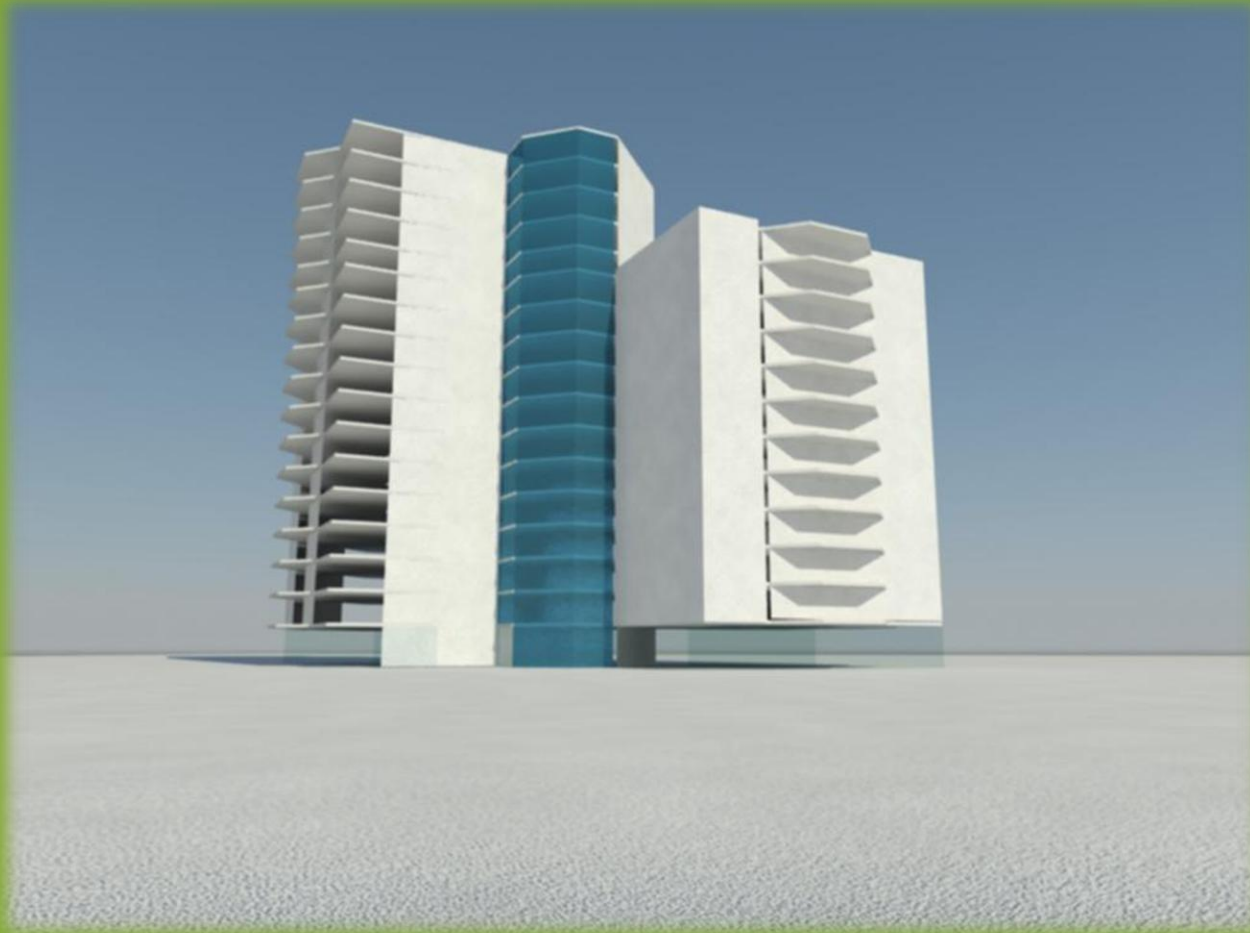


I^{PRO} 315

Design of a Large Scale Structure

Architectural Rendering



Objective

- ❑ To design a sustainable modern and efficient residential building on Illinois Institute of Technology's campus, replacing an outdated and unsightly graduate dorm.
- ❑ Use advanced design techniques to facilitate both the initial design and subsequent revisions.

