

Senior Capstone Project 2023-24

Phase 2: Riverwalk Development

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University of New Hampshire

Introduction

The Riverwalk Development in Lawrence, MA, is undergoing redevelopment along the Merrimack River. The area, once a major mill area, is now being repurposed into a prospective area of economic growth. Phase 2 of the project aims to develop a 2.4-acre lot into an apartment building, with a restaurant and parking structure. The proposed development includes architectural design, site planning geotechnical, structural, and drainage components.



Site Restrictions

The site had many physical design restrictions including:

- The topography of the site,
- Other buildings at the location
- Utilities on site.
- Adopting the Riverwalk next to site.



Site Plan



The process of developing a site plan took the following aspects into account:

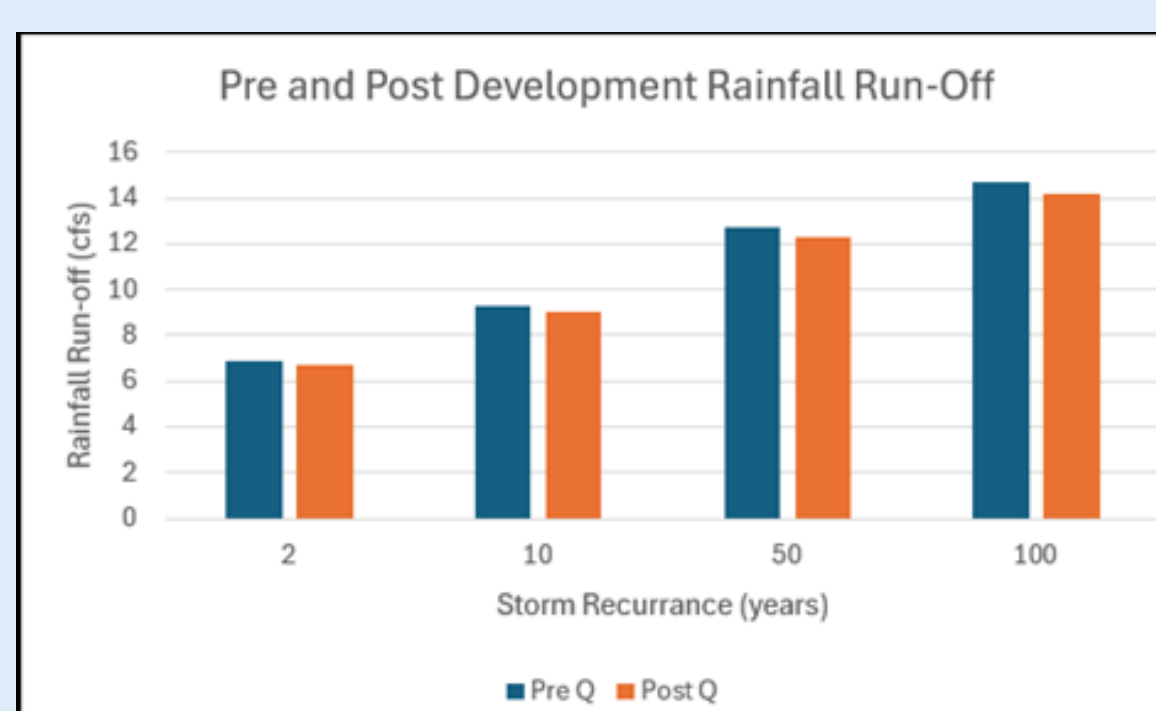
- Criteria provided by TEC includes 120 apartments, restaurant area, and adequate parking.
- Zoning ordinances were studied to include restrictions and guidelines on building height, setbacks, and permits.
- Parking capacity was a key design factor in the shape and layout of the building:
 - 340 spaces needed
 - ADA and EV charging spaces
 - Ramps and Parking Garage

