



Bringing Water to Curingue

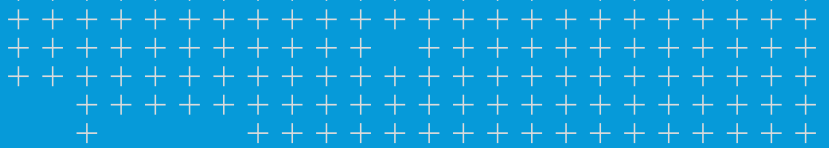


Accurate positioning plays a key role in supplying fresh water to an isolated village in the Andes.

A surveyor uses Trimble technology to support humanitarian efforts in South America.

Solution

- ▶ Trimble® CenterPoint® RTX Correction Service
- ▶ Trimble R10 GNSS Receiver



overview

High in the Andes mountains of Ecuador, the village of Curingue is home to roughly 200 residents. Curingue has no centralized water supply system and the lack of reliable water means villagers face hardship and increased risk of health issues. In 2018, Engineers Without Borders (EWB) began work to install infrastructure that could deliver water to Curingue. The effort required accurate positioning to provide reliable data for design and construction.



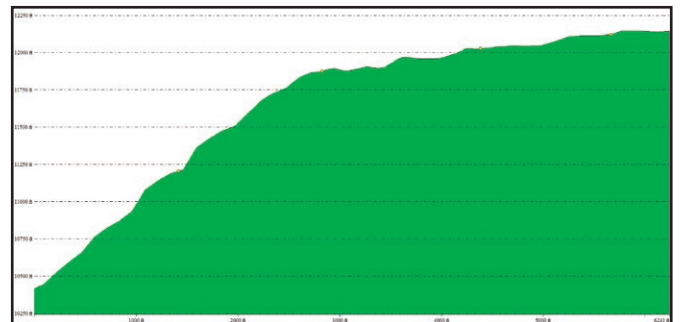
At an elevation of roughly 3,600 m (11,800 feet), Curingue is an isolated rural community. There is no cellular phone service and only limited electricity for the roughly 210 people living there. When EWB proposed to provide a water supply system, they needed data about the area's steep terrain. But they soon discovered that there were no existing large-scale maps or geographic information for the area. In order to plan the work, EWB needed accurate maps and elevation information. But the remote location had no existing geodetic control points—a complication that could add time and uncertainty to the mapping effort.

Among the EWB volunteers in Curingue was John Hamilton, a U.S. surveyor who specializes in precise measurement and control over large areas. With three decades of experience on four continents, Hamilton has dealt with sparse control and remote locations many times. A long-time GNSS user, he examined possible approaches to gathering accurate survey data. His options included conducting long-observation GNSS sessions and then post processing the data to establish reference stations for RTK. But accessing data from Ecuador's GNSS continuously operating reference stations (CORS) proved problematic. In addition, the mountainous landscape made using RTK with UHF radios unfeasible.

PRECISE GNSS IN DIFFICULT TERRAIN

Hamilton turned to the Trimble CenterPoint® RTX positioning service. The service enables users to achieve survey-grade GNSS positioning (< 2 cm horizontal and 5 cm vertical accuracy) around the world. Hamilton had gained experience with CenterPoint RTX on projects in the U.S. and Canada and he knew that it could provide the needed accuracy even in the remote Ecuadorian mountains.

Using a single Trimble R10 GNSS receiver, Hamilton captured the 3D location of water sources that would supply the village. He also collected measurements at sites for a planned pump station and water storage tank. He worked along the route of the proposed pipeline collecting data to compile critical vertical profile information for the



Hamilton's profile data shows the steep terrain traversed by the planned Curingue pipeline.



The EWB teams captured the location of structures in Curingue to support pipeline design efforts.

pipe. He also located ravines and roads that would impact the construction. Finally, he visited each house in the village to collect position and elevation data.

EWB will use the information to establish a durable, sustainable water supply that will improve the lives of Curingue residents. Hamilton plans a return visit to Ecuador, where he will work on a similar project in a different village. CenterPoint RTX will again be his primary tool for accurate GNSS positioning in the rugged and remote terrain.

“There was absolutely no way to do this without RTX. It was very convenient; I didn’t need anything other than my GNSS receiver to do the survey.”

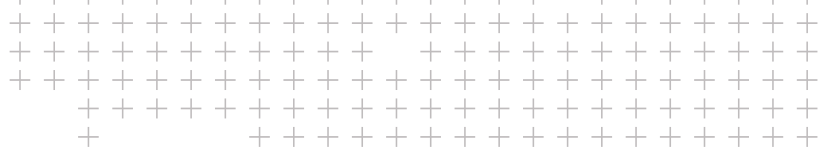
— John Hamilton, President, Terrasurv Inc.



As part of the water project, Curingue residents work on building a water collection and storage structure high above the village.



John Hamilton (center) and fellow volunteers from EWB spent a week supporting work to provide water to Curingue, Ecuador.



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