Low Impact Development - Bioretention

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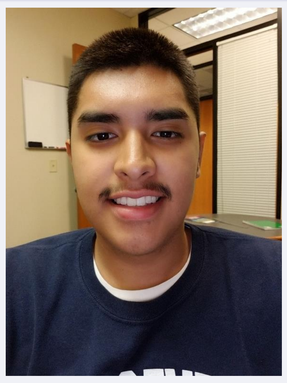

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Research Area

Through our bioretention research we will determine the effects of impermeable liner as required by San Antonio River Authority)and test the quality and impacts of water infiltrating back into the native soil. To accompany this, the best media and vegetation will also be determined based on the positive parameter results.

Motivation or Background

With urban development comes the negative impact on surface and groundwater quality. With the effects of pollutants in water also comes the effect of higher runoff volumes and faster/higher peak flows after this process. The effects are not only based on the potential property and life loss but the negative impact on Edwards Aquifer which supplies water to over two million people.

Objectives

1) Identify an optimal bioretention design for San Antonio using bioretention column experiments. 2) Implement a full scale BMP test bed composed of a series of parallel bioretention and sand filter cells. 3) Monitor before and after the implementation of the BMP LID test bed. 4) Enhance education of the public and students about storm water sustainability**.**

Methodology

Through the use of small-scale bioretention columns, we are going to be able to determine the best soil and vegetation in order to implement into the life size cells. Fig. 1 shows this process.

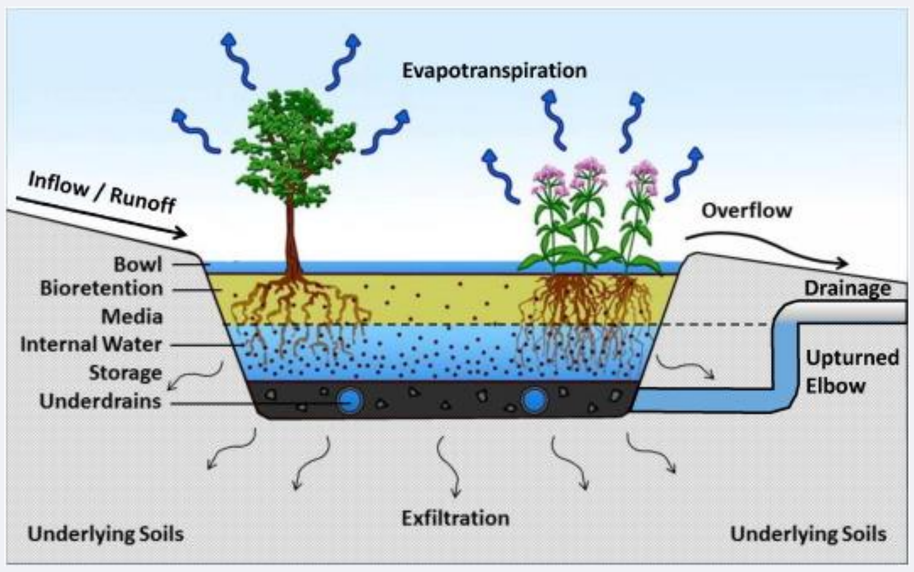

Fig. 1

Results

First set of preliminary results available fall 2017
- With and without liners -
Parameters being tested:

- Total Suspended Solids (TSS) [mg/L]
- Volatile Suspended Solids (VSS) [mg/L]
- Bacteria – Non-Fecal Colonies [# / 100 mL]
- Bacteria –Fecal Colonies [# / 100 mL]
- Copper [µg/L],
- Zinc [µg/L]
- Lead [µg/L]
- Phosphorus [mg/L of PO_4^{3-}]
- Nitrogen [mg/L as NO_3^--N]
- Conductivity [µS/cm]
- Dissolved Oxygen [mg/L of O_2]
- pH.

Skills and Experience

1. Understanding the bioretention process 2. Understanding bioretention terminology 3. Learning required biorentention procedures based on San Antonio River Authority 4. MS Office (Word, Excel, PowerPoint, Cloud) knowledge
5. Designing and building bioretention cells

What I Learned

Throughout the project I learned the many different methods of implementing Low Impact Development practices, concentrating on bioretention, I had to learn not only the effects of runoff but the process on how to remove contaminants from runoff safely and effectively.

Future Plans

For the remainder of the project we will build six life size bioretention cells behind the Margaret Batts Tobin Laboratories @ UTSA in order to test water quality there such as fecal matter, nitrogen, phosphorus levels and pH before and after our filtration practices. At this location there will be four bioretention and two sand filter cells with the different parameters discussed.

Acknowledgments

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References

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