

Summer research summary

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My summer project is called Curb-cut rain garden water flow monitoring. It is a storm water management project, which has as main focus the Plaster Creek.

Stormwater and snowmelt have been causing several problems to Plaster Creek along the years. When this water and/or snow runs rapidly in the land towards the creek instead of being absorbed by the soil, it can cause issues to the environment such as erosion and floods. Furthermore, the runoff can drag sediments contained in the streets and rooftops of houses straight to the creek, causing pollution. To reduce the effects of these issues, several stormwater management practices have been studied and implemented. One of them, the one this project focuses on, is the installation of curb cut rain gardens. Rain gardens are landscaped gardens in a shallow depression that receive water runoff from nearby rooftops, driveways, sidewalks, parking lots and streets. They reduce the peak of runoff by storing the water inside the garden so that it can infiltrate in the soil or evaporate.

In this project my goal was to show, based on data, how efficient this stormwater management practice is. I had to monitor the runoff flow, to see what volume of water is collected by the rain gardens from a specific amount of rain. To achieve this goal, we chose four houses with curb cut rain gardens, and installed at each one of these locations, a 6-foot long perforated PVC tube containing a pressure transducer. These perforations allow water to enter the tube so that the pressure in the tube is the same in the rain garden. Each one of these tubes was buried 4ft, which is the depth of good soil that allows for infiltration below the ground level.

One other factor analyzed in this research was sediment, given the fact that one of the main features of the rain gardens is to reduce the amount of sediment that runs into the creek. Some of the rain gardens have what we call sediment trap or forebay. It is basically a rectangular box formed by concrete blocks. The forebay is the first place runoff flows into from the road, where it ponds which reduce its velocity, allowing sediment to drop out of the water and get stored. After each rain event I would go and collect this sediment, to then dry and weight in the lab, in order to have data on how much sediment can be collected by those forebays from a determined amount of rain.

This research project has been a blessing for me in so many ways. As a sophomore Engineering student, I had a lot of doubts on whether I was in the right field of study for me or not, and this doubt had been putting me down, worrying me, and taking away my motivation to study. This was the first opportunity I had, to explore civil and environmental engineering and be sure it is what I want to do for a living, and it is my vocation. Now, after couple weeks of work, I am sure this civil engineering is what I want to keep studying and work on in the future. More than that, the sustainability part this project had a deeper meaning to me because it gave me a feeling that I was contributing for a better world, and being a good God's steward.