SMBH
STRUCTURAL ENGINEERING

SE UNIVERSITY
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Lecture Three - Design and Coordination

The Design Team

- Owner/User
- Architects
- MEP Engineers
- Soils Engineers
- Civil Engineers
- Construction Managers

WHAT DO THEY DO?

(Straight from the source)

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Owner/User

- Tells the design team what functions the building needs to serve
- Sets the project budget
- Sets operating/performance criteria
- Sets goals for efficiency of systems and ease of maintenance requirements
- Balances planning for the future with today's budget and needs

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Architect(s)

- Assist in development of a Program of Requirements for a client (identify their needs).
- Through interaction with the client; Identify their needs and match the design form to those needs in a creative way.
  - Determine building footprint & shape, number of floors, layout of rooms, floor to floor & building heights
  - Aesthetic of building interior & exterior

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Architect(s)

- Assist in developing a budget and schedule, and remain conscious of both throughout the process.
- Understand and Evaluate Code Issues
- Select Materials for specification
  - Select & specify things like roofing, windows, doors, interior finishes, cladding types & materials

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MEP Engineers

- Mechanical Electrical & Plumbing
- Design the interior environment for water/sewer services, climate control (HVAC)and lighting to meet the space needs.
  - Select appropriate equipment
  - Layout piping, duct work & conduit
- Coordinate requirements for efficiency & sustainability with owner/user

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MEP Engineers

- Design life safety systems – sprinkler, fire alarm, security.
- Work with Structural Engineers to ensure equipment is adequately/safely supported.
- Work with Architects to ensure that equipment fits into spaces.
- Work with Civil Engineers to coordinate utilities to the building.

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Soils Engineer

- Perform soil borings and testing
- Recommend suitable foundation/retaining wall systems (don't design the systems themselves)
- Determine allowable soil and rock bearing pressures and equivalent fluid pressures
- Estimate settlement and differential settlement using loading from Structural Engineer
- Evaluate effect of groundwater on structure
- Determine Seismic Site Class

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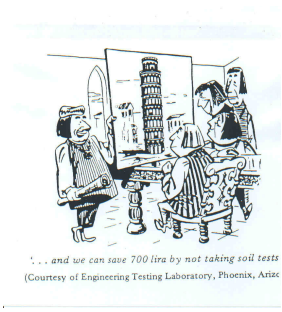
Soils Engineer



- "…and we can save 700 lira by not taking soil tests…"

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Civil Engineer

- Locate building on the site
- Determine ground floor elevation
- Locate & design site utilities
  - Storm, sanitary & electric within 5' of building
- Layout & design pavement, sidewalks & parking
- Work with municipalities to design site access
- Site grading

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Construction Manager

- Help determine if design is within project budget
- Determine construction schedule
- Provide Constructability review
- Suggest VE items if necessary
- Coordinate contractors, construction logistics & facilitate submittal process
- Not all projects have a CM during design

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How we work together

- A Process
  - SD – Schematic Design
  - DD – Design Development
  - CD – Construction Documents
  - Iterative
  - Collaborative
  - Requires communication & flexibility

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Foundations

- What information does the soils engineer need to perform his/her job?
  - Project location
  - Project description
  - Sometimes suggestions for boring locations
  - Approximate column/bearing wall loads

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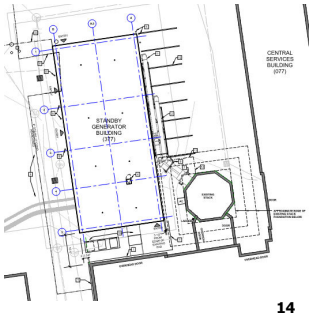
Foundations

- Soil Conditions
  - Boring Results
    - Foundation recommendation
    - Bearing capacities
  - Seismic Site Class results
  - Soil lateral pressures



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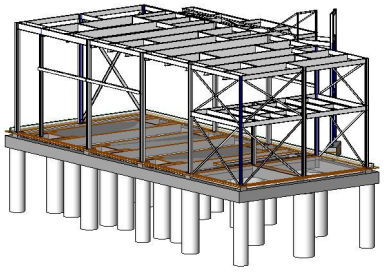
Foundations



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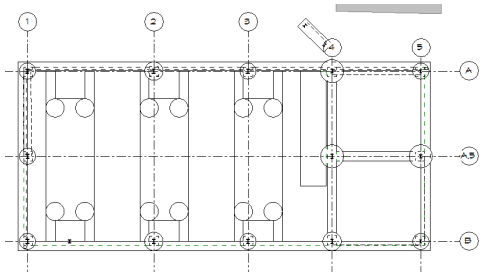

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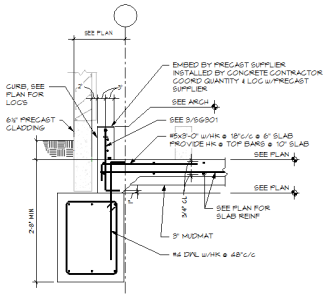

