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2020 Collaboratory/Engineering Symposium

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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.

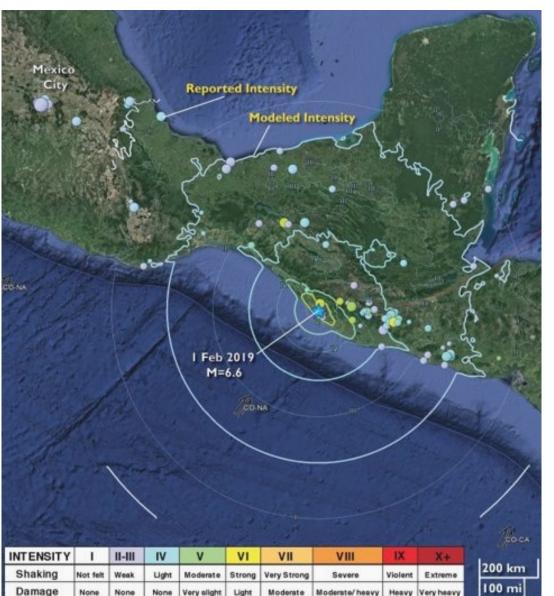


# Our Partner

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



Source: temblor.net





Relief, development and peace in the name of Christ

waterborne diseases

# **Gravity Fed Water System**

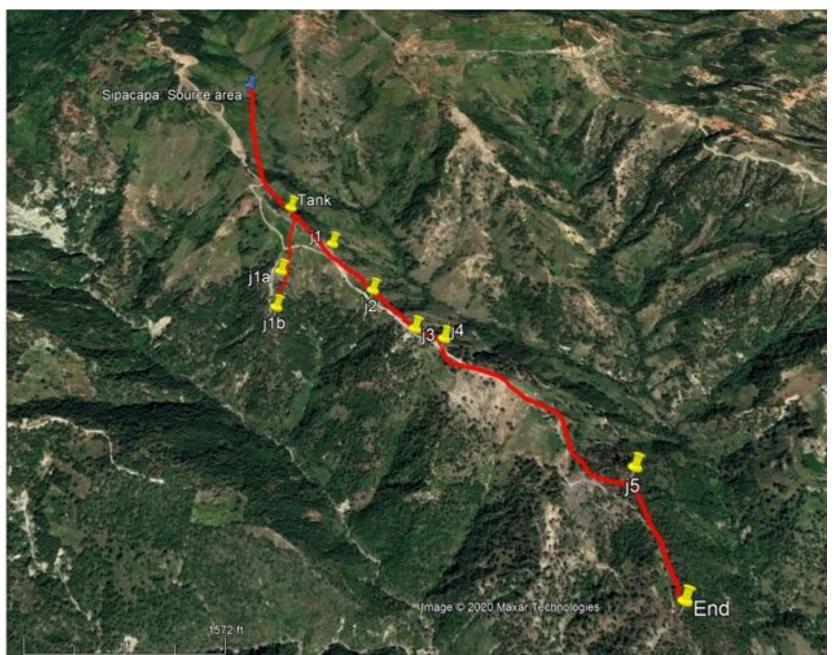
Sarah Aldrich and Joseph Grant

# The Water System

# Water Source

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





IPELINE TO THE COLLECTION

MULTIPLE SOURCES & COLLECTION TANK

Source: Dr. Thomas Jordan Jnr

Cost Estimate

# Intake Structures

## Piping Network • 1.25" PVC piping

- pressure calculations along system
- Water tanks will store at least a days worth of water for the village

# COVER SLOPED TO DEPLECT RAIN NAT OVERFLOW PIPE, SCREENED 3 INCHES DIAMETER ARGE AND SMALL STONES STACKED TO FORM HALL ALLONING HATER TO FLOH THROUGH

Source: EMI

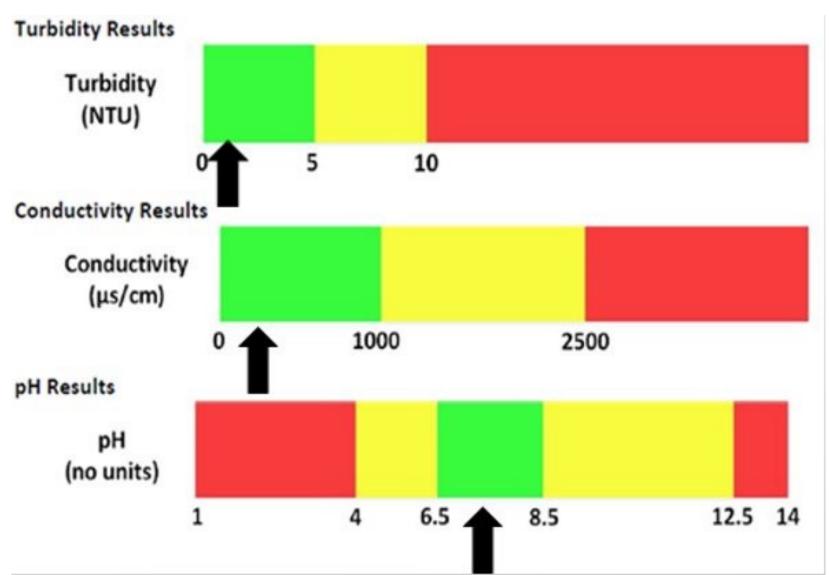
Concrete Work	\$ 1,663.89
Watermain Work- Intake to Community Building Storage Tank	\$ 2,011.40
Watermain Work- Community Building Storage Tank to Village	\$ 4,591.08
Water main Work- First Main Lateral	\$ 805.62
Storage Tank Work	\$ 1,200.00
Subtotal	\$10,271.99
20% Contingency	\$ 2,054.40
Total Project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



• EPANET and Microsoft Excel models for • 3 concrete water tanks throughout system

# 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.





## •3 concrete intake structures feeding into one larger concrete intake structure

