SOLOMON CLARK   PETER DUIN   JAVIERE HINOJOSA   MATTHEW SMALL

WetLand

HUMBOLDT STATE UNIVERSITY

Background

WetLand is a mobile self-sustainable island-based ecosystem located on the Delaware River in Philadelphia, PA. The goal of WetLand is to offer a workspace for artists; a stage for forums on our shared future; as well as to showcase art, life on the water, architecture, and appropriate technology.

Objective

The water meter is designed to monitor the volume, flowrate, and quality of water which is collected and stored on the WetLand habitat.

Criteria

Criteria	Constraint
Cost	Less than $400
Functionality	Must be reliable
Safety	Must not pose threat to occupants
Asthetics	Must look simple and concise
Maintainability	Minimal maintenance
Reproducibility	Must be reproducible
Ease of Use	Must be usable by average person
Power Consumption	Uses as little electricity as possible

Cost

Material	Cost [$]
Arduino Uno Microchip	25.00
LCD Screen	11.00
Sensor Shield	10.00
Temperature Sensor	6.50
pH Sensor	112.00
Flow Rate Sensor	12.00
Salinity Sensor	9.00
Sonar-Volume Sensor	5.50
Data Storage Shield	8.50
Wiring	12.00
Plumbing	47.00
Total	**$258.50**

Water Storage

Volume is measured with a sonar sensor. The sensor emits an ultrasonic sound wave that bounces of the surface of the water in the tank, determining the level of the water in the tank. This distance is then converted into volume in gallons.
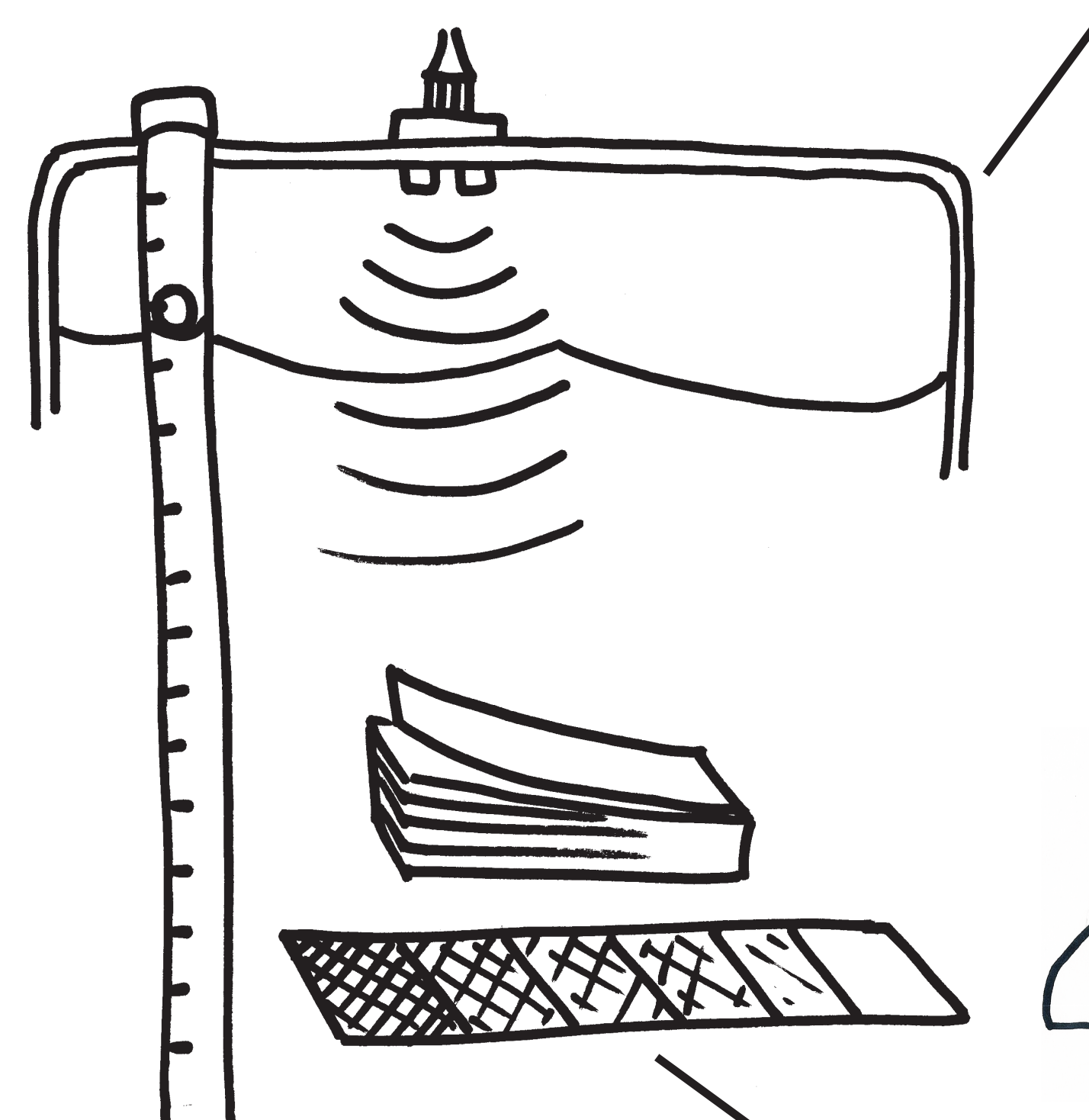
Flowrate Sensors

Flowrate sensors are installed at the inlet and outlet of the water storage tank. They record the amount of water being collected, and begin water quality testing as the faucet is turned on.