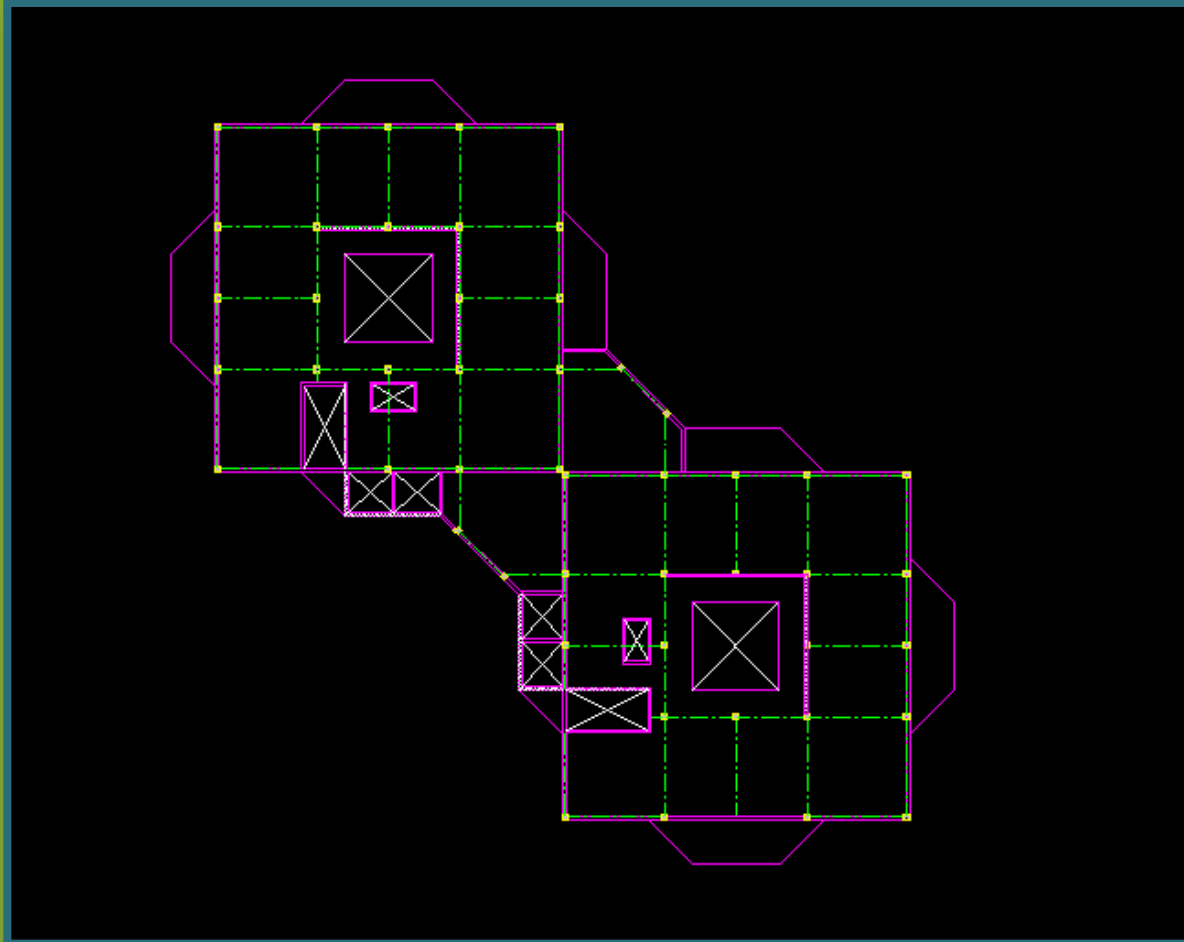
Team Organization

- ❑ Structural Design & Analysis
 - ❑ Responsible for design of a complete structural system incorporating precast structural concrete.
- ❑ Foundations
 - ❑ Responsible for the analysis of existing soil conditions and design of a foundation system and basement structure for the proposed building.
 - ❑ Responsible for examining the existing site and utilities and creating a civil site plan

