Well-Pump System at the Bondo Teachers Training College in Bondo, Kenya

Abstract

The Bondo Teachers Training College (BTTC) is a school in the town of Bondo, Kenya which primarily trains the future generation of teachers within the region. The school is approximately 250 miles from the country's capital of Nairobi, and houses nearly 650 students during the school year. The BTTC is surrounded by a community which houses approximately 700 people, all within a one mile radius of the school. The school and community's current water supply comes from pumping water from the Yala River, which ends up running dry for five months of the year, leaving both the students and surrounding community members without a reliable source of water. During this time, the BTTC is burdened with the financial responsibility of paying for water to be delivered to both the school and community, and this water is both expensive (due to high costs of Petrol in the region) and often contaminated. Often, when both the river is dry and water has not been delivered yet, community members are left drinking water from local collection ponds. These ponds collect surface runoff during the wet season and store it into the dry season, oftentimes going dry before the next wet season. Since these surface ponds are also used by the cattle and goats in the area, the water in these ponds is unsafe to drink due to the harmful bacteria which they harvest.

In July of 2023, our Engineers Without Borders (EWB) chapter visited Kenya and heard about the BTTC's struggles, and we assembled a team of students, professional engineers, faculty at our university, and other mentors to come up with a solution to these problems. Our team has decided that the best solution is twofold: first, we will fix one of the school's broken 70,000 Liter tanks to help with storing excess water during the rainy season, and secondly we will implement a well-pump system with an additional two 10,000 Liter tanks. To fix the tank, the team will travel to Kenya to implement a fiberglass laminate or a large HDPE sheet in July of 2024. Next, the team will implement our well in July of 2025, which will consist of a well pump, six 410 Watt solar panels to power the pump, two 10,000 Liter tanks, and a piping system to connect all of these parts. The BTTC have been in constant communication with our team, and they have given our team an exact location for our project to be implemented at, as well as ensuring us 24/7 security of our system for when construction is finished.

This project has both reinforced concepts our students have learned within the classroom, as well as teaching them new skills and ideas that will be essential for them when they graduate and enter the engineering field. From learning technical skills such as SolidWorks and MATLAB, to reinforcing their knowledge in concepts from fluid mechanics and electrical engineering, as well as learning soft skills such as cultural competency and teamwork, our team has been able to benefit from helping a community that could truly use our help.