7/26/2018

WRI Final Report

Emily Laplante

CSU Fresno State

Emily Laplante
WRI

Acknowledgements

"This project was supported by Hispanic-Serving Institution's Education Program Grant no. 2015-38422-24058 from the USDA National Institute of Food and Agriculture."

Executive Summary

For this project my team inventoried culverts assigned by our supervisor Antonino Cabera and mapped them using GPS location for future use. My self and the other intern where also assigned a culvert to calculate the stream flow then analyze if the culvert was the right size or not.

Project Objective

The project objective was to inventory the culverts, so in the future the engineers for the Sierra National Forest would have an accurate and updated count of all culverts for a road we were assigned. Knowing the size and condition of the culverts on the road is important, so any necessary repairs can be scheduled. Calculating the stream flow allows the engineers to assess how much water drains to road after it rains; and if need the flow is greater than what the culvert can handle then the engineers can add more culvert or enlarge the ones that are already existing. After the culverts were inventoried, one culvert was assigned to analyze and make sure the right size culvert was put into place. Learning how to calculate the stream and then relating it back to the culvert size will be helpful to my base knowledge and possibly even in my future career. I want emphasize in water, and as it is related it will be useful in future. I know how to utilize the site to get the information that is needed to calculate the stream flow. I also learn a lot about problem solving, when I had a question abut something there was not always someone available to answer it, so I would have to google it and try to figure out before I went and asked someone for help. That made me learn to problem solving skills and that will be help in my future career too.

Project Approach

Inventorying the culverts was not a very difficult task. At the beginning of the summer we used a device called Trimble Geo 7x. This device used Satellites in the area and then with those Satilites it would estimate the GPS location of the culvert. When we inputed the culvert into the Trimble Geo 7x we would state the condition of the culvert, what size the pipe is, and if there was any plant growth around the culvert. After we finished the first road we used a tablet that had an app called 123 Survey along with the Trimble Geo7x. 123 Survey had similar information of that of the Trimble Goe7x but with 123 Survey we had to get a picture of culvert and what type it was. After the culverts where inventoried, we were assigned a culvert to calculate the stream flow through the assigned culvert. We used 3 different ways to calculate the stream flow for the culvert. The first was using the TR-55 equation, this is the most accurate way to calculate stream flow. As soon as the site was given, we went to StreamStat to see how big the drainage area was for that culvert. Then with the data from StreamStat, with that information we went to the web soil survey website and got the type of soil that was related to

that area. The reason for getting the type of soil for the area is because different types of soil absorbs more water than others, so to calculate the stream flow we had to know how much water was going in to the ground. After we got the soil group and type of area it was we then used the information to get a number for that soil that was called the CN. Then from there we found how much rain falls is in the area, with that information we plug that in to the equation and got the stream flow, or q value. The other equation we used was the rational equation. The rational is the more commonly used equation for calculation the stream flow. The equation is like use and requires less information. When the calculation where done the value you where within reason of each. The TR-55 has a slightly lower Q flow then the Rational but not big enough to make a huge difference.

Project Outcomes

After the culvert flow was calculated, the data was inputted in to a program called Hec grass. The conclusion after I analyzed the Culvert was that the culvert was the correct size and the there was no changes needed for this culvert at this point. The reason for this culvert to be calculated was because the previous year, with the amount rain California had, caused a blow on this road making it unpassable for the cars. The point was to make sure that culvert that was placed was the correct size. Having another blow out would be costly and doing the calculation was an easy way to check and make sure that the culvert won't fail again.

Conclusion

During this internship I learn a lot about engineering and water. I learned how to calculate the flow of a culvert and then applied that calculation to make sure the culvert is the correct size. There were many opportunities to grow in my knowledge. It didn't matter if we were in the field or in the office there was also something to learn. Sometimes it was a simple as don't forget the bug spray because if you do it makes for a long day, and other times it was spending an hour researching how to do something. There was also the satisfaction after I spent many hours trying to figure something out and then I finally did, it is a great feeling. At the end of each day I always felt like accomplished something and I always looked forward to coming to work the next day.