Troy Meinen

Thanks to more than 80 friends and family and Living Water International
Where Do You Get Drinking Water
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For 884 million people, drinking water looks like this.
Troche Trece
Nueva Concepcion, Pacific Coastal Plain, Guatemala
Physiography and Geological Setting

- Quaternary sediments
- Quaternary volcanic rocks
- Tertiary volcanic rocks

- Quaternary volcaniclastic sands and gravels
- Pumaceous ash falls and lahars
- Occasional welded tuffs and basaltic flows
- Thick, rich soil with high porosity and permeability
Physiography and Geological Setting

- Common Hand Dug Well Depth is 15 ft
- Common Depth for Latrine Pit is 15 ft
Sustainable Right Sized Drilling Techniques

- LS 300 manufactured by Lone Star Drills
- Trailer mounted with hydraulics powered by a diesel engine
- Portable mud pump for mud circulation
- Collapsible drilling mast fitted with a chain drive and hydraulic rotary motor
## LS-300 Lone Star Drills

### LS300T+

<table>
<thead>
<tr>
<th>Mast</th>
<th>Rotary</th>
<th>Trailer</th>
<th>Dimensions</th>
<th>Weights</th>
<th>Mud Pump</th>
<th>Controls</th>
<th>Hydraulic Power Source</th>
<th>Drill Stem</th>
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</thead>
<tbody>
<tr>
<td>Pull Back-5,000 lbs. at 2,500 PSI</td>
<td>665 ft. lbs. Max Torque at 2,500 PSI</td>
<td>7,000 lb. Rated Tandem Axle</td>
<td>Overall Length: 190 in.</td>
<td>Operating Weight: 4,750 lbs. Average</td>
<td>13 HP Gas Engine or 10 HP Diesel Engine</td>
<td>Rotary – 4 way Detented Valve</td>
<td>20 HP Honda Gas – 10 GPM, 3,000 PSI</td>
<td>2 in. ID x 5 ft. long, N80 Mayhew Jr. Oil Field Quality Tapered Thread Tool Joints</td>
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<tr>
<td>Push Down – 5,000 lbs. at 2,500 PSI</td>
<td>95 RPM at 10GPM</td>
<td>5 ft. x 10 ft. Open Grating Bed</td>
<td>Overall Width: 82 in.</td>
<td>190 ft. Max Head</td>
<td>Draw-works – 4 way Spring Centered Valve</td>
<td>19 HP Kohler Diesel – 10 GPM, 3,000 PSI</td>
<td>Joints with Breakout Lug</td>
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<tr>
<td>6 in. by 3 in. steel tubing</td>
<td>Leveling Jacks (3)</td>
<td>Operating Height: 130 in.</td>
<td>2 in. Discharge</td>
<td>Circuit Provides Adjustable Weight on Bit</td>
<td>4 Gal. Fuel Tank</td>
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<tr>
<td>#80 chain</td>
<td>Pipe Racks (2)</td>
<td>2 in. Suction</td>
<td>Pressure Gauge – 0-3,000 PSI</td>
<td>Built-in Heat Exchanger and Cooling Fan</td>
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<td></td>
<td>2 in. Ball Coupler</td>
<td>12-volt Battery with Electric Start</td>
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<tr>
<td></td>
<td>Spare Tire</td>
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www.lonestardrills.com
Lead driller and assistant driller are in-country individuals trained in operation of the rig and familiar with local geology.

Drilling “crew” comprised of volunteer team members.

Team members rotate thru assignments.

Community residents often pitch in to help.
Sustainable
Right Sized
Drilling
Techniques
- Pilot hole to verify local geology and look for transmissive zones beneath an aquitard
- Ream hole to TD for well
- Install well
Living Water asks the local community leaders to provide for well pad materials and construction and mid-day meals for the volunteer team. This leads to local sense of ownership and pride in the well.
Village-level operation and maintenance hand operated pump developed by the Rural Water Supply Network of the Swiss Resource Centre and Consultancies for Development (SKAT)

- Low-maintenance simple lift pump
- PVC, Brass, and Stainless construction
- Entire pump operation parts can be replaced without removing drop pipe
Sustainable Right Sized Pump

- Designed to lift water from 30 to 140 feet
- Flow rate of 300 gal per hour
Sustainable Right Sized Pump
Hygiene: Helping Local Residents Keep Clean Water Sustainable
Hygiene: Helping Local Residents Keep Clean Water Sustainable

- Tour the local community to better understand the challenges in a particular community
- Female team volunteers lead by a trained hygiene expert hold hygiene classes
Hygiene: Helping Local Residents Keep Clean Water Sustainable

- Keeping the Well Clean
- Use of clean containers for the well water
- Hand washing
- Recognizing symptoms of common diseases and how to prevent spread
To Finish: Helping Local Residents Keep Clean Water FUN
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