

WEFTA Field Report – Honduras (English)
August 24 to September 3, 2017

Wednesday, August 23 – Depart ABQ

- John, Karen and Andrew spent night at Andrew's parents' house in Atlanta (Delta flights require overnight stay in ATL).

Thursday, August 24 – Arrive in Honduras

- Arrived in San Pedro Sula, and got ride from USAID (FINTRAC) to La Iguala, Lempira
- Set up living arrangements in Palacio Municipal de La Iguala, a 5-star luxury accommodation in the heart of downtown La Iguala (population about 834).

Friday, August 25 – Guadalupe, Lempira

Rio Guadalupe Crossing:

- Andrew and John reviewed construction issues at river crossing with municipality's construction supervisor. The crossing was designed by Enrique, and his calculations were checked by Andrew. The problem is that the steep, rocky slopes do not provide enough room to anchor the suspension bridge-style crossing per specifications and still provide enough room to work safely. On south side, we adjusted tower height to compensate. On north side, we decided to deepen the anchor into the rock and make the tower shorter.
- John surveyed the vertical angle of the river crossing (See photo). The crossing will have an angle of 4.7° from vertical. We called Greta Quintana, SMA's structural engineer in New Mexico, who confirmed this was acceptable.
- Andrew spoke to the construction manager about increasing the portion of Portland cement in the concrete mix to ensure 3,000 psi minimum strength for the anchors and towers.

Pueblo of Guadalupe Water Storage Tank:

- John, Karen and Andrew visited highest-elevation home in Guadalupe. John surveyed elevation, and then surveyed new site for tank, to ensure the new tank would be at least 7 meters higher than the house to provide enough pressure. This methodology ensures that all homes in Guadalupe will have adequate water pressure.
- Andrew updated hydraulic calculations to accommodate the new tank site elevation. The pipeline will be 3" PVC.

Saturday, August 26 – Llano Largo, Lempira

- We visited the newly leveled Llano Largo tank site. The site looks good, was nicely leveled using the Municipality's bulldozer, but was done at a different location than contemplated in the design. The design elevation for the tank was 644 m, and the site

they actually leveled for the tank is 652 m. This will reduce the quantity of water reaching the tank by about 5%, but otherwise should work out fine. On the plus side, it will provide a little more pressure for residences on the distribution system.

- We surveyed from the tank to the two highest-elevation homes in the community. The highest was Cleotilde Bejerano's house, at 640 m. The second was doña Ernestina's house, at 632 m. Both are well below the tank, so they will have plenty of water pressure.
- Andrew and a group of community members hiked from doña Ernestina's house back to the tank site and staked out the future distribution system alignment using wood stakes GPS. There is a huge cliff in the middle of this path, so we had to backtrack and explore a few different routes before we found the most feasible one. We provided this data to the surveyors (Olivera's crew) so they could follow our alignment and pick up design-grade topo survey.

Sunday, August 27 – Quioco

Community Training Session:

- We met with several dozen community volunteers in the morning at the materials warehouse to provide training on PVC piping, steel pipe connections, flanged connections, general work practices, and pressure testing. The community volunteers took turns practicing the work. See photos.
- Karen spent this time training Tania to manage project finances and keep records of payments from community members, expenses, receipts, etc.

Quioco Tank and Pipeline Staking:

- Andrew and Quioco volunteers noted that the proposed tank site had an elevation of 450 m, which is too low to reach the entire community. After walking the area and analyzing the terrain, we decided to look for a spot with an elevation of between 465m and 470m.
- John and the survey crew set out after Andrew's crew finished, to find a spot with an elevation of 468m, and place a wooden stake for Andrew and community to consider for tank site.
- Andrew and Quioco crew went back to John's tank site stake, which looked good. They field-aligned the pipeline with GPS, and gave GPS data to John so his crew could follow up with design-grade topo survey the following week, while Andrew continued with other task.

Monday, August 28 – La Iguala

Meeting with Mayor

- World Vision wants to donate some 2" steel pipes, since they were part of decision to switch from pumped system to gravity design, but they don't know how much funding they will have available. They should know by November 2017.
- USAID would like to help fund the distribution systems, but they need designs from WEFTA.
- WEFTA needs to execute grant agreement with community before we can transfer funds for material purchases. First, we need the following documents:
 - Budget
 - Community's bank statement
 - Easements from all property owners

Inspection of River Diversion Dam:

- Filter system needs re-work. Community needs to cap open pipes, and cover all perforated pipe with gravel.
- Air valve #1 has a leak that needs to be repaired.
- Andrew and Llano Largo volunteer crew measured flow rate in Rompecarga #1, at 90 gpm. This was better than we expected. See photo.

Tuesday, August 29 – Aerial Crossings

- John and survey crew continued surveying Quioco supply line and Llano Largo distribution line.
- Meanwhile, Andrew and community volunteer (Victor) checked out proposed aerial crossings. There are two crossings using suspension bridge-style cable crossings, plus several other crossings using concrete pillars.
- While looking for crossings and comparing to plans, Andrew noticed several discrepancies in the PI numbers and stationing between the plans and the field. This is a serious problem, because it can lead to confusion and cause construction crews to put valves, rompecargas, etc. in the wrong place.
- Andrew spent most of the day documenting discrepancies in survey.