Sampling Compartment

The water quality sampling compartment is made of sections of PVC pipe with Sensor integrated caps for ease of access.

Water Quality Sensors

Several water quality sensors are installed in caps in the piping of the sampling compartment. These sensors include a pH sensor, a salinity sensor, and a temperature sensor.

Display

Data from the sensors is displayed on an LCD screen at the outlet faucet. The display is designed to simply show the water quality and wether or not the water is safe to drink.

Analog Backups

Backup pH, salinity, and volume systems are included to measure water quality in the event of a power failure.
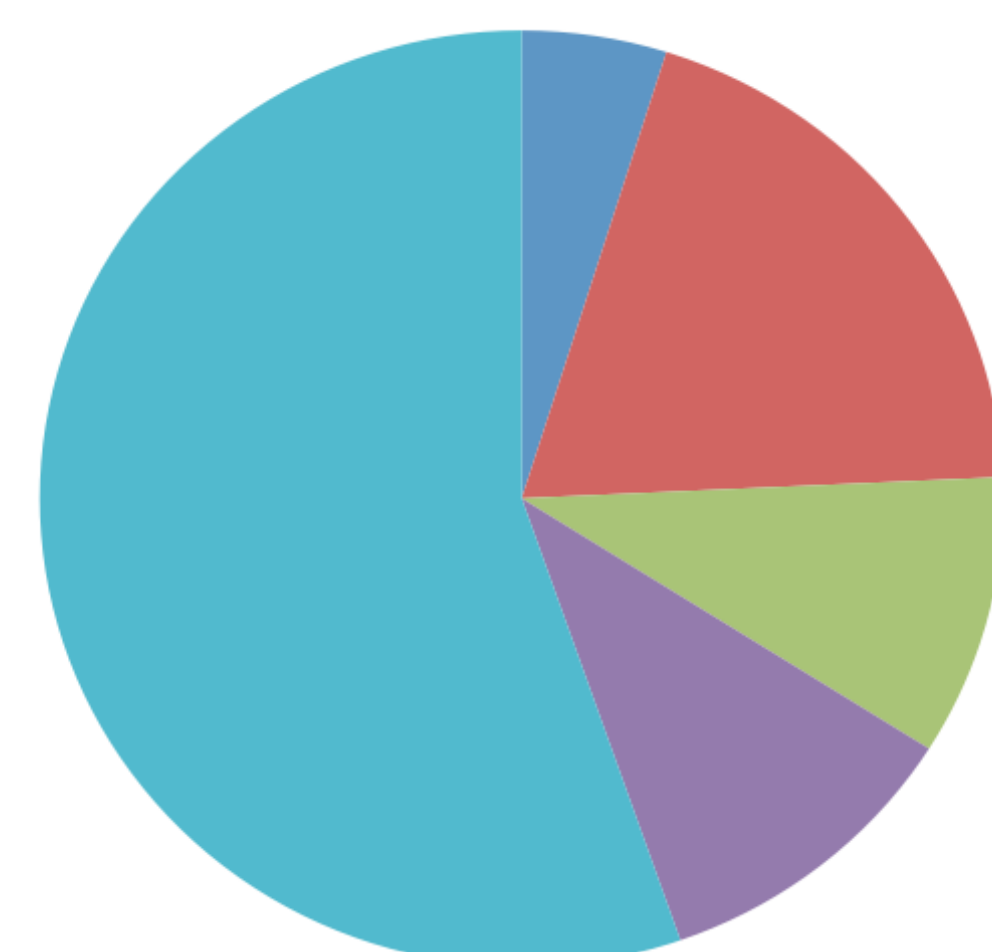
Arduino Uno

The data from all the sensors in the water meter is computed and compiled using an Arduino Uno programable microchip.

Data Storage

The Data Storage Shield uses an SD or micro SD memory card to track and store data trends that are being measured by each sensor.

Hours Spent

- Problem Formulation — 10
- Problem Analysis and Research — 40
- Alternative Solutions — 20
- Final Decision — 22
- Building And Testing — 114

Total: 206 Hours

Results

The water meter records the inflow of water into the storage tank. The water meter begins taking measurements of volume, pH, temperature, and salinity automatically when the faucet is turned on. These readings are then displayed on and LCD screen at the outlet faucet.