
MEMORANDUM

TO: MARGERET LANG
FROM: JACOB TURNER
SUBJECT: REVIEW OF ARCATA WASTERWATER TREATMENT PLANT FIELD TRIP
DATE: OCTOBER 2, 2016

Purpose

The purpose of this memorandum is to present a rundown of the field trip taken to the Arcata Wastewater Treatment Plant on September 30th, 2016 at approximately 8:30 a.m. in Arcata, Ca. Various data and information, such as: the average effluent volumes of the plant, how the sludge is managed, and BOD5 at particular stages of the process will be included.

Discussion

The first apparent observation upon arriving was the extremely distasteful smell which, according to our guide, came from the anaerobic digesters and the open settling/filtering tanks. Once at the location of the primary treatment our guide discussed with us the varying effluent volumes that occurred during the different seasons. Where it was found that during the current fall season the plant will see an average volume of 1.1 million gallons of wastewater daily. This is seemingly miniscule when compared with their effluent volume during the rainy season (Nov or late Dec) of about 7-8 million gallons. This huge increase is due to heavy rains in winter and recovery seasons. The dry summer intake of the plant may imply even further microscopic volumes of only 7-8 hundred thousand gallons per day. This summer effluent volume is largely due to the absence of much of the student population and the lack of the vast rains/moisture of other seasons.

Subsequently, the secondary treatment was shown to the group. This stage largely involves degrading the biological matter in the sewage by utilizing the wildlife (plants) of the treatment wetlands. However, before being passed onto the treatment wetlands the wastewater first travels through a clarifier to settle out organics and sludge. The wastewater is then transported to the oxidations ponds to degrade the organic matter in the water further. The sludge is separated at the bottom of the clarifier and taken to the anaerobic digester. The central purpose of the digester is to separate the solid waste from the liquid, which is then taken to the sludge drying beds. After the sludge completely dries it is composted and eventually made into fertilizer to be used at various grassy fields in the city.

Lastly, the water is transported to the enhancement wetlands (the tertiary treatment) where it is provided one last opportunity to improve the quality, before it is sent out to be disinfected and then de-chlorinated and released into the ocean. Once it is discharged into the ocean the final BOD5 of the water should be between 20 and 30 (mg/L). This number is drastically reduced from the 60-70 (mg/L) that is measured when it comes out of the primary treatment. The nearly 50% decrease in BOD5 is partially due to the biological nutrient removal that naturally occurs in the enhancement wetlands. The entire process from pre-treatment to de-chlorination is incredibly efficient as the water generally comes into the plant with a BOD5 between 200 and 250 (mg/L) and leaves with the 20-30 (mg/L) needed to be released.

Conclusion

The field trip to the Arcata Wastewater Treatment Plant allowed the lab group an opportunity for hands on learning and a real world depiction of in class learning material. In addition, the group was given access to a primary source of information, the lead plant operator. This meant many students were able to inquire about and draw from her experience, thus making further connections between the design facet and experience aspect of any environmental engineers job.