

INTEGRATION SERIES: 201

BRIDGING DESIGN, IMPLEMENTATION & OWNERSHIP

SPONSOR
COMMERCIAL & INDUSTRIAL
ENERGY EFFICIENCY

 **conEdison**
the **power** of green

ASSOCIATION
ASHRAE NY & AIANY COTE



THE COOPER UNION

RADIANT SYSTEMS



150
THE COOPER UNION
YEARS



cxa

engineer

owner

architect



SARAH HAGA



JODY GRAPES

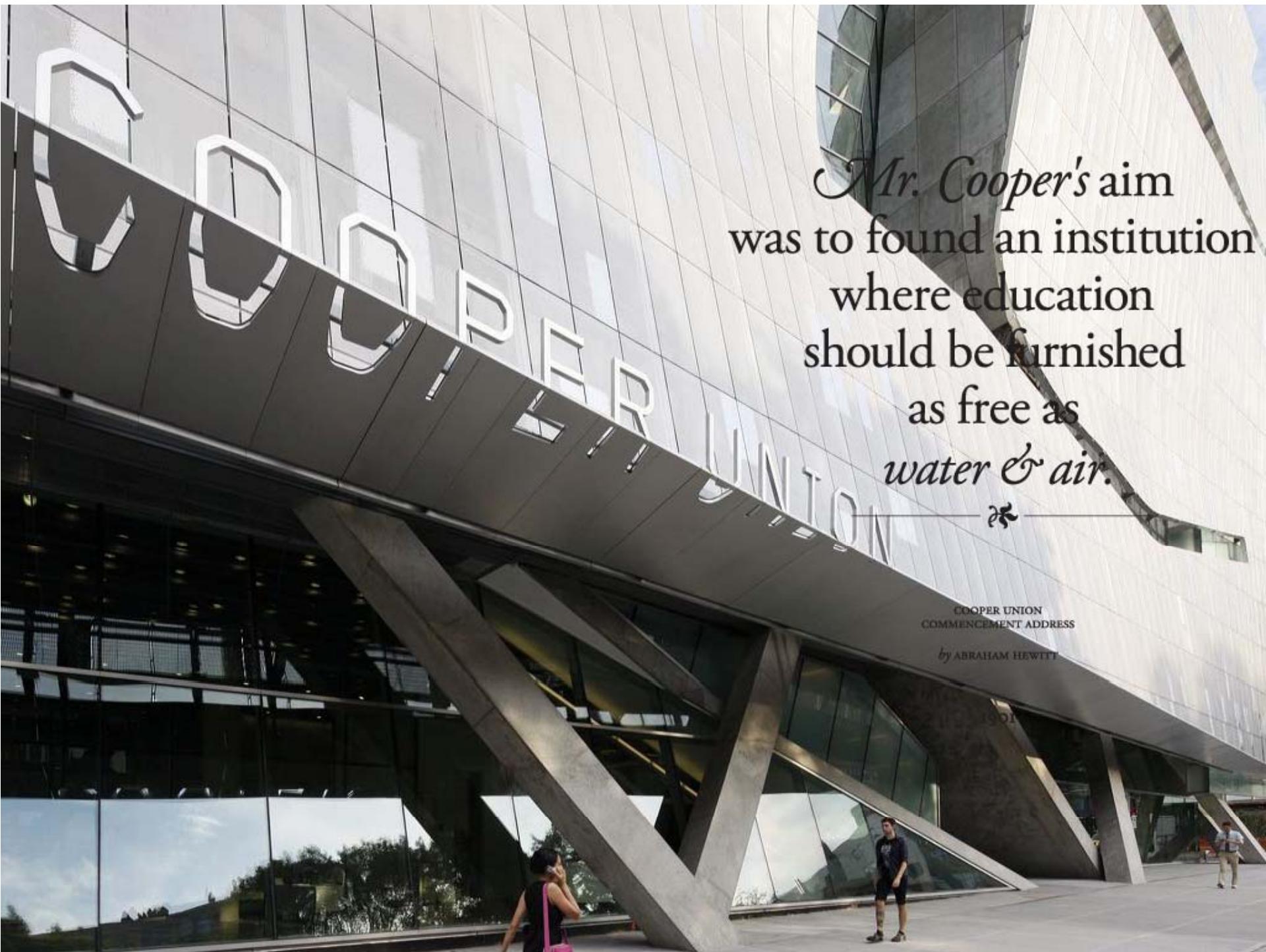


SERGIU PELAU



ALEC STRONGIN

PROJECT CONTEXT



*Mr. Cooper's aim
was to found an institution
where education
should be furnished
as free as
water & air.*

