Kuna Nega Community Improvement Project
BY: Pitt Humanities, Engineering And Design
Fall 2015

BACKGROUND

Kuna Nega is a small community of around 3,000 people and is located 15 miles east of Panama City. The people of the community are in need of an updated water distribution system due to the recent addition of 80 new homes. Our team prepared, designed, and began to implement a new solution in the hope of bringing a valuable resource to the Kuna people.

ENVIRONMENTAL

Providing a septic system to an area of Kuna Nega would not only help to appease the current mindset of the local community but also improve their quality of life substantially. Our solution to these development issues of the area is to design a household sewage system as well as effective onsite sanitation.

- Preliminary Sewer Layout
  - Services 40 households
  - Gravity-fed pipe design
  - Septic Tank
  - Primary BOD treatment
  - Two chamber tank
  - Constructed Wetland
  - Secondary BOD treatment
  - Low maintenance & operation costs
  - Environmentally conscious

WATER RESOURCES

Used EPANet Software to model water distribution system for the community of Kuna Nega

Installed:
- 1,000 Linear Feet of Pipe
- 1 – 3” Check Valve
- 2 – 3” Ball Valves
- 2 – 2” Ball Valves

When Mainline is off for 48 hours:
189 houses (76% of the community) that would not have water will receive water

The geotechnical design analyzed the new tank site using laboratory testing methods on the soil along with computer software and design codes. These calculations created a stable and safe soil foundation for the new 20,000 gallon water tank. The final assessment of the site included:
- Slope Stability
- Bearing Capacity (Ultimate and Local)
- Settlement
- Earthwork
- Footing Design

PROJECT SCOPE

Water Resources: Provide changes and additions to the current distribution system in Kuna Nega using EPANet; Preliminary design for Mocambo pipeline

Structural & Geotechnical: Design an implementation of tank and tank foundation

Construction Management: Site and project management; Creating a schedule and budget to allocate funds raised

Environmental: Preliminary design for Kuna Nega sanitary system

New Large Tank
- Location: Community Center
- Dimensions: 6.5’ x 6.5’ x 5’
- Storage Capacity: 750 Gal.

New Water Storage Tank
- Location: Community Center
- Dimensions: 21.5’ x 16’ x 10’
- Storage Capacity: 20,000 Gal.

GEOTECHNICAL

The geotechnical design analyzed the new tank site using laboratory testing methods on the soil along with computer software and design codes. These calculations created a stable and safe soil foundation for the new 20,000 gallon water tank. The final assessment of the site included:
- Slope Stability
- Bearing Capacity (Ultimate and Local)
- Settlement
- Earthwork
- Footing Design

Site assessment was conducted using on site GPS data collection and measurements. The elevation profile layout created a model to test slope stability software on the new tank site’s construction area to ensure adequate soil strength was present to eliminate the possibility of slope failure.

Final site designs were created to provide the community with the safest and most cost effective layout to ensure the site would exhibit long term stability and ensure the longevity of the water tank.

48 hr. Mainline off No New Tanks

48 hr. Mainline off with New Tanks