Low Flow Flocculator: Detailed Task List

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We will transition from the Floc Venturi project to the Low Flow Flocculator by beginning to evaluate different options. We will focus on designs within a pipe because they are easier to construct in the lab and eliminate constraints from using the current flocculator model. Pipe flocculation is not ideal in actuality because operators cannot see inside of the pipes and they could be difficult to clean.

Previous designs for low flow flocculators have created workable models that provide the necessary collisions to prepare the particles for sedimentation (see TapTrust DC Capstone 11 and Figure 1). Yet, these designs, which are modeled after current AguaClara flocculators with slight modifications, are held back by many restrictions. These restrictions and constraints are mainly due to geometry and construction of the plant itself, which ultimately result in an inefficient design and unexpected high costs for a low flow flocculator. So, by ridding ourselves of these current constraints in design, our team will be able to look outside the box and create the best low flow flocculator that suits the needs of a Honduran town. The options described below are a starting point for our research which aims to provide a 1 L/s AguaClara flocculator that is technologically feasible and ecologically and economically viable.

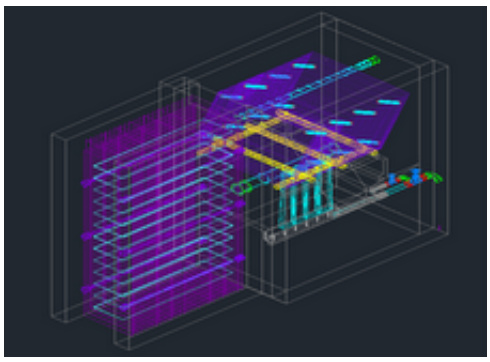

Figure 1: TapTrust DC Capstone Project: final low flow flocculator design with current plant constraints.

Weeks 6-8: Design Analysis

We will model the options described below in MathCad to further determine their feasibility and create a clear comparison between options:

- Option 1: The first proposed solution involves constructing both horizontal and vertical baffles inside the pipe; different combinations and orientations of baffles can be examined. Horizontal baffles could be attached to a string running through the center of the pipe with additional horizontal baffles affixed to an insert sitting on the outside of the pipe - these layers would alternate. Vertical baffles could then be attached to some of these horizontal baffles to increase collisions (see Figure 2).

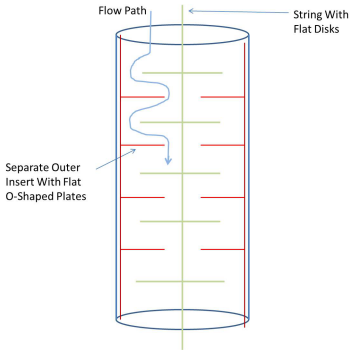

Figure 2: Option 1

- Option 2: Another idea involves attaching balls to a string that would hang through the pipe's center in a similar fashion to the horizontal baffles previously described. Depending on the size of these balls, horizontal baffles could be installed attached to the pipe wall alternating in between the balls (see Figure 3).

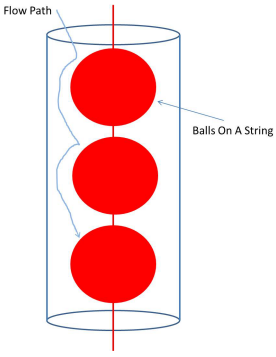

Figure 3: Option 2

- Option 3: We can also construct a pipe within a pipe in which water enters the flocculator through the inner pipe. Horizontal baffles would then route flow from the inner pipe to the outer pipe through small drilled holes and then back again. This process would repeat through the length of the pipes. The small holes would cause a contraction and expansion in the flow to increase collisions (see Figure 4).

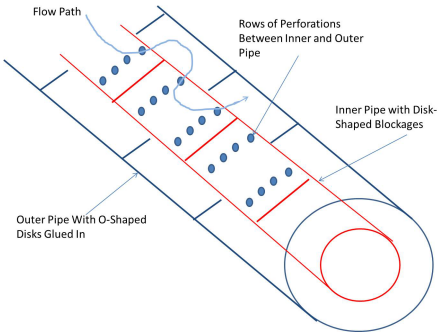

Figure 4: Option 3

Week 9: Spring Break

Week 10-14: Design Construction, Testing and Final Conclusions

We will use these weeks to find the best way to construct and test the options deemed most feasible from our analysis. This design will be easy to take apart and clean as well as to construct. If possible, we will determine a way to "see inside the pipe" to ensure that flocculation occurs. We will also use this time to develop our final report and presentation.