and animal fodder in surrounding areas due to floodingLikelihood
LikelyExtent
HarmfulRisk Level
Medium risk

Hazard name

Extreme cold

Exposure Not sure

Comments At the project site, between 90 to 180 days per year with frosts are observed, 3'835 m above sea level, average temperatures around 4°C, minimum temperatures until -10°C. It happens on average every 2 years.

Consequence

Problems in the operation of the plant and reduced efficiency of the oxidation lagoonsLikelihood
LikelyExtent
HarmfulRisk Level
Medium risk

Hazards arising from climate change (and climate variability)

Hazard name

Changes in frequency and intensity of climatic extreme events and associated disasters (e.g. cold and heat waves, flood, drought, storms, hurricanes, cyclones)

Exposure Not sure

Comments There are variations of extreme temperatures, mainly frost with a tendency to increase in the future

Consequence

It could affect the operation and efficiency of the wastewater treatment plant in oxidation lagoonsLikelihood
UnlikelyExtent
HarmfulRisk Level
Low risk

Detailed risk assessment needed?

Yes - A detailed risk assessment is needed

● Impact perspective

Estimate impact on the environment

Environmental Area **Water**

Component of the activity Wastewater treatment plant

Impact on environment Bad odors from the plant could disturb the surrounding population

Estimate impact on disaster risks

Component of the activity Wastewater treatment plant

Exacerbated or newly created risk Could be an incentive for the construction of new settlements in areas at risk from flooding

Estimate impact on climate change

Component of the activity Wastewater treatment plant

Impacts on climate change Greenhouse gas emissions from oxidation lagoons

Detailed impact assessment needed?

Yes - A detailed impact assessment is needed