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Hydraulic Engineering Design

UT Austin – Project Progress Report #1

Project Description

The focal area of this proposal is the lawn in front of the CPE that is home to the Clock Knot sculpture and a well-publicized area of the UT campus. At the south edge of this lawn there is a steep grassed slope that is easily eroded by storm water runoff. This runoff then flows east into the inlets at the intersection of Dean Keeton and San Jacinto. Another addition to runoff into the street is water that flows off the pedestrian bridge. While the pedestrian bridge is a source of runoff, water also typically forms ponds on the bridge creating hazards for pedestrians.

Scope

Our objective is to alleviate the standing water in our focal area and reduce the amount of storm water runoff that reaches the downstream Dean Keaton inlet. In order to do this we are wanting to implement a tiered infiltration rain garden system on the steep sloping section of the lawn in front of the CPE. An infiltration rain garden allows the runoff to be cleansed, detained, and eventually infiltrated into the surrounding soil. In addition to the garden, we would like to create a system of drainage pipes on the pedestrian bridge and the CPE and ETC lawns to direct runoff to the proposed tiered rain garden. A base map of the area being considered and the corresponding catalog are presented in Figure 1 and 2 respectively.

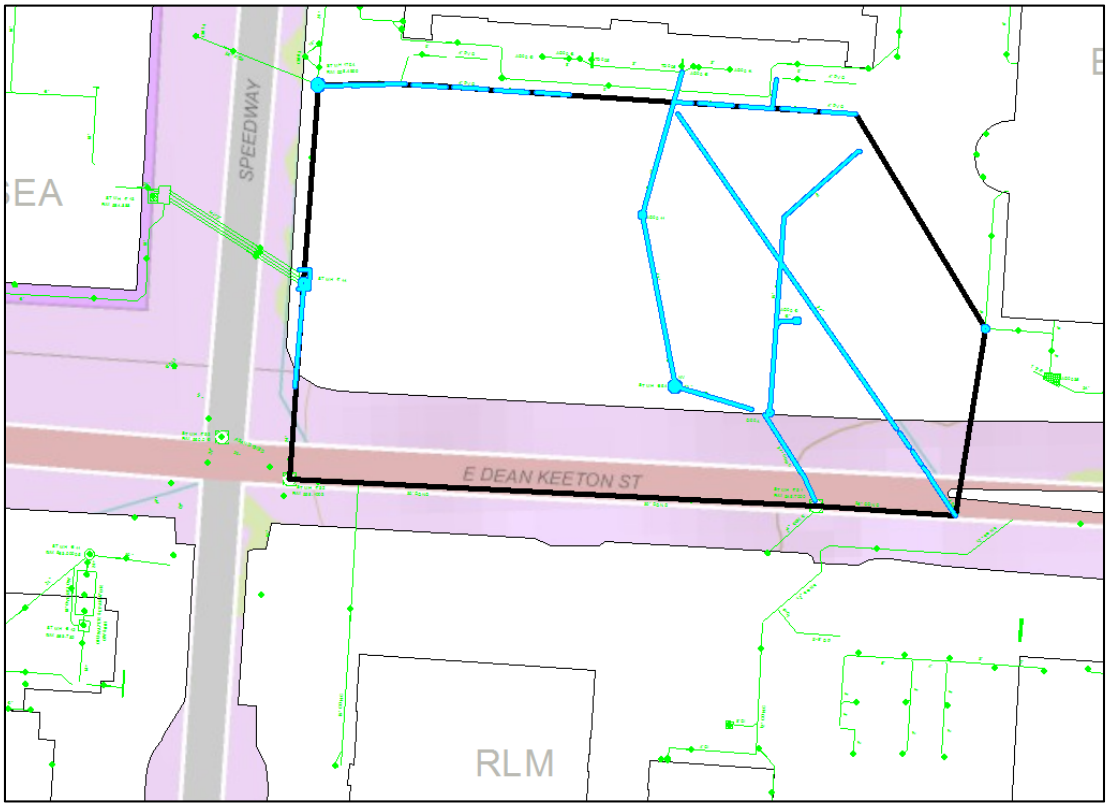

Figure 1: Base Map of Proposed Project Location

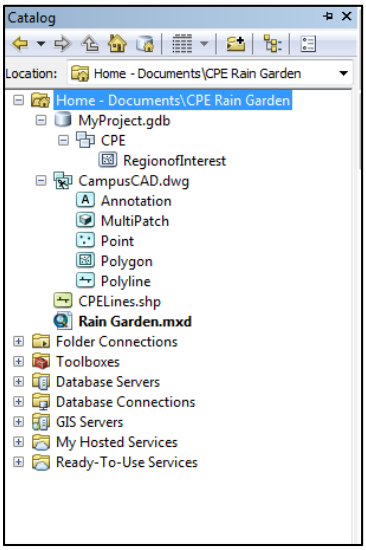

Figure 2: Corresponding Catalog

A system providing water detention will significantly reduce the amount of runoff contained within the downstream inlets. Another drainage point for this area is Waller Creek located south of the ETC, but north of the inlets. Waller Creek is known as a polluted and easily flooded drainage area for this section of UT. By removing this area's runoff to Waller Creek, we will help solve a few of these issues. Our plan to alter the study area will not only increase the efficiency of operation, but it will also provide aesthetic elements to the surrounding area.

Data and Simulation Models

In order to understand the study area and how it currently operates, we will need to consult a number of programs. An initial GIS database was used to develop a detailed description of how the area looks now and will allow us to compare it to the plan we develop. LIDAR will assess the elevations and slopes of the proposed area giving us a more detailed understanding of water movement within the study area. Once the necessary data is obtained, a simulation model will be able to show the impact on the hydraulic function of our project. It will show the reduction of runoff further down on the Dean Keaton inlet and also the reduction of standing water on the bridge and surrounding area. After using simulation models to find the most efficient design, CAD will be utilized for a dimensioned design drawing of at least one key element of the project in great detail.

Division of Tasks

Major tasks include communication with our mentor, site visits, GIS database maps, hydraulic simulation models, a CAD model, and calculations. To work as a productive and successful group, all tasks must be divided evenly and flexibly to the needs of the individual. Kelly Best will continue to be the main contact for our mentor and in charge of setting up any consultations and meetings necessary to fully develop the project, Chelsea Burkett will be head of the simulation models and alternate systems for efficiency comparison, and Shannon Sullivan will be in charge of the design details for the rain garden and piping system.