COOPER UNION
COMMENCEMENT ADDRESS

by ABRAHAM HEWITT

- **Architect:**
 - Morphosis (LA)
(architect of record)
 - Gruzen Sampton (NYC)
- **Engineer:**
 - Syska Hennessy Group (NYC)
(engineer of record)
 - IBE Consulting Engineers (LA)
- **Construction Manager:**
 - F.J. Sciame Construction
- **Owner's Representative**
 - Jonathan Rose Companies

100%CD GMP set: September 2006

Groundbreaking: May 2007

Building opened: September 2009



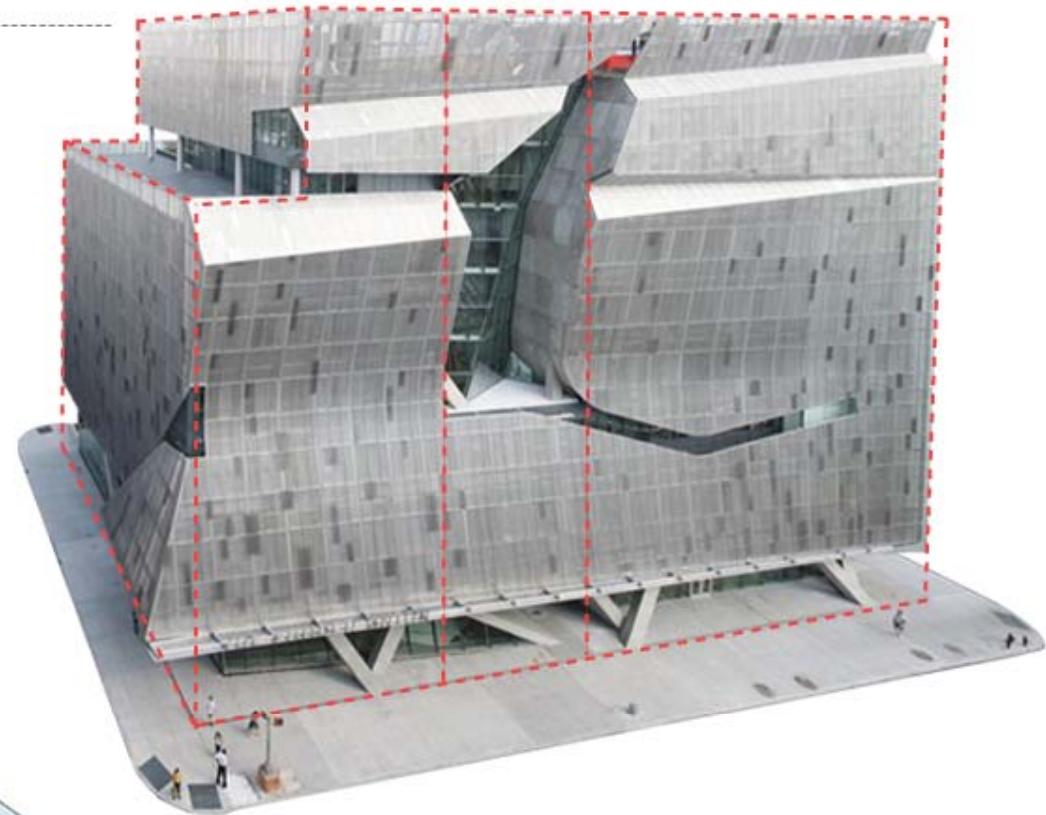
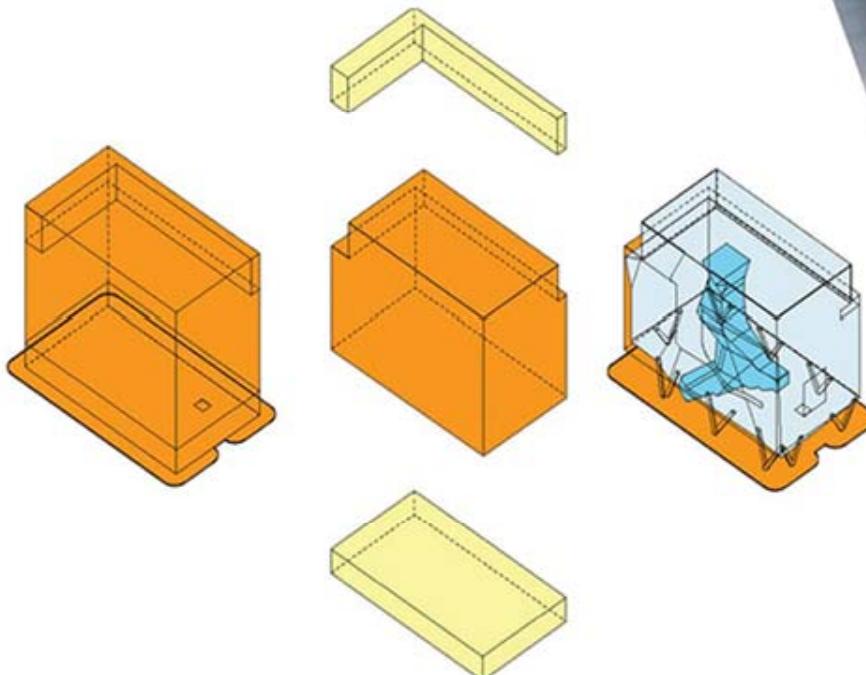
LEED Platinum

