2020

Gravity Fed Water System

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Gravity Fed Water System

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Project Background

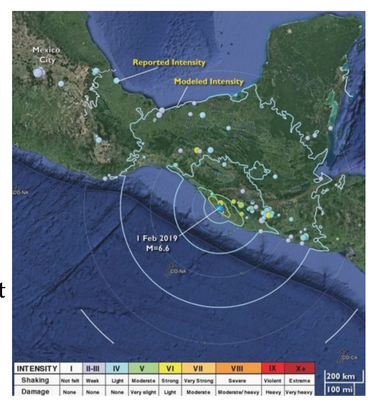
In Sipacapa, Guatemala, a village of approximately 150 people lack direct access to safe and potable water. We are working with Mennonite Central Committee to design a gravity fed water system to solve this problem. The system captures water from a spring and pipes it by gravity (without pumps) to the village. It is a sustainable zero energy water system. By providing access to water, the local people will no longer have to walk or horseback ride miles to retrieve water from the river.

Our Partner

The Gravity Fed Water project team collaborates with **Mennonite Central Committee** to serve our brothers and sisters in Sipacapa, Guatemala.

Environmental Impact

- Earthquakes occur frequently in Guatemala so the intake structure and tanks will be reinforced with rebar
- Installation of a fence around the intake structures will help prevent source contamination and waterborne diseases

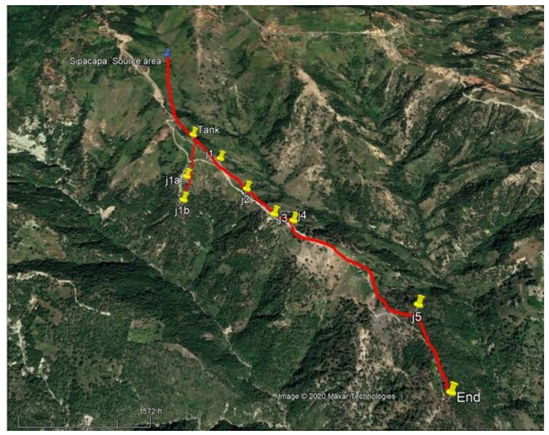


Source: temblor.net

The Water System

Water Source

- Multiple groundwater seeps
- ~7 GPM flow rate
- Highest elevation point in the system
- Reduce potential contaminants

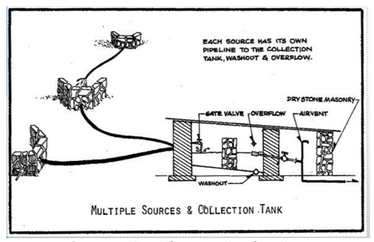


Piping Network

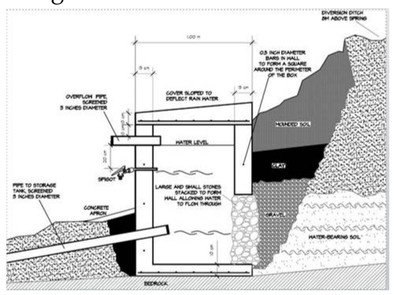
- 1.25" PVC piping
- EPANET and Microsoft Excel models for pressure calculations along system
- 3 concrete water tanks throughout system
- Water tanks will store at least a days worth of water for the village

Intake Structures

- 3 concrete intake structures feeding into one larger concrete intake structure



Source: Dr. Thomas Jordan Jnr



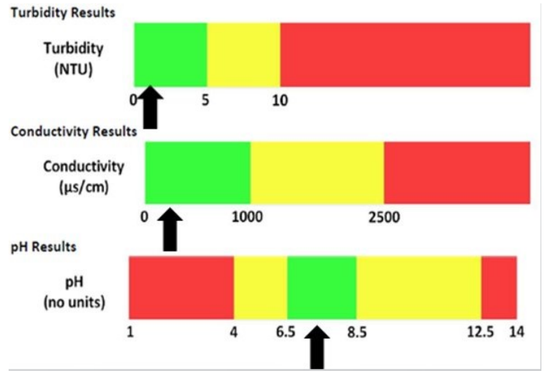
Source: EMI

Cost Estimate

Concrete Work	$ 1,663.89
Watermain Work- Intake to Community Building Storage Tank	$ 2,011.40
Watermain Work- Community Building Storage Tank to Village	$ 4,591.08
Water main Work- First Main Lateral	$ 805.62
Storage Tank Work	$ 1,200.00
Subtotal	**$ 10,271.99**
20% Contingency	$ 2,054.40
Total Project Cost	**$ 22,598.38**

Water Treatment

- Tested Water Alkalinity, Hardness, Turbidity, pH
- Onsite water testing for indicator coliforms will be performed after intake structures are built
- Will chlorinate water if needed



Project Impacts

Some of the potential impacts of installing the gravity fed water system in Sipacapa include:

- Access to safe, potable water
- Reduced disease
- More people brought to Christ
- Reduced time spent getting water to allow more time spent on education, working, and further development

Acknowledgements

We would like to acknowledge our mentor, Thomas Soerens, and our other team members: Ella Sobek (Student Project Manager) and Jordan Higley.

MCC Relief, development and peace in the name of Christ

the Collaboratory for strategic partnerships and applied research

Messiah College

Department of Engineering