Grand River Rapids

Background & Objective
Over the last few years, a growing number of kayakers and whitewater rafters have shown interest in a project that would make the Grand River safer for passage and enhance the aesthetics of the river in the downtown area. Grand Rapids Whitewater, a non-profit organization, has been created with this goal in mind.

Working with Grand Rapids Whitewater, our objective was to design a whitewater kayak course on the Grand River through downtown Grand Rapids. This design was meant to create safe passage for kayakers over/through/around the dams as well as make the river more aesthetically pleasing. Our design included computer modeling of the hydraulics of the river and the use of a benchtop model of the downtown area to simulate flows in the Grand River.

4th Street Dam Stair Step
The 4th Street Dam is a safety hazard because of the dangerous undertow created at the base of the dam. This undertow has a drawback effect which is deadly.

To mitigate this issue, a stair step structure is proposed on the downstream side of the dam. This will break up the undertow making it safer for people to fish downstream and kayak in the area. This design is shown in the figure below.

Site Planning
One goal of this project was to make the river more accessible so that when the dams are altered the waterway will be safe and easy to traverse. Without the addition of access points, the construction and alteration of the dams will be useless because people would have no way to enjoy the river.

Four access points were chosen to increase the usability of the river; two sites were chosen on the east side and two on the west side. They create a mile of access to the river, spanning both sides of the 4th Street Dam.

Floatable docks were also recommended for the river. These provide convenient access into and out of the river despite seasonal water level fluctuation.

Security lighting for the access points and signage for kayakers were also included in the scope of the site planning.

Conclusion
Team Grand River Rapids has created a design which meets the needs of our client, is environmentally conscious, and employs engineering techniques which stretched our learning outside of the classroom.