Wednesday, August 30 – Chusquin

- John and survey crew continued with design surveys
- Karen and Andrew met with representatives of community of Chusquin, another community in Lempira, to discuss potential new project and visit their proposed water source.
- Chusquin's current water supply was built in 1993 to serve 40 homes. It now serves 193 families, and suffers from severe water shortages.
- Monthly water bill is Lps. 20.
- The Junta has 6 members – 2 women and 4 men, including don Alejandro and don Tito (our guides for the day).

- Tito and Alejandro stated they have official act recognizing their right to the water source. They also said they have laboratory report on water quality.
 - Andrew requested copies of both documents.
 - Andrew did taste the water, and it tastes excellent.
- Existing tank is 5,000 gallons, which is too small for ~200 homes. Should be at least 15,000 gallons for this population, and better to double that size for future growth.
- Community currently construction water catchment structure at water source.
- Tito and Alejandro said community would commit to pay Lps. 500,000, and already have Lps. 450,000 collected.
- Community already purchased 600 mts of 3" PVC SDR 26.
 - Not sure if this is included in the Lps. 500,000, or not. Assume so.
- Municipality has assisted by purchasing:
 - 240 mts of 4" PVC SDR 26
 - 1860 mts of 3" PVC SDR 26
 - 2100 mts of 2" PVC SDR 26
- The 4" and 3" pipes are already installed, but not covered up. The 2" pipes are laid out next to the trench, but not installed yet.
- No design. No survey.
- Andrew suggested they pay for a survey with community funds, and WEFTA would donate the design.
- Need to talk to community first, to make sure everyone supports project. Also to find out if everyone will benefit, and if water will be used for human consumption or for washing coffee beans.

Thursday, August 31 – La Esperanza

Meeting with field engineer, Enrique:

- Quality control:
 - Correct and maintain survey staking
 - Ongoing training of volunteers to ensure proper work technique
 - Find field assistance for Enrique, use walkie-talkies to communicate in field
 - Need to perform frequent hydrostatic pressure tests to ensure no leaks in pipeline
 - Every pressure breaker
 - Every change of pipe pressure class
 - In the steel pipe section, at every flange
 - Do not bury PVC pipe until tested
 - Do not set steel pipe in concrete pillars until tested
 - Make sure crews have all the tools and materials they need every day before working, so they don't have to take any short-cuts
- Review problem with survey staking

- Enrique, John, Hector, and Andrew will meet tomorrow in San Pedro Sula
- Five problems to be resolved:
 1. PI numbering on field stakes – Hector agrees to correct
 2. Stationing on field stakes – Hector agrees to correct
 3. Stakes in the bottom of the trench (no off-sets) – Hector agrees to correct
 4. “Normal” errors with staking not matching design, like missing flange stake, HG aerial crossing misplaced, another HG crossing too short, etc. – Hector need to review everything to make sure no human errors.
 5. Survey crew marked the trench community dug, not the design alignment. But the trench does not always follow design. The problem is they changed the stationing downstream based on trench, so now none of the stations match the design. Need to persuade Hector to fix this.
- Design change – move RC#4 from Est 3+120 to 3+100 (raise elevation from 850.67 to 852.50 mts).
- Other specific survey issues with Hector to be corrected – see detailed field notes in Spanish.
- Aerial crossings
 - Eliminate third cable parallel to pipes
 - Need to keep pipes and tops of cable suspension towers level
 - Use columns, not cables, in El Tule and Las Sardinias crossings
 - Use cables to cross Rio Guadalupe and La Bernalda
 - Vertical drops using HG pipe will need concrete support blocks at the bottom

Friday, September 1 – Monquecagua

- The closed the valve between the new and old tanks, so now the Monquecagua and La Rinconada systems operate independently.
- Community finished construction of main trunk line of distribution in Llano Redondo using USAID funding for materials and WEFTA’s design. Looks good, from what I can see.
- Community has reconnected existing branch lines to new trunk line, temporarily, to put it into immediate service.
- Currently community has 356 active connections, 276 in Monquecagua and 80 in La Rinconada.
- The Mystery of the Disappearing Water:
 - The new tank in Monquecagua is not filling, staying empty and high elevation homes have no water service
 - No problem in La Rinconada
 - Appears to be two problems:
 - We measured flow rate entering new Monquecagua tank. It was only 42 gpm, whereas it was 58 gpm when project was first completed. Appears to be a blockage in the line.