Autodesk Revit Model



Additional Design Elements

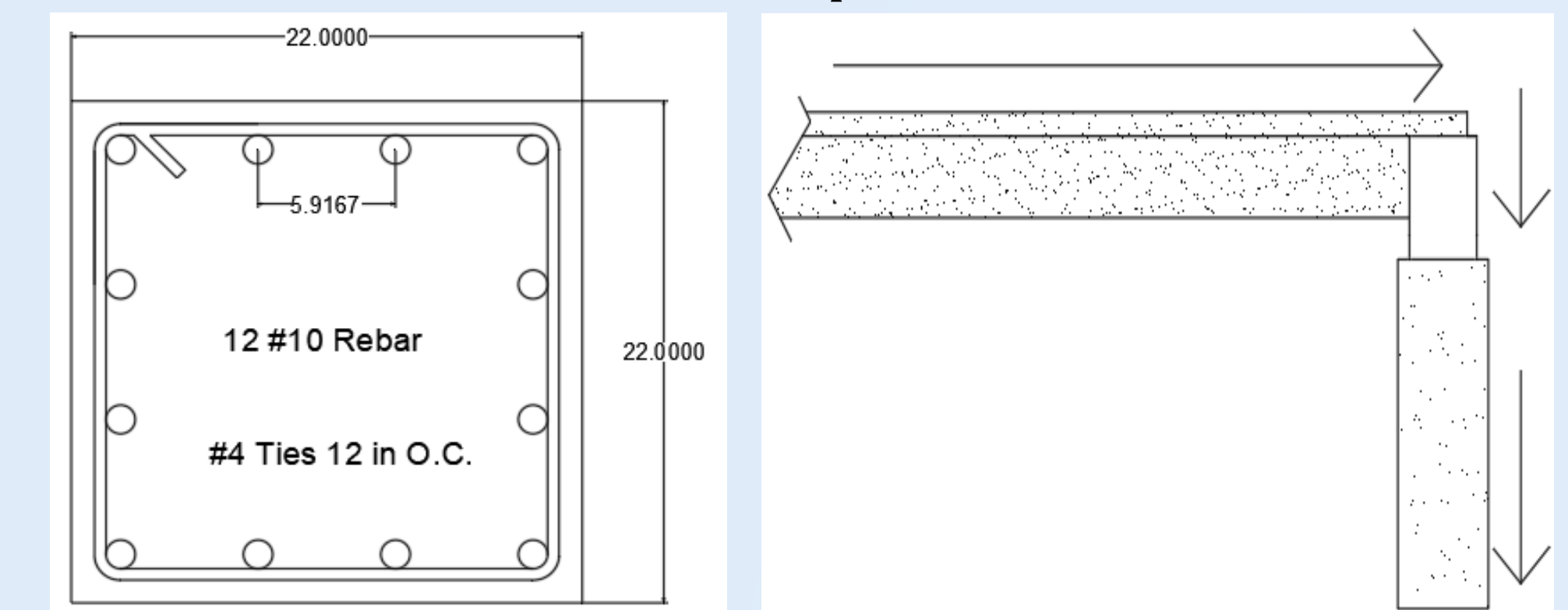
- The team was dedicated to propose a sustainable building design. LEED credits were used as guidance, including EV charging, green space and material selection.
- The rational drainage method was used to estimate the proposed site improvements will produce less drainage runoff post construction.



Structural Design

Our building was designed as 2 structures, the first one being the parking garage, which was made of large concrete elements. And the second being the apartment building, which incorporated steel structural members.