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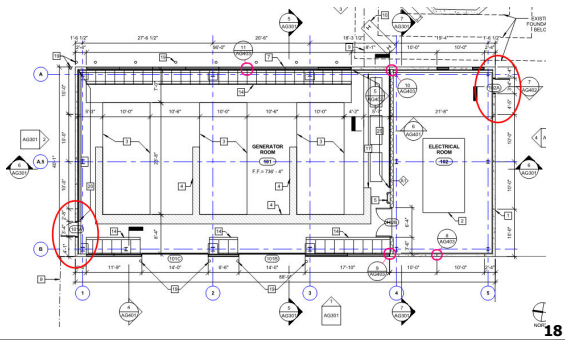
Framing



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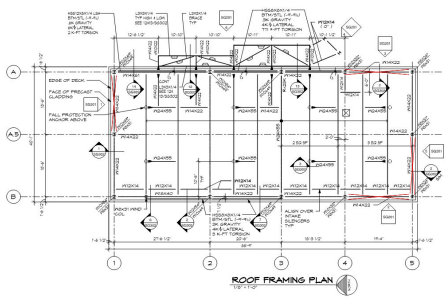

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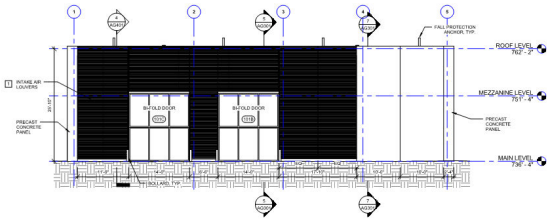
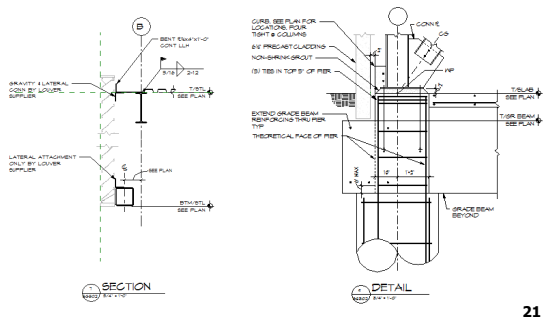


West Elevation

Framing Details



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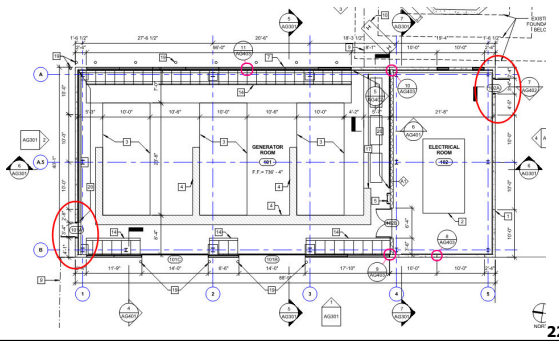

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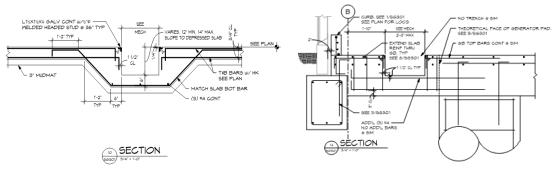
Foundation & Slab Details



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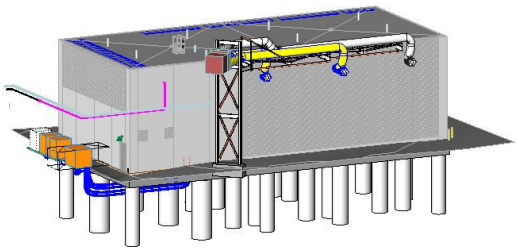

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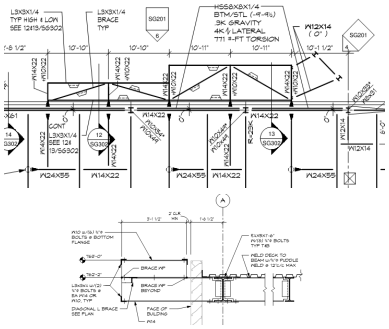

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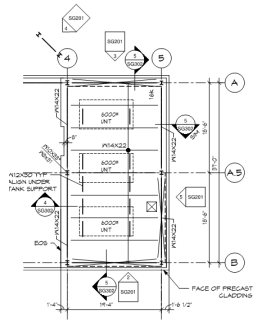

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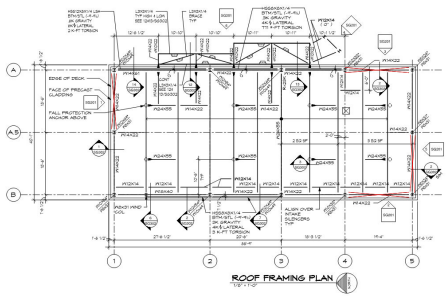

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Questions?

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Which University is the answer to this session's challenge question?

- Cornell
- Michigan Tech
- University of Kentucky
- University of Texas at Arlington