

## History

Over the past decade, AguaClara has made designs for water treatment in towns and small cities, but has not yet succeeded in creating a low cost, climate-friendly, high performing treatment plant for villages that rely on turbid surface waters. Today, AguaClara has successfully created a sedimentation tank for a 1 L/s plant piloting in Honduras, which has the potential to provide water for approximately 300 people.

## Current Implementation

### Honduras

The 1 L/s sedimentation tank was shipped to Honduras in November of 2016. A new pipe flocculator will be assembled in Honduras in January of 2016. Currently, there are two student teams working to design a shorter filter that can be added to the 1 L/s plant and that will not require placement at a lower elevation than the rest of the plant. It is the hope that by the end of the summer in 2017, AguaClara will have provided a full plant; including a flocculator and a stacked rapid sand filter that comprises a complete prefabricated package.



# 1 L/s Plant



## Agua Clara Technologies

The AguaClara engineering project team at Cornell University **researches, innovates, and designs** municipal water treatment technologies. AguaClara technologies are gravity-powered, electricity free, made with locally sourced materials, and scalable for communities throughout the world.

## 1 L/s Plant Objectives

**Research, test, and determine** fabrication methods for the full-scale plant production in Honduras. **Design** novel geometries for low-flow sedimentation tanks and flocculators. **Refine** the integration of the dosing, flocculation, sedimentation, and filtration processes.



# 1 L/s Plant



# Fabrication

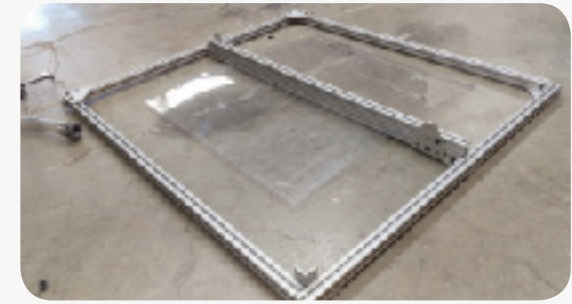
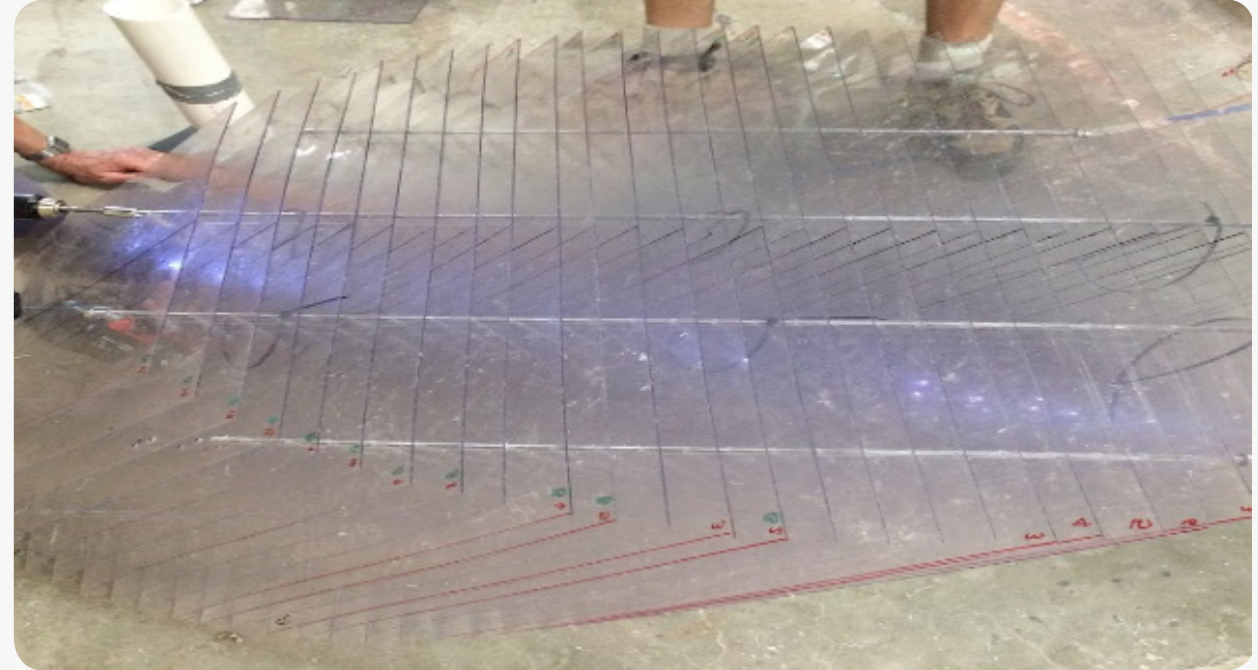
## Sedimentation Tank

In order to cut the pipe, a wooden jig consisting of a board with an ellipse cut in its center was fit over the pipe. The jig was fixed using extruded aluminum bars and joints, which screwed directly to the pipe. In order to make the cut, a reciprocating saw was fit into a cradle and brought around the circumference of the pipe.



## Plate Settlers

A jig, which also requires extruded aluminum bars and joints, was used in fabrication to allow for the shear to cut the plate settlers more accurately, as it provides a surface for the plate settlers to lay against.



