SWANA Application Essay

By Luke Moser

The United States generates roughly 300 million tons of solid waste each year, with approximately 50 percent of this waste going to landfills. Landfilling solid waste is the most common method used to manage waste. With this approach, large amounts of land are required for appropriate waste disposal and increased measures need to be taken to ensure environmental safety. As a result, civil and environmental engineers play a crucial role with the design and development of these structures and ensuring the enforcement of safety regulations and structural standards. My major in civil engineering will provide me with tools and education needed to contribute to improving the waste management practices and to minimize its impact on the environmental footprint.

The designing and permitting of landfills will provide future generations with the disposal space needed for population growth and a means to protect the environment. From initial concept to final construction, civil engineers use their skills to determine if a site is suitable for landfill placement, to plan and construct infrastructure in all phases of solid waste facility design, and to provide efficiency updates to existing facilities. Although I do not know where my career will take me, my passion is the construction of these environment protecting structures. Moving earth to create space, and building disposal cells is an interesting experience that I have seen through my summer work at the Rolling Hills Landfill. The amount of design, equipment, labor, and geosynthetic materials required is overwhelming. As an engineer I will be tasked with maximizing efficiency and designing a suitable subgrade that will provide stability for waste placement. I believe there are steps we can take to lessen our environmental impact and improve sustainability while providing an effective solid waste facility design.

One underutilized approach to achieve this improved environmental efficiency is to convert land from old strip-mining quarries into current day landfills. With this approach, the infrastructure from the quarry has already been created, which minimizes the need for additional resources to build roads, buildings, and stormwater management systems. The mining process will have also created the floor of the landfill, resulting in less excavation need with the initial landfill construction. In addition, the pre-existing quarry will have already had a buffer zone established. This results in immediate possession of appropriate land size and lessens instance of new residential impact. It is also important to note that community traffic patterns would remain relatively unchanged. With this approach, we would maximize use of our natural resources by reclaiming this unusable space and making it productive again.

Another area in which we need to improve with landfill development is maximizing renewable energy solutions. For existing active and closed landfills, there are many opportunities where energy efficient structures can be incorporated, and energy can be generated. This can be achieved by integrating smart infrastructure in the landfill. Energy

can be generated through solar power by adding solar panels, or through wind via construction of windmills. Energy can also be produced by landfills by capturing and burning of the methane gas that develops from the waste decomposition. This process not only produces energy, but it also prevents this gas from escaping into the atmosphere as a greenhouse gas.

Overall, I believe we need to create more solid waste facilities as the world's population continues to grow and produce more waste every year. This action needs to happen fast since airspace is rapidly filling up, and the process to generate new, environmentally safe, sanitary landfills can take years. With more efficient designs, strategic use of natural resources, and incorporation of smart infrastructure to generate energy, we can improve landfill efficiency and develop a sustainable eco-friendly future.