

All grand projects and innovations begin as an idea; however, in order to bring those ideas to life, appropriate research is required. The Las Vegas Strip Wastewater Odor Remediation Project started as an idea between three engineering students and their professor, and after many months of research it turned into a civil and environmental engineering project. The two objectives of the project were to complete the engineering capstone course and also to compete in the engineering senior design competition. The capstone course in engineering is a crucial course as it incorporates all the knowledge and experience acquired during a typical four years of intensive study. The Las Vegas Strip Waste Water Odor Remediation Project was unique in the various sources of research it utilized: the experience of academic and professional advisors, the vast and diverse knowledge in library resources, and the minute details and expertise acquired from field work and engineering consultants.

We had the privilege to work with College of Civil and Environmental Engineering's Dr. Jacimaria Batista and Clark County Water Reclamation District's (CCWRD) professional engineer Bryan Osborne. Dr. Batista served as our academic guide in the research project, while Bryan Osborne provided valuable firsthand experience in the area that we were researching. Dr. Batista's 14 years of experience in wastewater treatment, research and teaching was fundamental in guiding us to narrow in on important aspects and design a meaningful project that would benefit the Las Vegas metropolitan area. With the help of Bryan Osborne we had access to CCWRD resources, which provided us with data such as pipe system layout and hydraulic characteristics at our project's location. We utilized CCWRD's GISQ and Flowmaster software for much of this data.

Throughout our project we referred to traditional methods of research in the Lied Library. The Scopus and Compendex databases were used extensively to locate scholarly articles in order to compose our literature review for each alternative odor technology. We stumbled upon several dead ends in our research due to vocabulary, so we had to broaden our search topic at these times. At other times, our searches returned too much irrelevant material and we had to narrow down our scope in order to find the information that we needed. In some instances, when we could not access articles through these databases, Google Scholar was used to acquire the articles. We also took a few days to find books that dealt with our topic and could provide us with useful information. We indeed found many books that were used in our written report. The library was the most efficient place for us to complete our research due to the access it provided us to the databases, books, study rooms and coffee to keep our spirit up.

In order to gather all the information needed, we had to change our research strategy to extend beyond traditional research methods used by students, such as advisors and textbooks; we had to conduct fieldwork and reach out to manufacturers and engineering firms. Along with these items, research was done on previous CCWRD projects that were similar in scope to ours and field work was conducted by taking a trip around the CCWRD. During the trip, photos were taken of odor control technologies that have been implemented at CCWRD. The information and photos gathered were used to give us an idea of the design of the technologies. We also visited our project site to determine the extent of the odor issue. We had to interact with manufacturers and consultants in order to fully design our alternative technologies. Once we had completed our design, the cost analysis of the odor technologies became a constraint. It was very difficult contacting the source of the information, manufacturers, but after hard work and a lot of patience we were able to come to a reasonable cost for our project.

The Las Vegas Strip Wastewater Odor Remediation research and design project resulted in more than an “A” in our capstone senior design class. Our group had the honor of receiving first place for the Harriet & Fred Cox Civil and Environmental Engineering Design Award. More than a grade or plaque, we’re taking with us the satisfaction of providing Las Vegas with a project report that is a potential solution to one of its problems. Literally speaking, civil and environmental engineering is the foundation of today’s society. As we ponder on this experience, we must admit that this foundation would unquestionably be brittle and unstable without proper research.