



Company Information

Company Name	<i>Boomerang Water</i>	Date Submitted	<i>05/18/2022</i>
Project Title	<i>Design of a Bottle Cap Sorting and Distribution System</i> (BOOM_SYSTEM)	Planned Starting Semester	<i>Fall 2022</i>

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

Discipline	Number	Discipline	Number
Mechanical	3	Electrical	1
Computer	1	Systems	

Company and Project Overview:

A Veteran-owned business, based in Davidson North Carolina, Boomerang Water is the world's first on-site, micro-bottling solution to economically replace plastic water bottles. We are committed to disrupting current water bottling practices to end single-use plastic and shipping. Our zero-waste system washes, sanitizes, filters, fills, and caps returnable glass or aluminum bottles with pure, premium water at the point of use to maximize freshness and keep source water local. 22 billion plastic water bottles are thrown away in the US every year. It will take over 1000 years for those bottles to biodegrade. Our system replaces the need for single-use plastics, eliminating waste and reducing carbon emissions.



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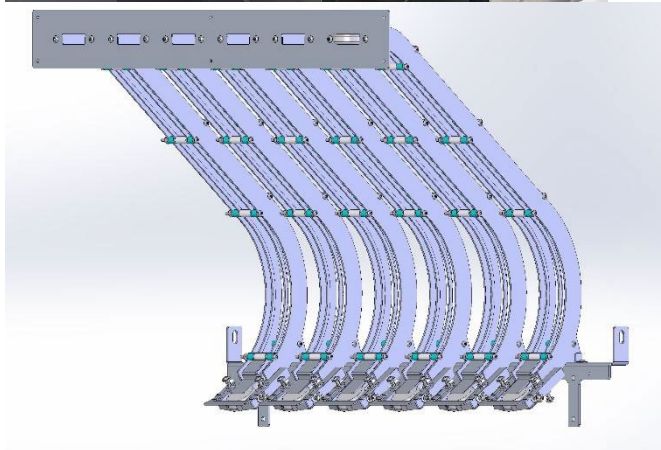
We hope to continue improving our system in ways that make it more feasible to implement world-wide. The current system relies on a great deal of manual actions to produce bottled water. This project would focus on the development of automating the bottle cap loading function in the machine. Loading bottle caps is currently a manual process and the through-put and ease of use would increase exponentially by removing the need for operator assisted cap loading.



This project is partially supported by a grant from the NC Manufacturing Extension partnership, an organization that helps to support business and job growth for NC companies. To learn more about the NC MEP, click on this link: <https://www.ncmep.org/>.

Project Requirements:

- I. Current Method:
Operators hand sort and deposit bottle caps into the Boomerang bottling system. This requires the operator to handle each cap which can pose potential contamination risk. The overhead repetitive motion also poses an ergonomic and strain injury risk.



II. Project Scope:

A system which can be bulk loaded with caps from the supplier containers should be developed.

- Design should be considerate of the ergonomics of the operator loading caps into the bulk holding area and keep the height below 52" and from the front of the system.
- The feeding system should orient the caps into the same direction.
- The caps must be conveyed to the existing cap chutes without using magnetic conveyors.
- The caps must then be fed equally into the loading slots in the system.
- Feeding mechanism must stop feeding when the cap chutes are full.
- Dimensions of the finished product excluding conveyance should be kept under L36" x W16" x H24".
- System should operate on either 24VDC or 230VAC.



Expected Deliverables/Results:

Complete drawing package that can be given to a machine shop for fabrication and assembly

- CAD drawings for each part (2-D Prints and 3-D Models)
- Bill of materials
- Assembly instructions
- Cost estimate for the complete system
- Complete build and integration of the system at the end of the SD II

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (if none please state none):

- Machine Design
- Sheet Metal Design
- CAD
- Travel required to Davidson facility, mileage will be reimbursed per ISL purchasing procedures.