- 175,000 sq.ft.
- 9 stories (+2 below ground)
- Construction Cost: \$110 Million
- Double Wall Façade
 - reduces heat gain/loss
- Open Atrium
 - airside heat recovery
- Green Roof
 - treats and manages storm water
- Radiant heating/cooling ceiling panels and floors
 - reduce energy usage
- VAV fume hoods, occupancy and CO₂ sensors, lighting controls
 - integrated into the BMS



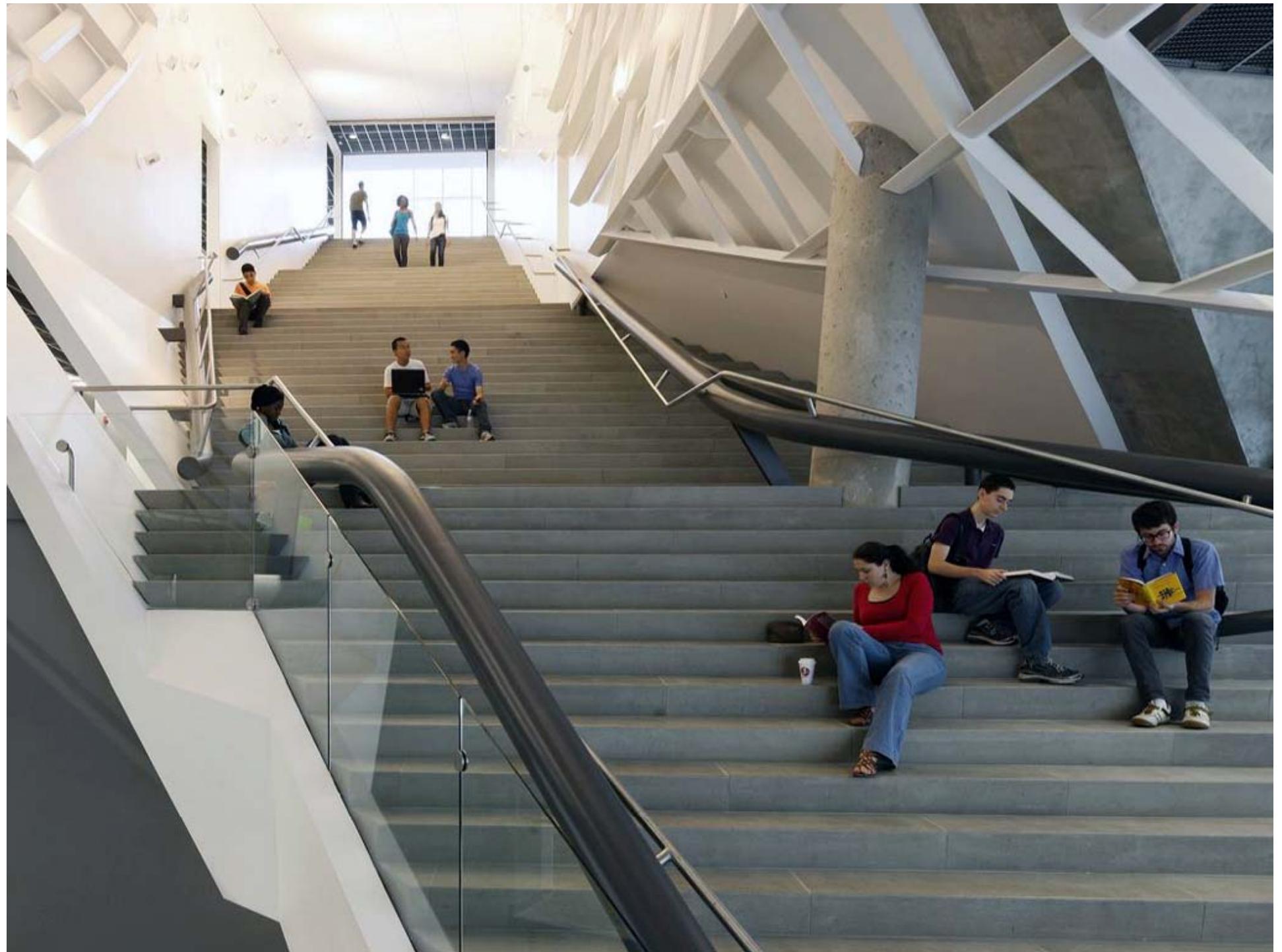
+135' MAX

175,000 GSF

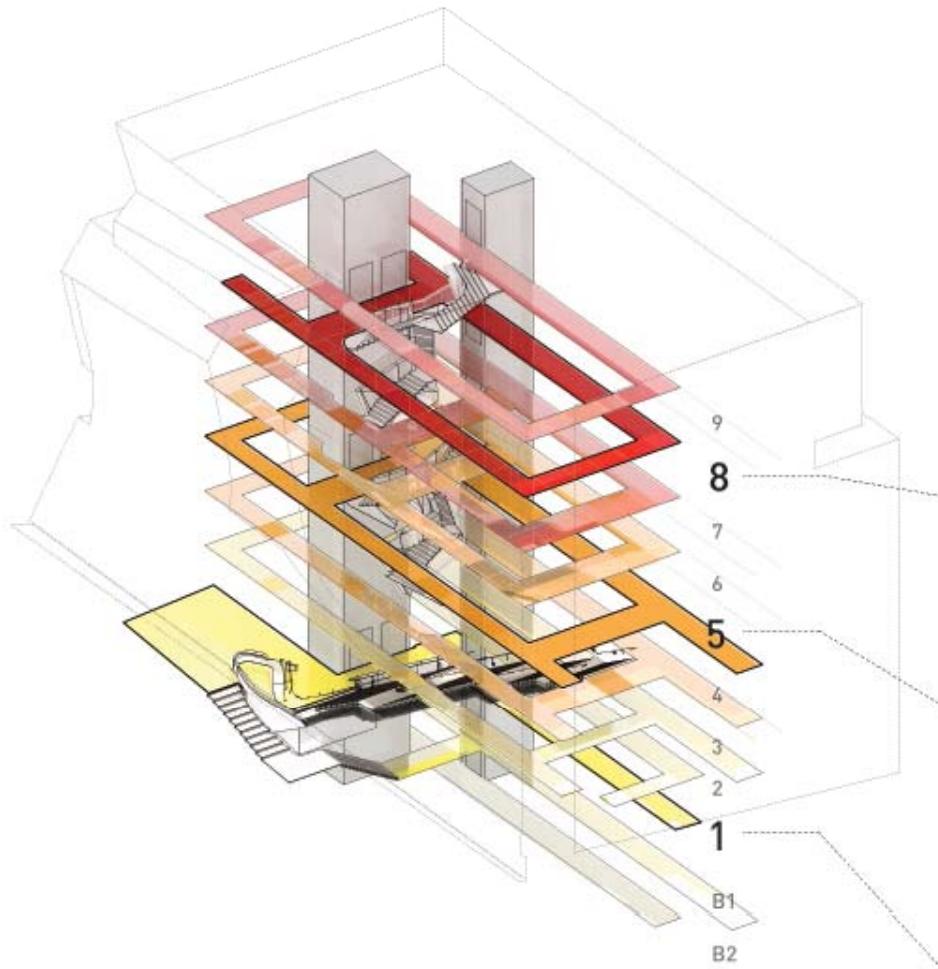


CAMPUS IN ONE BUILDING

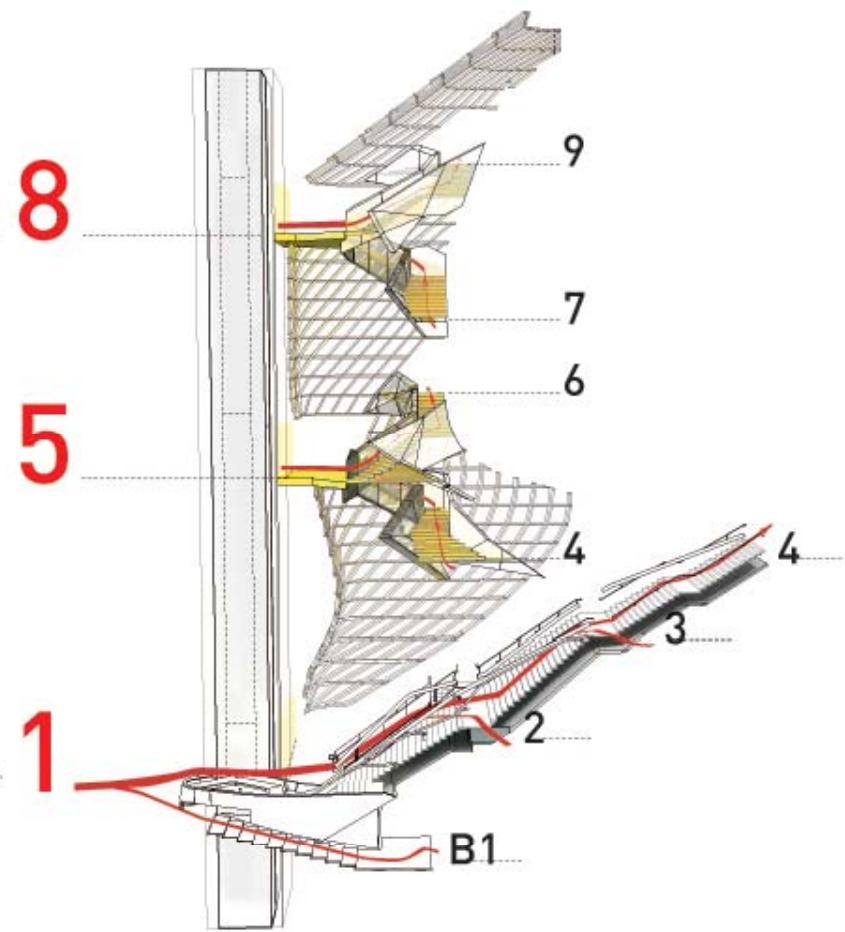


