
SANITARY SURVEYS

Zaira D Alvarez

May 22, 2017

Supervisor Antonio Cabrera. Forest Engineer

Supervisor Edward Dietz. Environmental Engineer

USDA

Sierra National Forest

CSU Fresno

September 6 – May 25, 2017

Table of Content

Acknowledgements.....	2
Executive Summary.....	2
Project Objective.....	3
Project Approach.....	3
Project outcome.....	4
Conclusion.....	5
Appendix A.....	6

Acknowledgements:

The Water Resource Institute (WRI) in collaboration with the USDA Forest Service funded this project, which is the continuation of a project conducted over the summer. I want to thank Christina E. Rodriguez and both of my supervisors, environmental engineer Edwards Dietz and Forest Engineer Antonio Cabrera for this experience. They were patient during the 2016 -2017 internship, which expose me to the professional life of engineering and assisted me in the development of my professional career. I would like to thank the Sierra National Forest for the opportunity they gave me to work on the work centers and their fire stations. Last but not least I want to thank CSU San Bernardino and Water Resources Institute for giving students, like me, the opportunity to experience real life engineering projects and to expose us to work under the supervision of engineers, and making us feel like professional engineers.

Executive Summary:

During this academic year, I was conducting an internship that consisted of completing a project within 360 hours with the Forest Service, that consisted of being expose to engineering work such as, surveying water systems and performing sanitary surveys. Working under the supervision of an environmental engineer, Edward Dietz and the Forest Engineer, Antonio Cabrera, it was a great experience. In this internship a Trimble Geo7x device was use in order to take accurate data such as, milepost and taking GPS points of some locations of the Sierra National Forest. The project consisted of surveying the well houses, storage tanks, valves, fire hydrants, pressure release valves and faucets. Another intern collected some of the data that was use in the project during the summer; this project is a continuation to a previous project. Surveying was necessary to update the locations of the water system of some forest stations such as Trimmer Fire Station, Clover Meadow and Jackass Meadow Station. The next step after surveying was to extract the data, in other words to extract the GPS points that were collected into ArcMap GIS. As the internship went on, sanitary surveys need to be completed and with the help of the Ed Dietz, environmental engineer, all surveys were properly perform. Law requires the sanitary surveys and in order to properly perform them the environmental engineer was there to supervise the process. Lastly, the data was extracted from the water meter with a Trimble Ranger and this data helped the Antonio Cabrera, forest engineer to keep track of the monthly usage of gallons that were been pump out of each well.

Project Objectives:

The objective of the project was to learn how water systems work and to conduct appropriate sanitary surveys. Sanitary surveys are required by law and needed to fulfill the criteria and the regulations that the state government requires. Sanitary surveys need to be done regularly because people that work or live on the Sierra National Forest need access to tapping water, which needs to be free from any bacteria or harmful chemicals.

Project Approach:

During the internship, while conducting sanitary surveys; there were many things that had to consider, such as checking if the pumps were working properly, that the chlorine is been added to the water when the well is being regularly use. During the process of the sanitary survey, we needed to verify that there weren't any problems with the systems, such as contamination; the best solution in case of contamination is to add the right amount of chlorine to control the contamination. The ultimate goal of performing a sanitary survey is to check that the system is working properly in order for people to have reliable drinking water. In order to performed satisfactory sanitary surveys; one of the main requirements was to check for cross connections that might cause contamination. In the process of the surveying, pressure was a concern, in order to have a proper water system; a good combination of chlorine and water needs to be achieved.

As an intern some duties consisted of how to take data point with a GPS system, which was Trimmer Geo7x. Throughout the process of using this device the first step was to connect the antenna to receive signal form the satellite, once the first step was done data points could be taken with very good accuracy. Once the data was taken the following step was to extract the data points into a portable Forest Service laptop that had the appropriate programs. After transferring the data that was saved in the Trimble device that is saved as ArcMap GIS. The following step was to convert the file that had all the point save as SSF (Standard Storage Format) file. Finally the last step was to correct the SSF files in order to locate the points on the forest service-mapping program, which is ArcMap GIS. Another Trimble device call Ranger was use to collect the data of the water meters located in the well house, this data consisted of how much water was been pump from the well into the water system. Throughout this internship, some of the work also consisted of checking chlorine levels in the water system using a digital chlorine-meter, required step when the water was at risk of contamination. In order to keep the water clean and safe for consumption, chlorine was added and in order to keep the chlorine under control weekly checking's were schedule.

Project Outcome:

Throughout the internship many skills were gained such as surveying water systems, extracting data, ArcMap GIS software, writing reports and analyzing the data. An important aspect of this internship was to learn about conducting professional paperwork and skills. Working with the environmental engineer on sanitary survey for the wells in different locations of the Sierra National Forest was the continuation a previous project that I collaborated during the internship. Some of the locations that were surveyed consisted of Pollard Camp, Clover Meadow Station, Douglas Station, Trimmer Station, North Fork and Westfall Station. During these sanitary inspections the main concern was the different type of contaminations, when encountering a contamination, the best way to fix the contamination is to flush the water system and then add chlorine. If a possible contamination was identified, the public that had access to the water needed to be notified, so the residents of the area would take the necessary measurements when consuming water. The notification was done within the same week the problem was identified.