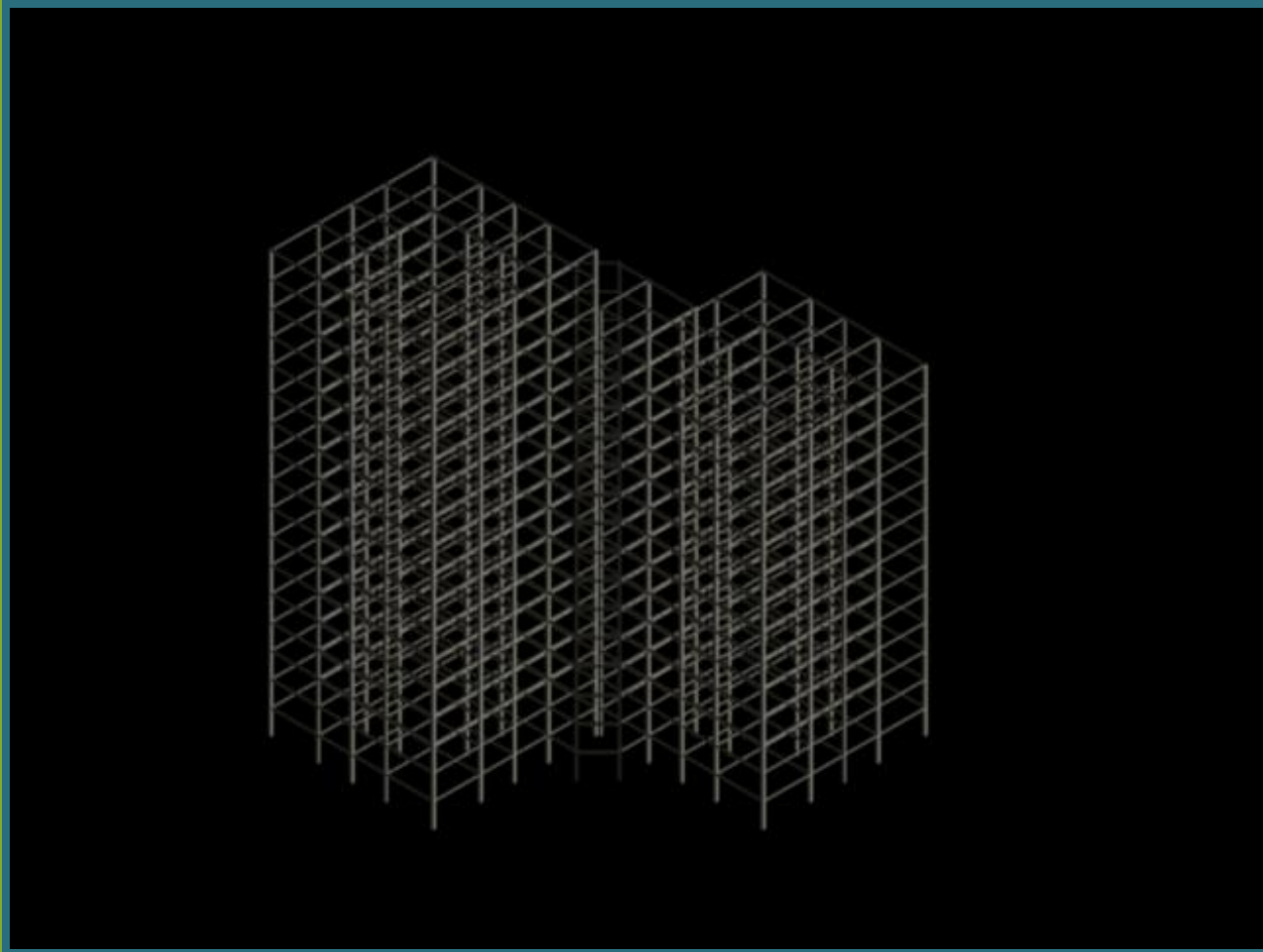
Structural Design & Analysis

- ❑ Coordination with architects from IPRO 335
- ❑ Choose structural system
 - ❑ Using precast and cast-in-place concrete
 - ❑ Gravity load bearing system
 - ❑ Lateral load resisting system
 - ❑ Shear wall and moment frame dual system
- ❑ Lay out column grid & floor system (in progress)
 - ❑ Determine column locations and girder spans
 - ❑ Calculate column, girder, and beam loading

