IOWA STATE UNIVERSITY
Department of Electrical and Computer Engineering

Senior Design Project Proposal Form

Client/Company/Organization: Troy Foreman, Alliant Energy

Submitter Name: Mat Wymore **Email:** mlwymore@iastate.edu

Project Contact: _____ **Email:** _____

Project Title:

Underground Cable Packing Web Tool

Project Abstract:

Many electric utilities are shifting to underground cabling to better withstand disasters such as the derecho that tore through Iowa in the summer of 2020. In order to streamline billing for underground cabling contractors, ISU's Electric Power Research Center (EPRC) and Alliant Energy have developed a prototype software tool that automatically determines the smallest of a set of bore sizes into which a given set of underground cables and ducts can be (ideally) packed. The goal of this senior design project is to expand on this tool, primarily by transitioning it to a web application that will be hosted by EPRC. This will make the tool readily available, in the office and in the field, for Alliant, cabling contractors, and other EPRC members. The project will also add new features to the tool, including enhancing the packing algorithm. The project is expected to involve full-stack web development in a stack chosen by the team, with the constraint of compatibility with EPRC's current website.

Expected Deliverables:

September 2021: web stack selection
October 2021: web application design and algorithm design
November 2021: continued design and initial proof-of-concept
December 2021: design review
February 2022: implementation
March 2022: implementation
April 2022: final web app, iteration, demonstration, presentation, and reporting

Specialized Resources Provided by Client:

None

Anticipated Cost: _____ **Financial Resources Provided by Client:** None

Preferred Students for the Project:

- ☐ Electrical Engineering
- ☑ Computer Engineering
- ☑ Software Engineering
- ☐ Cyber Security Engineering
- ☐ Other:

Other Special Skills: Web development, algorithms

Anticipated Client Interaction (estimate):

- ☐ 1 meeting per week
  - ☐ In person, ☐ Over the phone, ☐ Web / video conferencing

☑ 1 meeting per month
☐ In person, ☐ Over the phone, ☑ Web / video conferencing
☐ 2 or more meetings per month
☐ In person, ☐ Over the phone, ☐ Web / video conferencing
☐ 1 meeting per semester
☐ In person, ☐ Over the phone, ☐ Web / video conferencing

Meeting ABET Criteria

Please rate the following statements as they relate to your proposed project:

0 – Not at all *1 – A Little* *2 – Somewhat* *3 – A Lot* *4 – Completely*

On this project, students will need to apply knowledge of mathematics, science, and engineering	☐ 0	☐ 1	☐ 2	☑ 3	☐ 4
This project gives students an opportunity to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	☐ 0	☐ 1	☐ 2	☑ 3	☐ 4
This project involves students from a variety of programs, i.e., CprE, EE, and SE	☐ 0	☐ 1	☑ 2	☐ 3	☐ 4
This project requires students to identify, formulate, and solve engineering problems	☐ 0	☐ 1	☐ 2	☑ 3	☐ 4
This project gives students an opportunity to use the techniques, skills, and modern engineering tools necessary for engineering practice	☐ 0	☐ 1	☐ 2	☐ 3	☑ 4

Project Approval – *for use by ECpE Senior Design Committee*

☑ Approved: sdmay22-proj022
☐ Project Assigned: _____
☐ Advisor(s) Assigned: _____
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