Conclusion:

After working with the Forest Service and becoming familiar with a Trimble (Geo 7x) device that the forest service uses in order to take accurate GPS points. After taking the data points of the water system, which helped Ed Dietz, environmental engineer have better and accurate water plans of how the system runs in the Sierra National Forest. The data will help future engineers or interns, like myself, locate most of the valves, faucets and fire hydrants faster. When surveying the water system, finding the valves and faucets was not an easy task, in some occasions there were some irregularities but were easily corrected. Updating the water system is important but the most important process is to maintain it. Therefore, water samples were required in a monthly basis that included checking the chlorine levels of the water. Keeping monthly records of how much water passes by the well pump was important for the forest engineer for his report of the water use that is due every year. This internship and working for some great supervisors, forest engineer Antonio Cabrera and environmental engineer Edward Dietz, was an excellent experience that helped me grow professionally and advanced academically.

Appendix A:

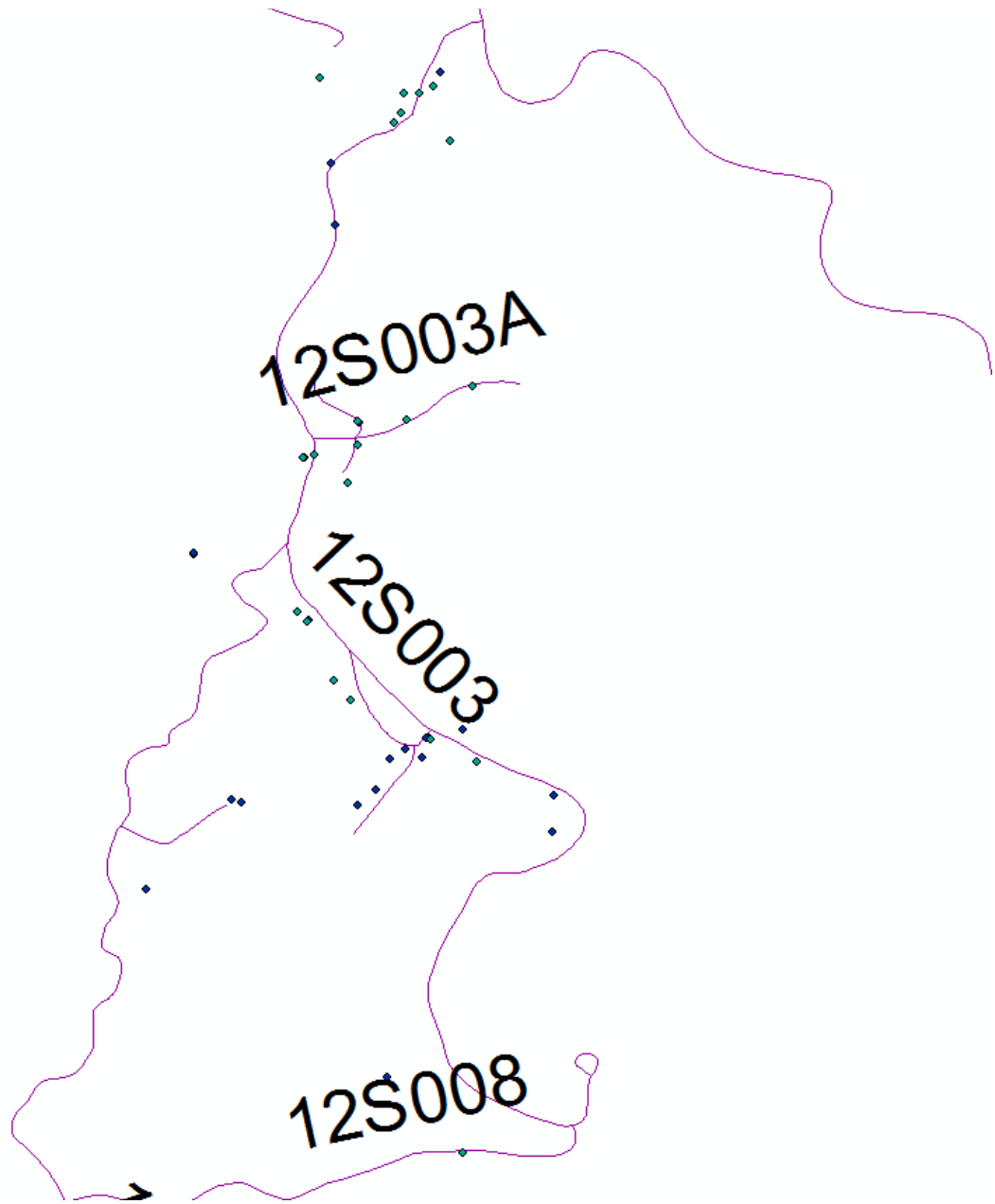


Figure 1. Trimmer Work Center is Located in the Sierra National Forest near Trimmer California. The points that we are able to see are GPS point that were survey, during the process of it, a Trimble device needed to be used. The program that was used to see the map and the data was ArcMap. The points that can be seen in the road are valves; fire hydrants, faucets and they are all part of the water system. The Trimmer Work Center was one of the main work stations that I worked on and submitted paperwork.