Structural Layout



Structural Model



Structural Design & Analysis

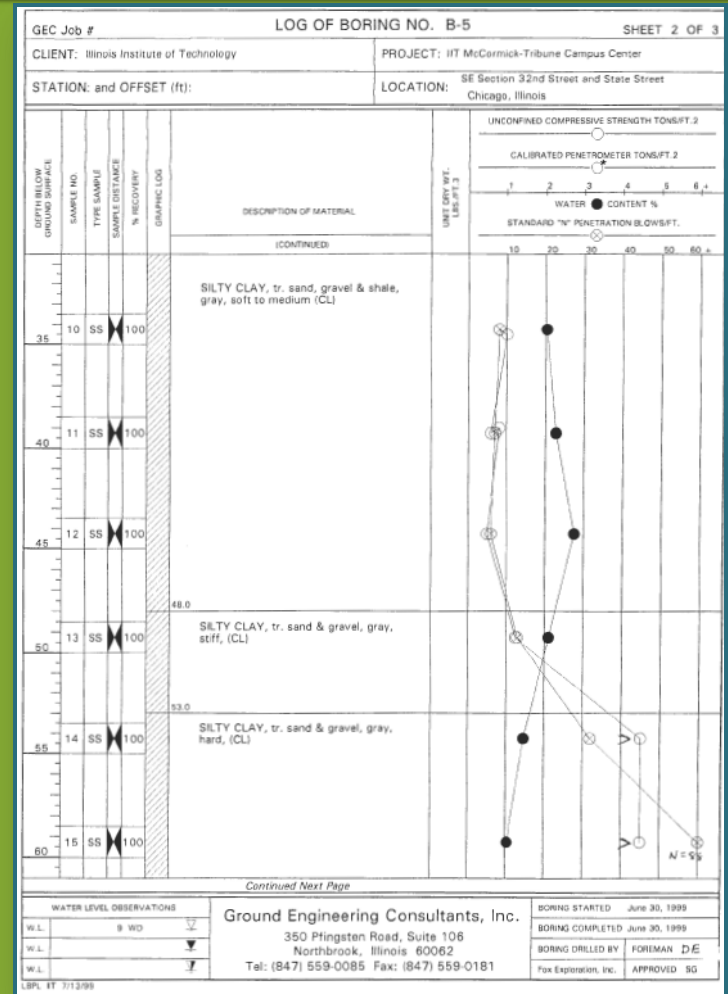
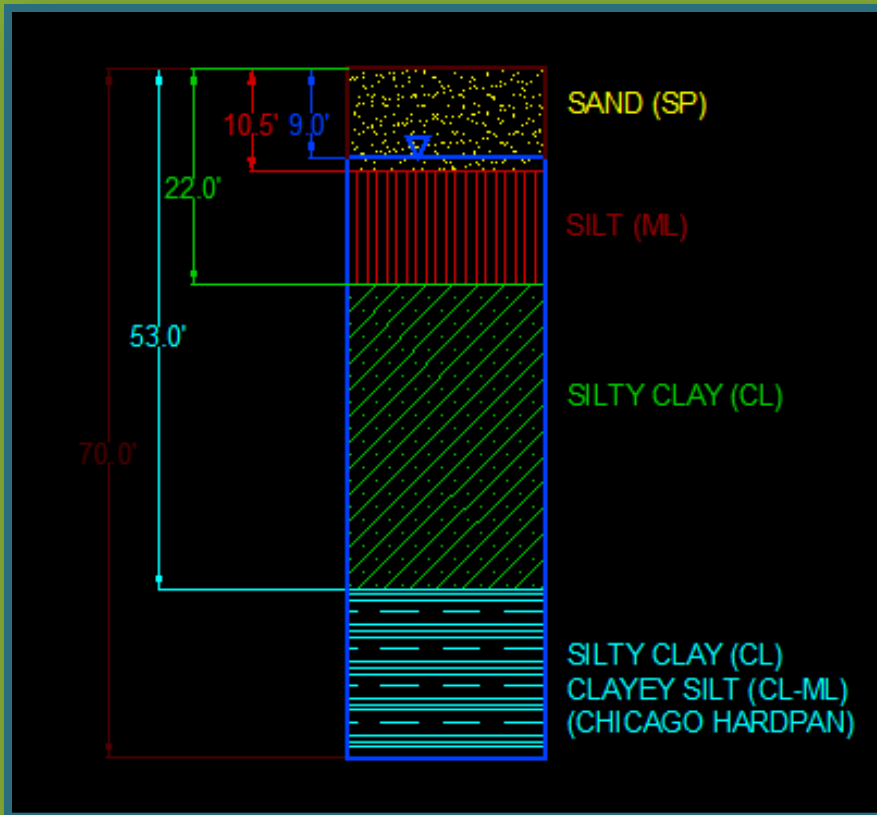
Looking forward:

- ❑ Sizing structural members
- ❑ Analyzing structural integrity and strength
- ❑ Follow current design codes (ACI 318 and CBC)
- ❑ Use computer-aided analysis programs to facilitate analysis

Foundations

- ❑ Research and analysis of existing conditions
 - ❑ Obtained soil boring logs from MTCC construction defining the properties and depth of the soil strata.
 - ❑ Acquired existing site plan and utilities map from IIT Facilities department
 - ❑ Planned site visit to identify utilities and obstructions

Soil Boring Log



Foundations

- ❑ Selection of Foundation System
 - ❑ Drilled reinforced concrete caissons extending to the hardpan layer
 - ❑ Sheet pile retaining structure and dewatering system to allow construction below the ground water table
 - ❑ Construction methods used to minimize site impact and disturbances to surrounding area.

Foundations

□ Looking Forward

- Site visit to identify and locate utilities and obstructions to construction
- Calculate allowable bearing pressures for the existing soil
- Coordinate with the Structural Analysis team to determine the required foundation capacity
- Design foundation system to safely carry the weight of the structure and prevent large settlements of the structure, following ACI 318-05 and CBC.

What Lies Ahead

- ❑ Continued cooperation with IPRO 335
 - ❑ Design revisions, support on engineering issues
- ❑ Design and Analysis of Load Bearing Systems
 - ❑ Structural system
 - ❑ Foundation system
- ❑ Finalization of Site plan and Excavation Procedures
- ❑ Questions