# Fabrication

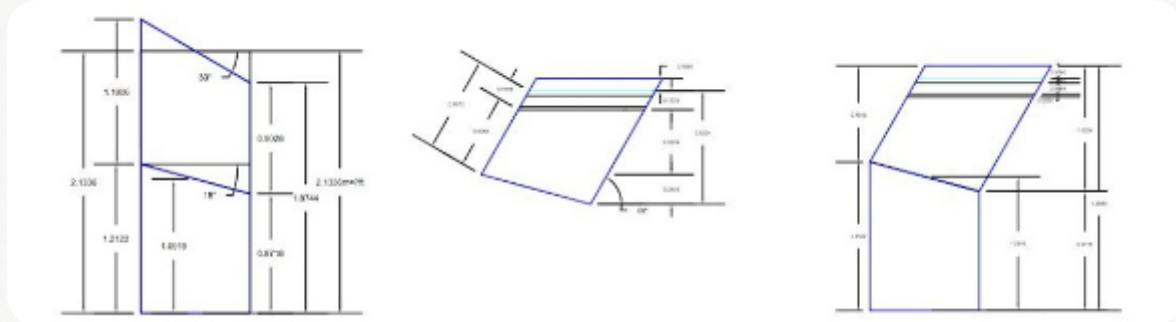




# Geometry

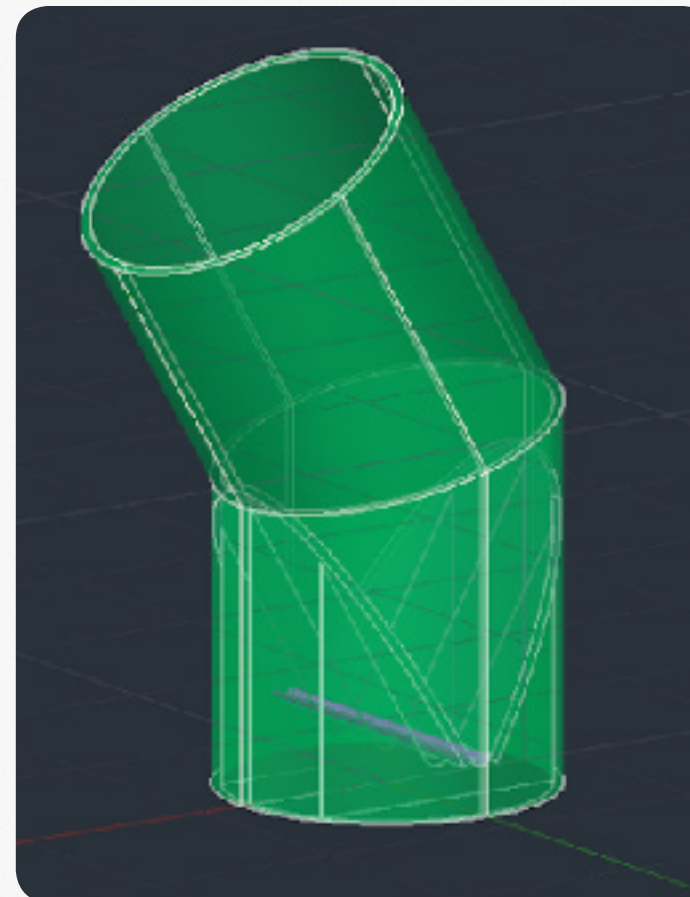
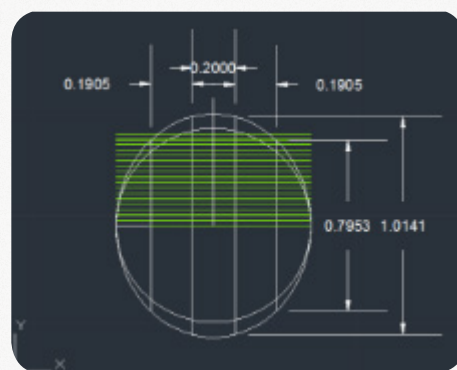
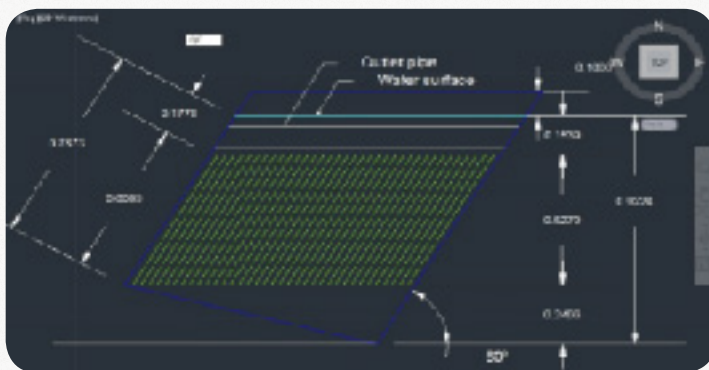
## Sedimentation Tank

The angles for the sedimentation tank geometry were chosen because the optimal angle for the plate settlers was 60 degrees from the horizontal. This angle ensures adequate settling, but also ensures there will not be too much buildup in the plate settlers. Thus, the main cut for the sedimentation tank was chosen to be 15 degrees, so that when the top piece was rotated 180 degrees, the total bend angle would add to 30 degrees.



## Plate Settlers

The plate settlers are angled 60 degrees from the horizontal, because it is the critical angle for the plate settlers to be so the flocs slide down the plates and into the floc blanket. The plate settler spacing was the same as that used in the built-in-place AguaClara plants.



Relative price, conservation, and shipping issues were all taken into account for the sedimentation tank. Structural analysis was performed using Mastan<sup>®</sup> software.

All necessary parameters: dimensions, inertia, and load, have been obtained to provide a structure that is both safe and durable.

# Structural Analysis

