Learning Innovation Center

Existing Conditions

- OSU Historic District in Corvallis Oregon
- Adjacent to existing parking lots
- Austin Hall construction site nearby

Oregon State University. (n.d.). [Photograph]. https://oregonstate.edu/

Objectives

- Maximize efficiency and sustainability
- Durable and flexible design
- Facilitate formal and informal learning environments

LINC Pictures. (n.d.). [Photograph]. Oregon State University. https://is.oregonstate.edu/learning-innovation-center/linc-pictures

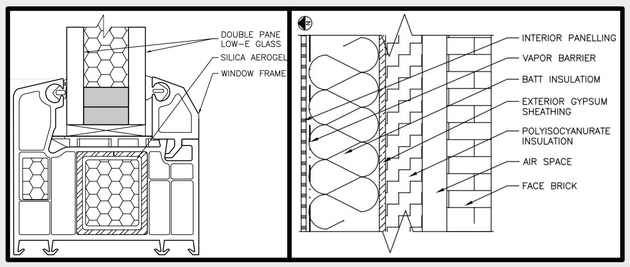
Oregon State University

OSU Learning Innovation Center. (n.d.). [Photograph]. BORA. https://bora.co/project/learning-innovation-center/

Building Envelope

Unified wall assemblies are expected to control vapor, water, moisture, and temperature, relieving heating and cooling loads seen by the mechanical system.

- Thermal resistance (R-Value) is a material property used to measure the resistance of heat flow through the assemblies.
- (L2) - Changed the sheathing material from mineral-wool to polyisocyanurate for better thermal performance
  - Improved R-Value from R-10 to R-18
- (L2) - Installed vapor barrier to the left side of the batt insulation to prevent vapor from traveling through the wall
- (L1) - Added silica-based aerogel occupy the conventional air gap and provide insulation to the double pane windows.
  - Light-weight, ultra-porous, and translucent
  - R-Value of 10.3 per inch



Window Assembly | Wall Assembly

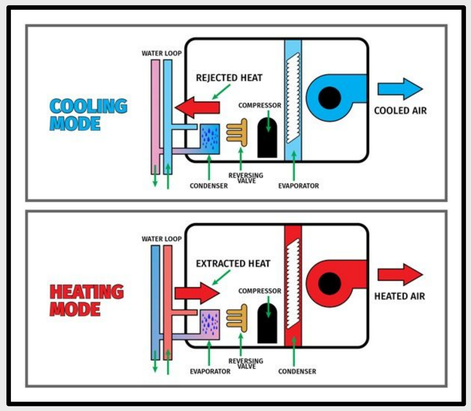
Mechanical Systems

The development of LInC's mechanical systems focused on the design of it's heating, ventilation, and cooling (HVAC) systems.

Design objectives:

- Optimizing energy efficiency (performance)
- Good indoor air quality (IAQ)
- Human thermal comfort
- Adhere to ASHRAE standards 62.1 and 90.1

Water is a more effective and efficient medium for transferring thermal energy than air. With energy efficiency as the foremost objective, Teams L1 and L2 decided to design hydronic (water) HVAC systems. Both teams have chosen to employ use of water source heat pumps, utilizing on campus steam (L1) and the rain reservoir under the building (L2).

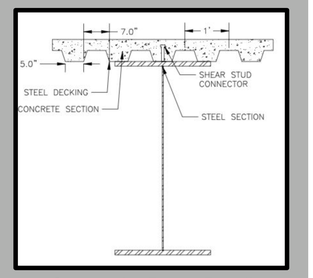


Water Source Heat Pump Operating Diagram

Structural (LRFD)

Gravity Frame

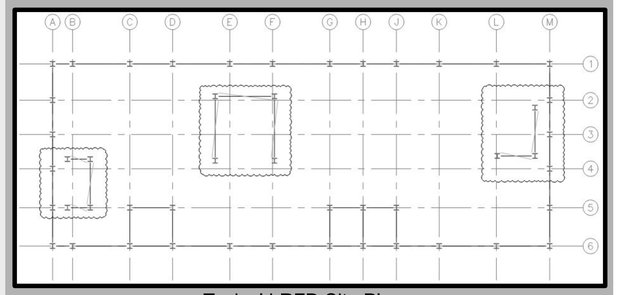
- Dead Load = 70 PSF
- Live Load = 100 PSF
- W14x211 Column
- 10' square footing
- 2VLI gage 16, 6.5" depth concrete slab
- Composite Beam Design



Composite Beam Detail

N-S Girders	E-W Beams	N-S Joists
W40x294	W21x44	W12x14
Fully Composite	Partially Composite	Fully Composite
100% Composite	28% Composite	100% Composite
402 Studs	34 Studs	20 Studs

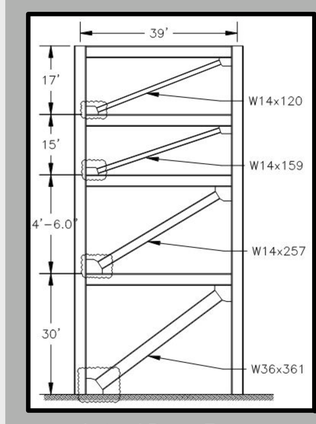
First Floor Beams



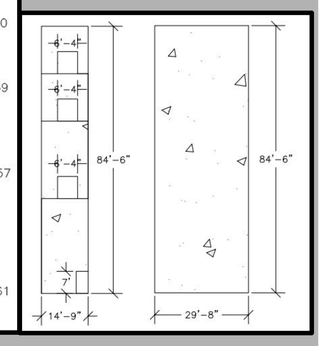
Typical LRFD Site Plan

Lateral Force Resisting System

- L1 - Shear Wall
- L2 - Lateral Brace Frame System (SIngle Diagonal)
- Risk Category III
- Soil Conditions - D



Lateral Brace Frame (Single Diagonal)



Shear Wall Detail