Introduction

Chet and Katie Williams have been missionaries in Ecuador for 18 years. The Williams operate a mission house that teaches transitional life skills to the surrounding Waodani people while fostering conversations about the gospel. Currently, the Williams spend around $90 per month purchasing bottled water to provide safe drinking water to their family and guests.

Water Treatment

Filtration

Three Sawyer MINI Water Filters will be implemented in the water treatment design to provide in-line filtration.
• Inexpensive
• 7-log removal of bacteria and 6-log removal of protozoa
• Small enough to fit in carry-on luggage

Disinfection

The Clorid L-30 System will produce chlorine solution for disinfection through electrolysis.
• Low operating costs
• Manufactured in Cuenca, Ecuador
• Excess chlorine can be used as a household cleaner around the property

Structural Design

Loads

Two upper storage tanks and three lower storage tanks will be supported by a reinforced concrete structure. Each tank holds 290 gallons of water (1100 L).

Material

Reinforced concrete was selected as the structure material for several reasons.
• Readily available in Ecuador
• Good workability
• Inexpensive
• Long-lasting; no risk of rust

Design

The structure will include 4 columns which will be 8”x8” wide with (4) #4 vertical bars and #3 lateral ties at 8” on center. The slab will be 6” deep with #4 bars at 12” on center longitudinally and #3 transverse bars at 12” on center.

Overall Project Design

Acknowledgements

Professor Leonard De Rooy, PE
Professor Robert Hoeksema, PhD
Professor Julie Wildschut, PE
Professor Chad Tatko, PhD
Professor Douglas Vander Griend, PhD
Chris Visscher, PE
Bob Masselink, PE
Sawyer Products
Engineering Unlimited Student Organization