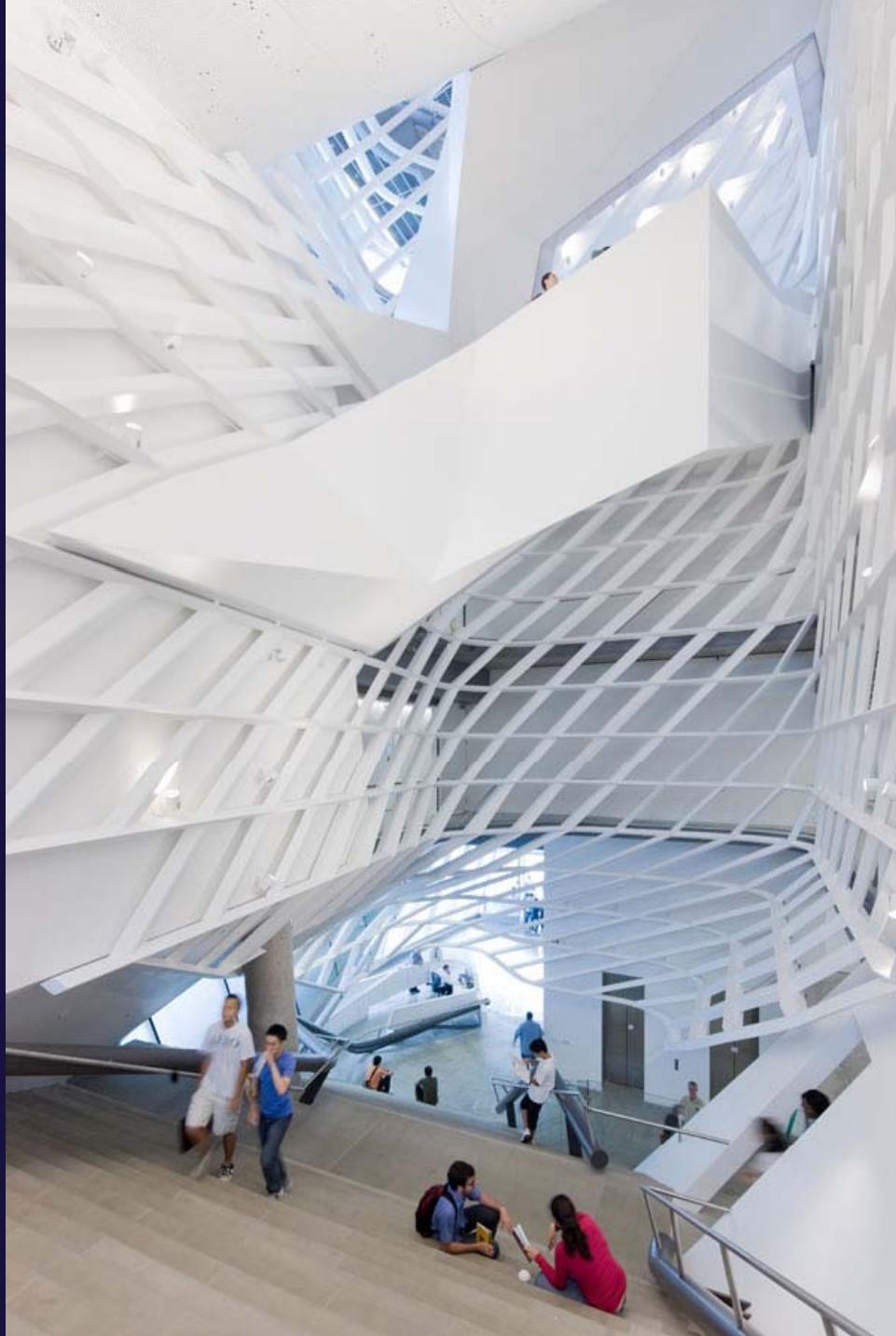


SKIP-STOP



CIRCULATION

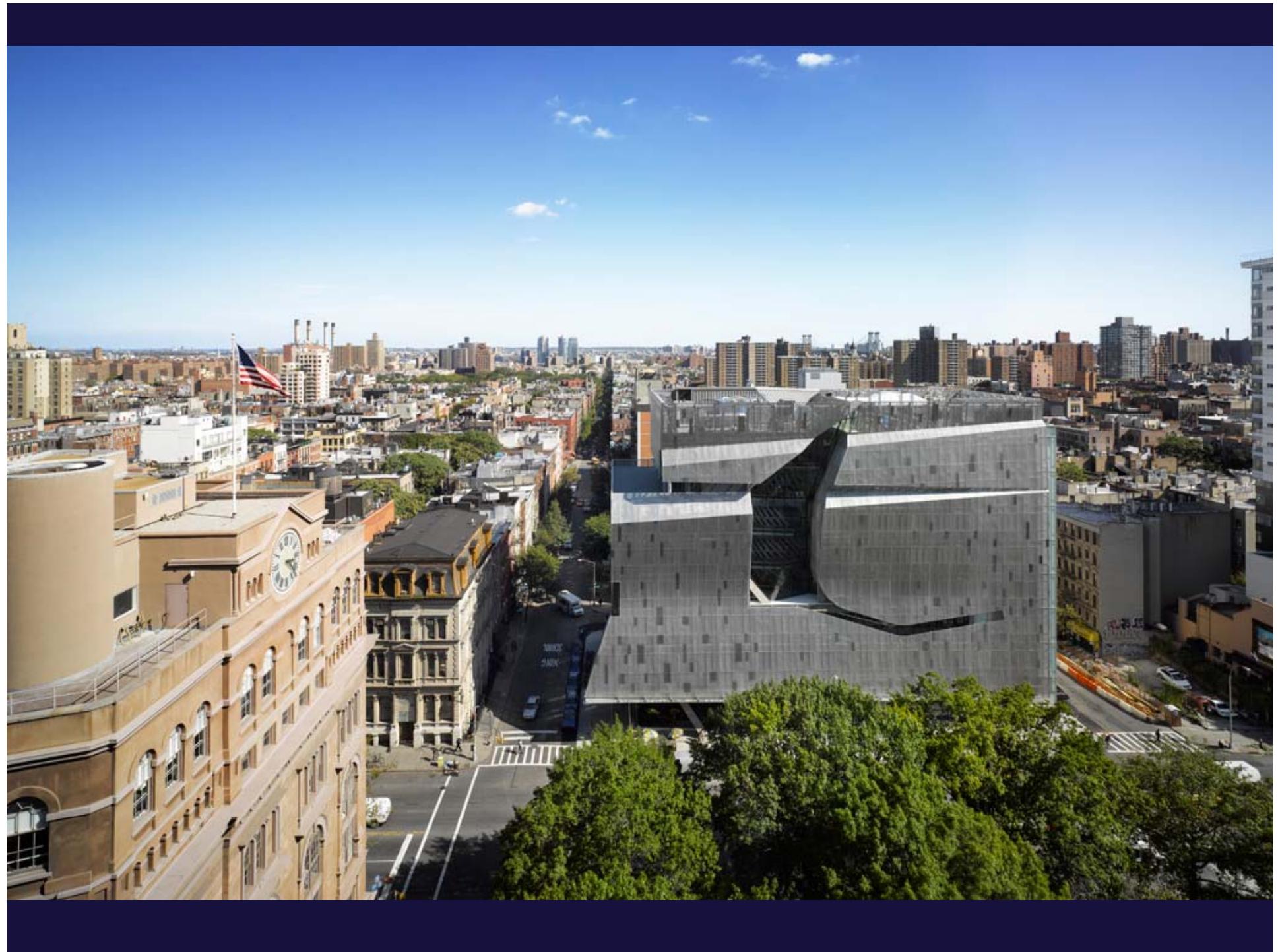




























COMMISSIONING AND OPERATIONS

