**Project Description**
A five-person student team prepared this project for Lakefront Park enhancements by working with a local nonprofit organization dedicated to the improving and protecting local lakes. The student team also attended three public meetings and received input through a preliminary report on the lake's waterfront. Four main goals guiding the project include:

1. Improved water quality and swim-ability
2. Improved park sustainability
3. Enhanced accessibility for all
4. Increased lakewater use and placemaking

**Protection of Public Safety**
Public safety and community considerations for Alternative 2 include:

- **Crosswalk Improvements** - The park is visited by up to 4,000 patrons a day, most of whom reach the park by passing over the adjacent U.S. Highway. Two adjacent intersections were recently the location of fatal vehicle-pedestrian accidents. This project simplifies those two intersections, installs pedestrian push buttons, and adds a bicycle queuing area.

- **Underpass** - The underpass will provide pedestrians and cyclists with a way to safely access the Park and lakewater bike trail. The underpass helps achieve the City’s Vision Zero Initiative by reducing the likelihood of vehicle-pedestrian accidents.

- **Boardwalk/Pier Railings** - Along the edge of the 12-foot-wide pier and boardwalk, 48-inch guardrails are incorporated to protect the public from fall hazards associated with the elevated boardwalk structures.

**Design Alternatives & Selection**
The student team developed three design alternatives, with all designs featuring a wetlands area defined by a boardwalk, stepped shoreline seating, beach and protective enclosure, pier, pavilion, stormwater screening devices, and road intersection modifications. Unique features of the alternatives are listed below.

- **Alternative 1** features the largest area of rain gardens and a single-story pavilion with two docks near the boardwalk for canoe/kayak access.

- **Alternative 2** includes a bike/pedestrian underpass below the adjacent U.S. highway, a smaller section of rain gardens with two green spaces on either side, a canoe/kayak path under the boardwalk, pavilion structure over the water, and an ADA-compliant canoe/kayak launch.

- **Alternative 3** includes an underpass in addition to a pedestrian bridge over the U.S. highway that connect the lakewater to the downtown, large boathouse over a floating boat dock, rain garden with green space near the stepped shoreline seating, and multiple ADA-compliant canoe/kayak launches.

Team attendance at three public meetings, two team presentations, and three Client/student team conferences provided valuable information and feedback for the Client and student team. The Client ultimately selected Alternative 2 for its ability to best meet the project criteria, while safely connecting the park and downtown area by including the pedestrian bridge and underpass.

**Multidisciplinary Collaboration**
Students collaborated with engineering professionals, the Client, and public during three meetings and a team of six judges during two formal presentations. They also worked with seven course instructors and three mentors during weekly in-person meetings. This collaboration spanned a full semester, resulting in guidance and instruction from:

- 6 P.E.s offering course instruction and special topics presentations
- 2 P.E.s and 1 PLA serving as team mentors
- 2 P.E.s serving as presentation judges
- Other industry professionals including individuals with chemical and mechanical engineering degrees, a professional hydrologist, geotechnical engineer, and an EIT.

**Knowledge & Skills Gained**
The team learned many skills during the proposal, preliminary design, and final design of this project, including:

- Experience in different code referencing and software
- Navigating USACE, State DOT, and IBC manuals to generate feasible solutions while meeting State environmental regulations, which was a significant portion of the design process
- Working with AutoCAD, Civil3D, and SketchUp, significantly increasing familiarity and proficiency with these programs
- Building their interpersonal skills and balancing team dynamics due to the large scale, multidisciplinary requirements of the project.
- Professional communication with other team members, the Client, and their staff, mentors, and course professors, helping them to prepare for collaborative, multidisciplinary projects in their future careers.
- Analysis and design in six civil engineering disciplines: coastal, environmental, geological, hydrologic, structural, and transportation.