- Edwin with USAID volunteered to measure flows in upstream pressure breaks to pinpoint blockage.
- On the distribution side, 42 gpm is still a lot of water for 276 homes, or even for 356 homes. So there must be a leak or some other escape of water downstream.
 - First two pressure breaks in distribution system had flows of 42 gpm, same as tank inlet. This implies leak downstream, but no leaks between tank and first 2 pressure breakers.
 - Problem is probably in old branch lines that were reconnected to new main line.
 - USAID and community will search for leaks by closing off valves sector by sector. They will need to warn residents ahead of time that water will be shut off.
- Community is continuing to chlorinate the water, and looks good.
 - Andrew inspected operation of chlorinator in new tank, but at the moment it was empty and needed to be refilled.
 - ADEC tests chlorine residual levels in 4 parts of the distribution network every week, and all good. ADEC also performs monthly bacteriological tests. They showed us results of latest test and it passed. See photo.
- Community meeting:
 - Entire community met at school.
 - All agreed to continue project until every single new branch line and house connection is built.
 - Community still has a bank balance of L. 220,000 (about \$9,000) available to continue with remaining phases of the project.
 - WEFTA offer to match this with L. 220,000 of WEFTA funding.
 - If additional funds are needed, we can split those additional costs 50/50.
 - Community wants to re-start construction of next phase in January 2018.

Saturday, September 2 – Yamaranguila

- Water system currently serves ~700 homes (over 4,000 people), plus ~30 additional service connections where one neighbor passes water to another.
- The pump at Well #1 burned out in 2016, after 12 years in service. This is normal service life. It cost over L. 400,000 to replace it. This has greatly impacted the Junta's savings.
- Junta currently has four (4) priorities:
 - Meters. Install meters at every house, and adopt volume-based rate schedule. This will help discourage water waste, raise more revenue from large water users, and help Junta identify water losses.
 - Need ~750 meters, at ~ L. 800 each.
 - Junta will pay part, Municipality will pay part.

- New well in Buenos Aires
 - Junta is working with USAID to fund this.
- Hydraulic model of distribution system
 - Many distribution lines are severely undersized, as they were built in 1980s when population was 1/5 what it is now.
 - They already have survey of distribution system, done by Adolfo Beltrand.
 - Now they need a hydraulic model of the system (requested from WEFTA).
 - Andrew needs to find volunteer to help with this.
 - No construction project yet, but need to do hydro model to start planning for future.
- New surface water source in Monquecagua/ Opalaca
 - Source produces 90 gpm, not less than 75 gpm in summer and up to 100 gpm in winter
 - Looks like we can get water to Yamaranguila without pump or a lot of HG pipe.
 - Junta needs to get a good topo survey. Andrew can help evaluate proposals.
 - Community needs to keep measuring flow rate every month for next year.

Sunday, September 3 – San Pedro Sula

Meeting with Hector Olivera, surveyor, and Enrique, John Rocha, and Andrew

- Need to start at true Sta. 0+000 on plans
- Critical points are pressure breaker locations and pipe transition locations
- Review locations of aerial crossings and valves
- Need to move stakes from trench bottom to off-sets
 - Enrique needs to explain this concept to community
- Hector will personally review entire project with plans-in-hand and total station and GPS. He estimates this will take 8 days in field.
- We discuss coffee harvesting season, which runs from October to December and coincides with rainiest time of year. Should we wait till after December to replace stakes, since they might otherwise become lost during this time?
 - Enrique spoke with Heliodoro, who said they would keep working.
 - We will see how things go during next few months and react accordingly.
 - Hector should re-stake in section, starting with dam to pressure breaker #4. When construction in this section is complete, they can continue staking further downstream. The length of each section will depend on speed of construction work.
- John suggested using oil-based paint to instead of markers.

Follow-ups:

Andrew

- Construction instructions
- Send field notes to Karen, John, Enrique
- Update design calculations based on survey data from this trip – tanks, pressure breakers
- Update construction plans with Mark and send to Enrique and Hector
 - Updated elevations
 - Updated pipe diameters
 - New tank sites and new transmission lines to tanks
 - Quioco line
 - Llano Largo distribution trunk line from new tank site to first house
- Update material quantities
- Independent verification of hydraulic calculations in WaterCAD by Tory
- Finalize cost estimate using Enrique's price quotes
- Consult with Enrique re future project in Chusquin
- Finish design for rest of Monquecagua distribution system before January 2018
- Follow up with community and USAID re mysterious blockage and leaks in Monquecagua
- Find help for Yamaranguila projects
- Yamaranguila WaterCAD model
- Consult with Yamaranguila re selection of surveyor for new transmission line

Enrique

- Obtain tools and materials needed for construction in La Iguala
- Find out required torque for flange bolts
- Train workers on regular basis during construction
- Find field assistant
- Buy walkie-talkies
- Get remaining price quotes for cost estimate
- Obtain all easements from community for La Iguala, to put into grant agreement, particularly new tanks and new ramales
- Follow up with World Vision re donations for La Iguala
- Get screens installed in pressure breaker inlets
- Follow up with Alejandro re: aerial crossings
- Distribute updated plans after Andrew emails them
- Make sure concrete support blocks get built at vertical pipe runs
- Find drafter to help finish Monquecagua distribution plans
- Follow up with Hector to correct construction survey staking

Karen

- Liquidation of municipal funds
- Old invoices
- WEFTA grant agreement

Hector

- Survey and draft line between designed transmission line and new Llano Largo tank site
- Draw Quioco line
- Draw Guadalupe line to new tank site
- Maybe help with Monquecagua distribution system drafting?

John

- Provide report on all survey work completed and new survey data







Notas:
Detallar Pafuer los lugares donde se extrae dicha pax