- Concrete deck: 128-D1 precast double T section
- Concrete columns: ACI 318
- W Beam Sections
- All other elements were case specific



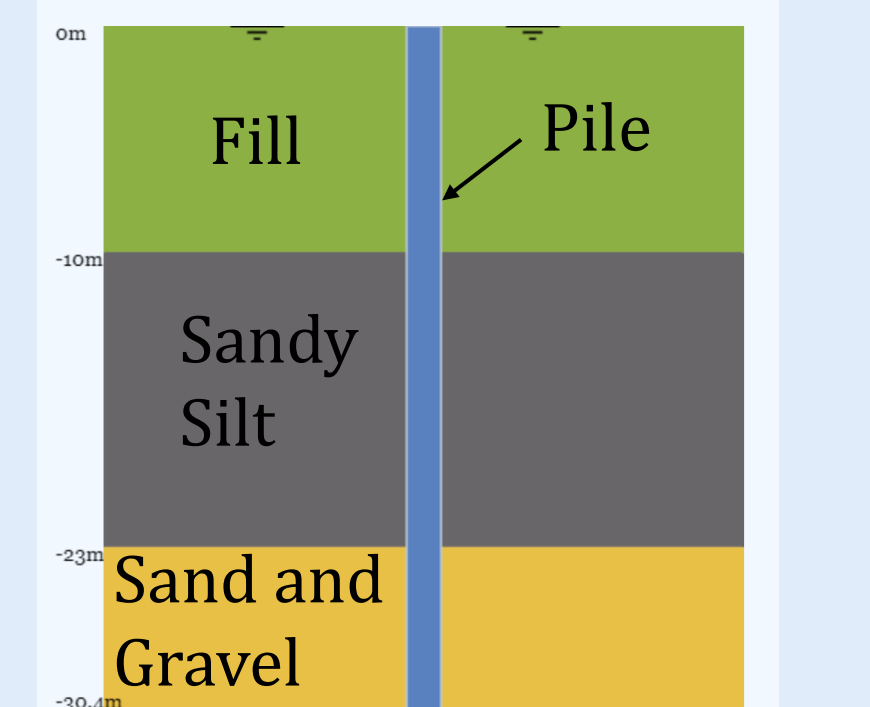
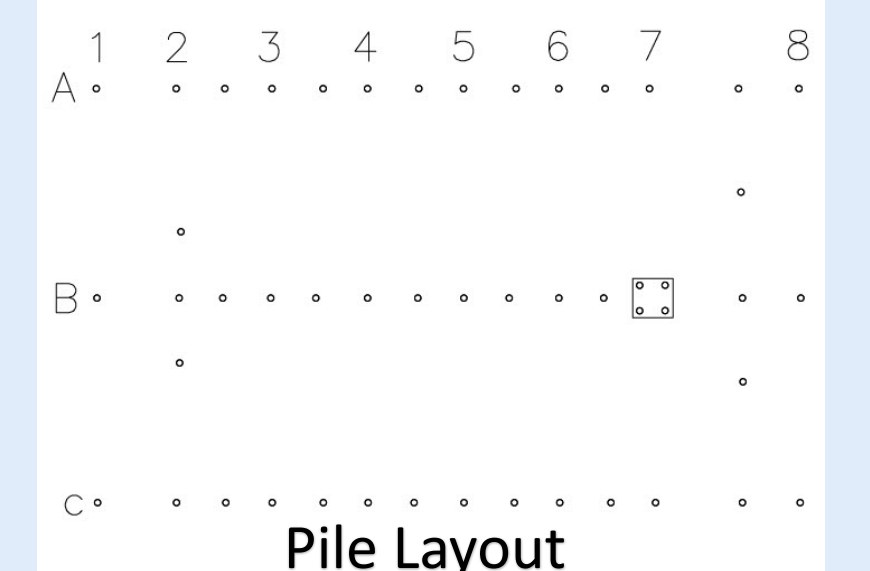
Column Cross-Section

Load Paths

Geotechnical Design

The foundation was designed using deep piles. Using boring logs, a soil profile was determined which allowed for use of the Perdue Method for shaft resistance and Meyerhof's method for base resistance. The pile properties include:

- Driven Steel Pipe Piles
- Sit on Bedrock
- 22 inch Diameter
- Placed below building columns
- 30.4 feet long



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