IMPORTANT CONSIDERATIONS

Managing indoor humidity Control: dehumidification

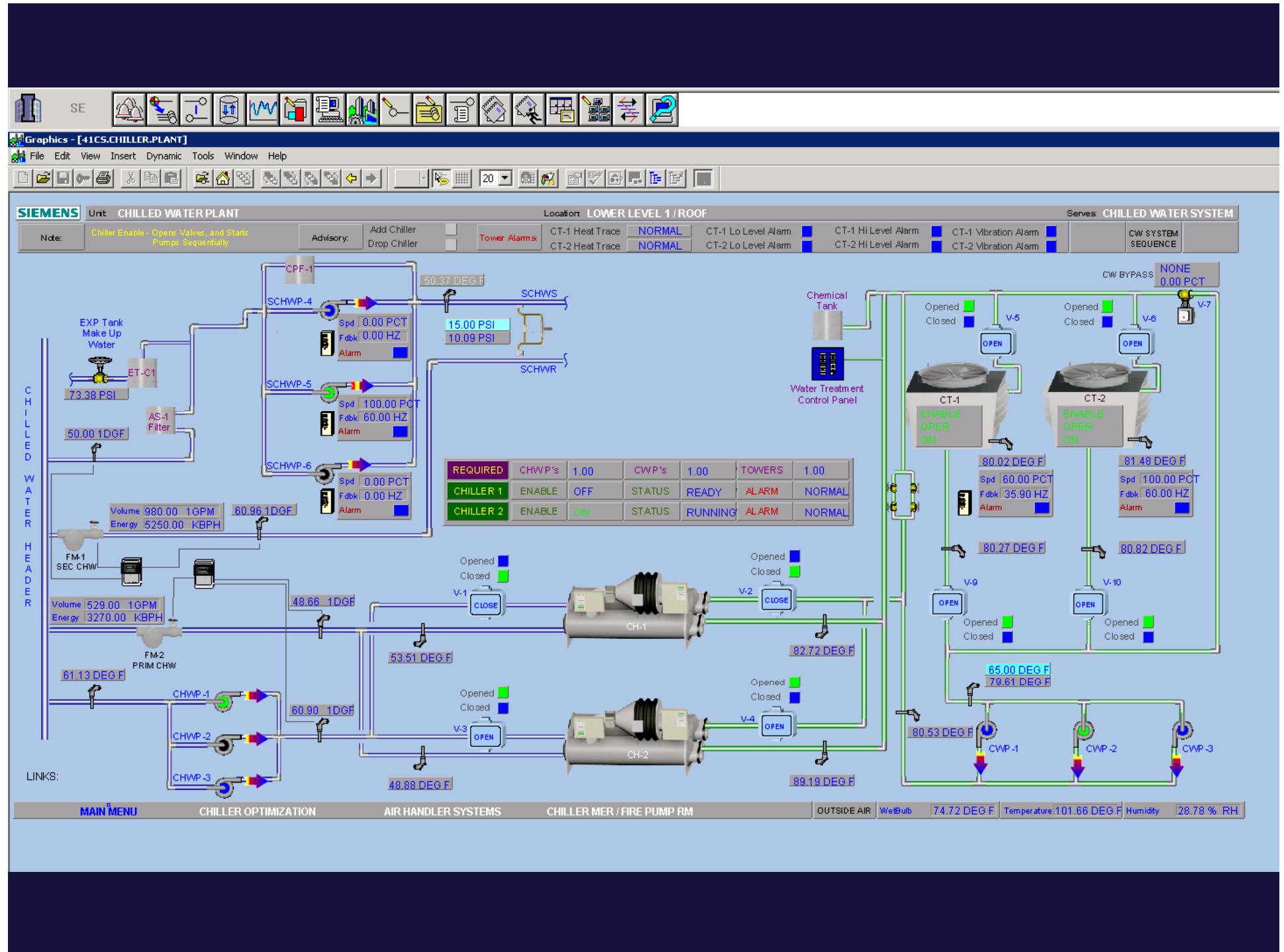
Dedicated OA Systems (DOAS), non-operable windows)

