

## **Abstract**

### **Traffic and Safety Improvement at a Busy T-Intersection**

**Project Description:** A T-intersection at a county road with a heavily used hiking trail nearby posed safety hazard to drivers, pedestrians, and bicyclists. There was a wetland nearby that also had to be considered in the improvement plan. The county approached the university, and this real-life problem was assigned to a team of five civil engineering seniors as a yearlong, capstone project.

The team studied the site conditions and the factors causing the problems. Thereafter, it developed three alternatives to improve the intersection: (i) a roundabout, (ii) three-way stop and (iii) traffic signalization. The team then evaluated these alternatives for traffic collision reduction, non-motorized user safety, traffic operations, construction and maintenance cost, environmental impact, and right of way acquisition. By developing a decision matrix and comparing the above alternatives against a no-build option, the team selected traffic signalization (alternative iii) as the preferred alternative.

The team took the preferred alternative to 30% design which involved detailed traffic analysis and roadway design, stormwater improvement, wetland mitigation, identification of utilities to be relocated and preliminary cost analysis. The team produced a set of professional quality engineering drawings for the county.

#### **Collaboration of Faculty, Students, Licensed Professional Engineers and other Allied**

**Professionals:** The students were mentored by two engineers from the county (a PE and an EIT) and two faculty members (a PE and a PE-PLS). At various stages of the project, county managers, construction personnel and a drafter provided the assistance needed for the team to successfully complete the project. The team presented its work to the department advisory board which consists of eight PEs and received feedback. Near the end of the academic year, the team participated in a local engineering competition, where the work was judged by a panel of five PEs.

**Benefits to Public Health, Safety and Welfare:** The impetus for the project was pedestrian, driver and trail user safety and welfare at the intersection. Stormwater and detention facility evaluation and wetland mitigation issues provided an appreciation for public health and welfare.

**Multidiscipline and Allied Professional Participation:** This project encompassed multiple disciplines: transportation for roadway design, water resources for stormwater and detention facility design and environmental engineering for wetland mitigation. The team was also exposed to construction and cost estimation. A drafter from the county guided the students in preparing professional quality engineering drawings.

**Knowledge and Skills Gained** Students learned to apply what they learned in their coursework to a real-life project. The team used federal, state and county design guidelines, a transportation modeling and a professional drafting software in coming up with a solution. The team improved its oral communication skills through several presentations to their class, the county and professional organizations, and written communication skills through the preparation of memos, proposal, and report to the county. The team learned to work in a hybrid (in-person and virtual) environment. The students also had the opportunity to develop project management and leadership skills through teamwork: time management, scheduling, and learning to run professional meetings.