

Lakefront Park Improvements

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 lakefront use and placemaking

Protection of Public Safety

Public safety and community considerations for Alternative 2 include: are summarized below.

- **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 lakefront 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.

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.

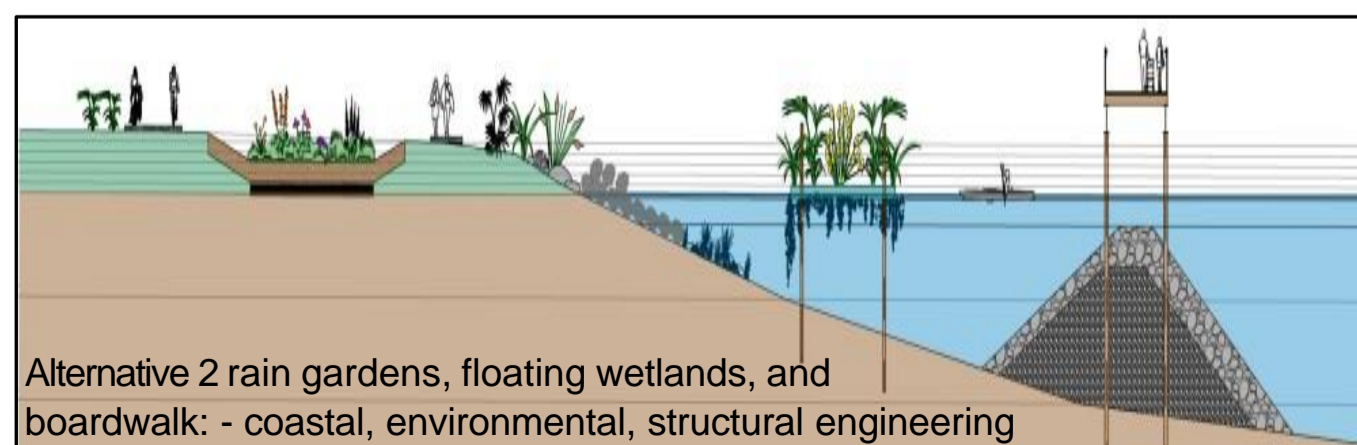
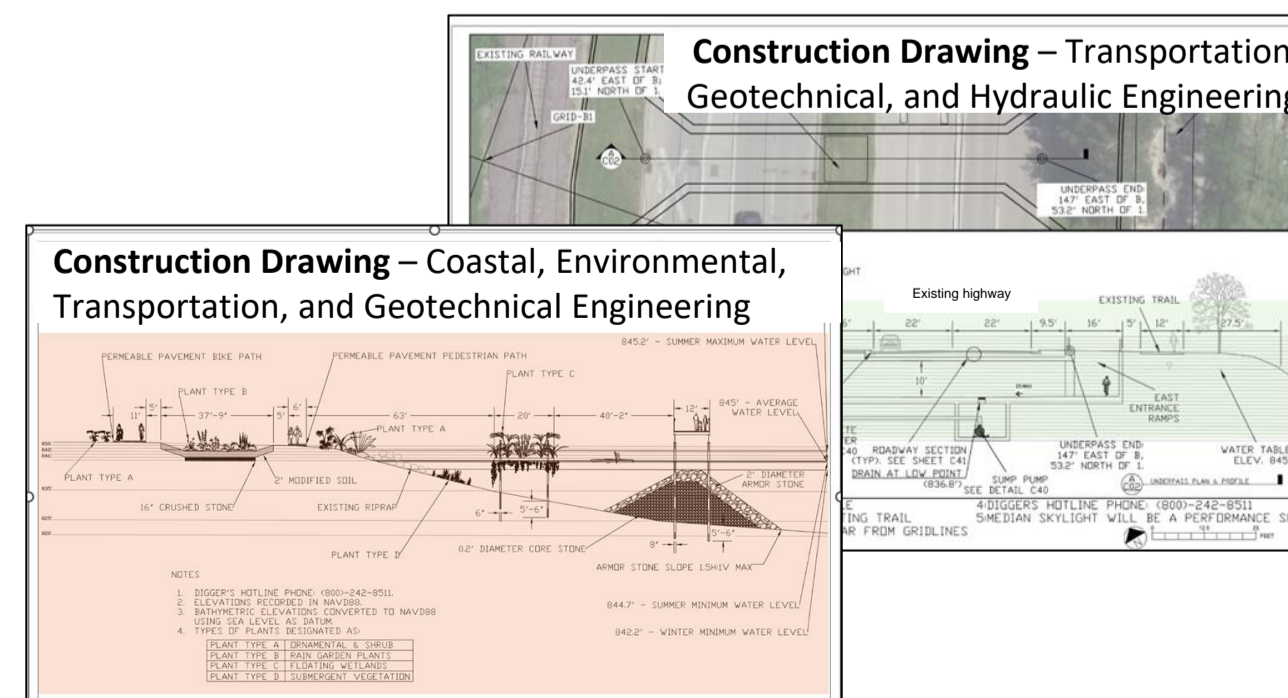
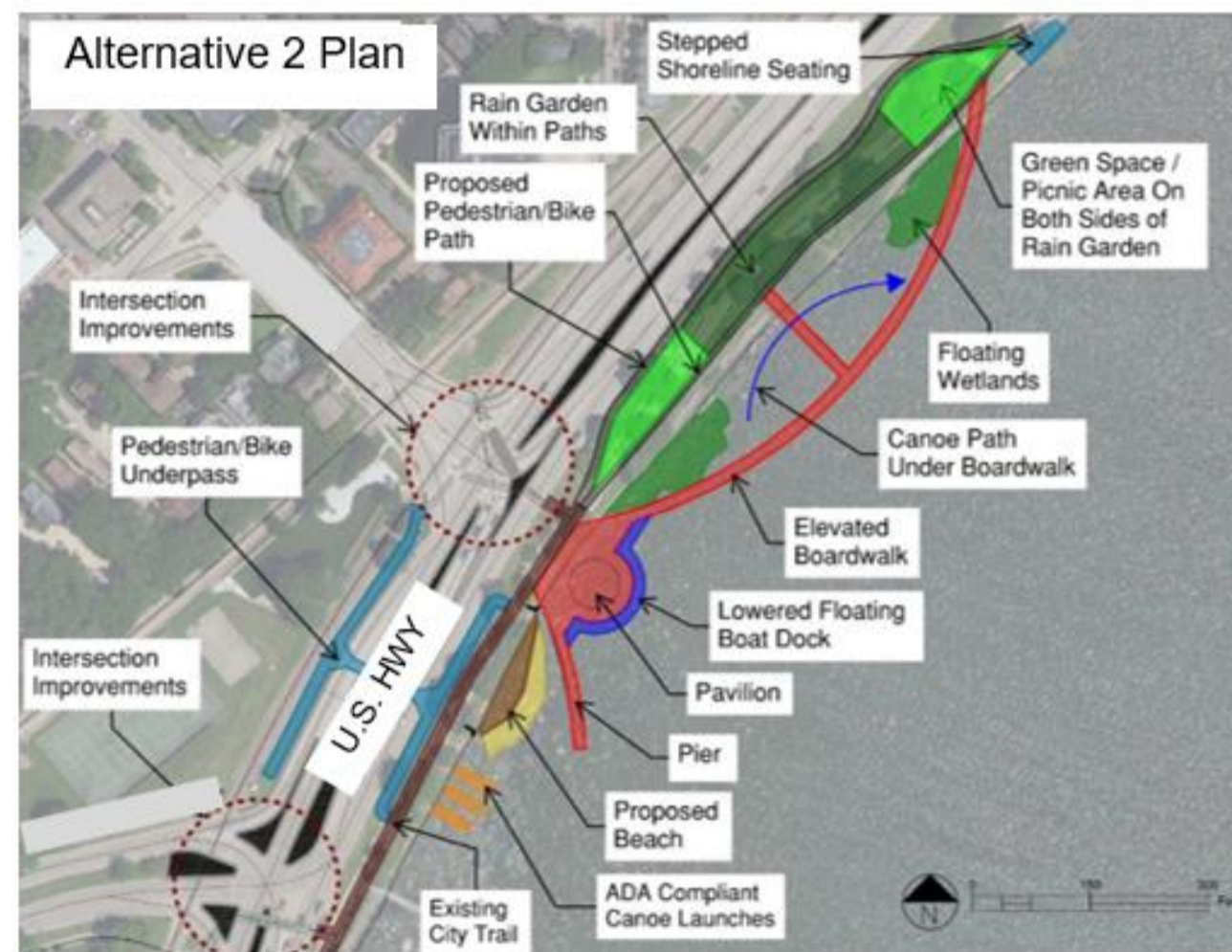
Design Alternatives & Selection

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 lakefront 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.



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 prepare for collaborative, multidisciplinary projects in their future careers.
- Analysis and design in six civil engineering disciplines: coastal, environmental, geological, hydrologic, structural, and transportation.