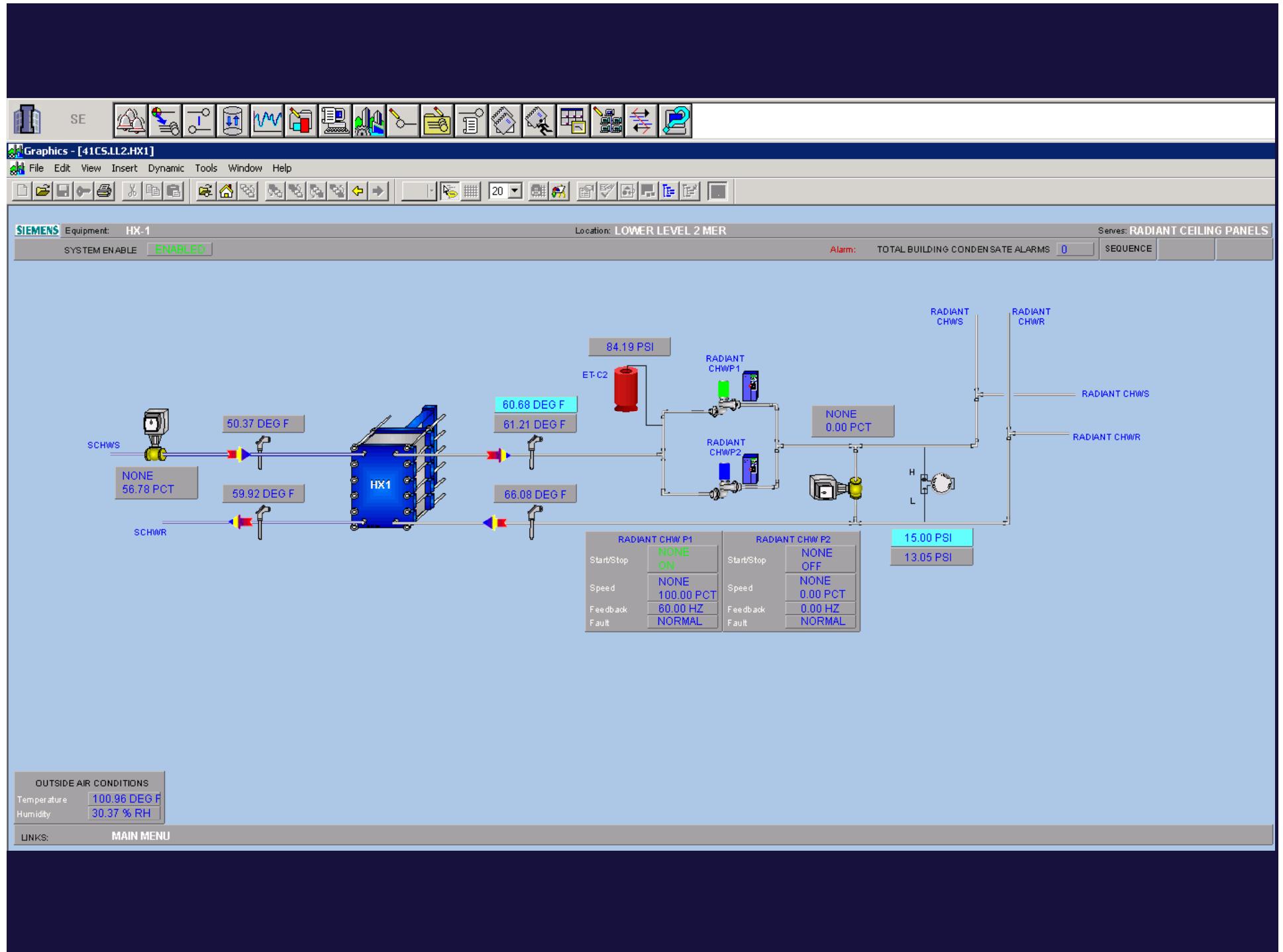
Maintaining Radiant panel surface temperature above dew point

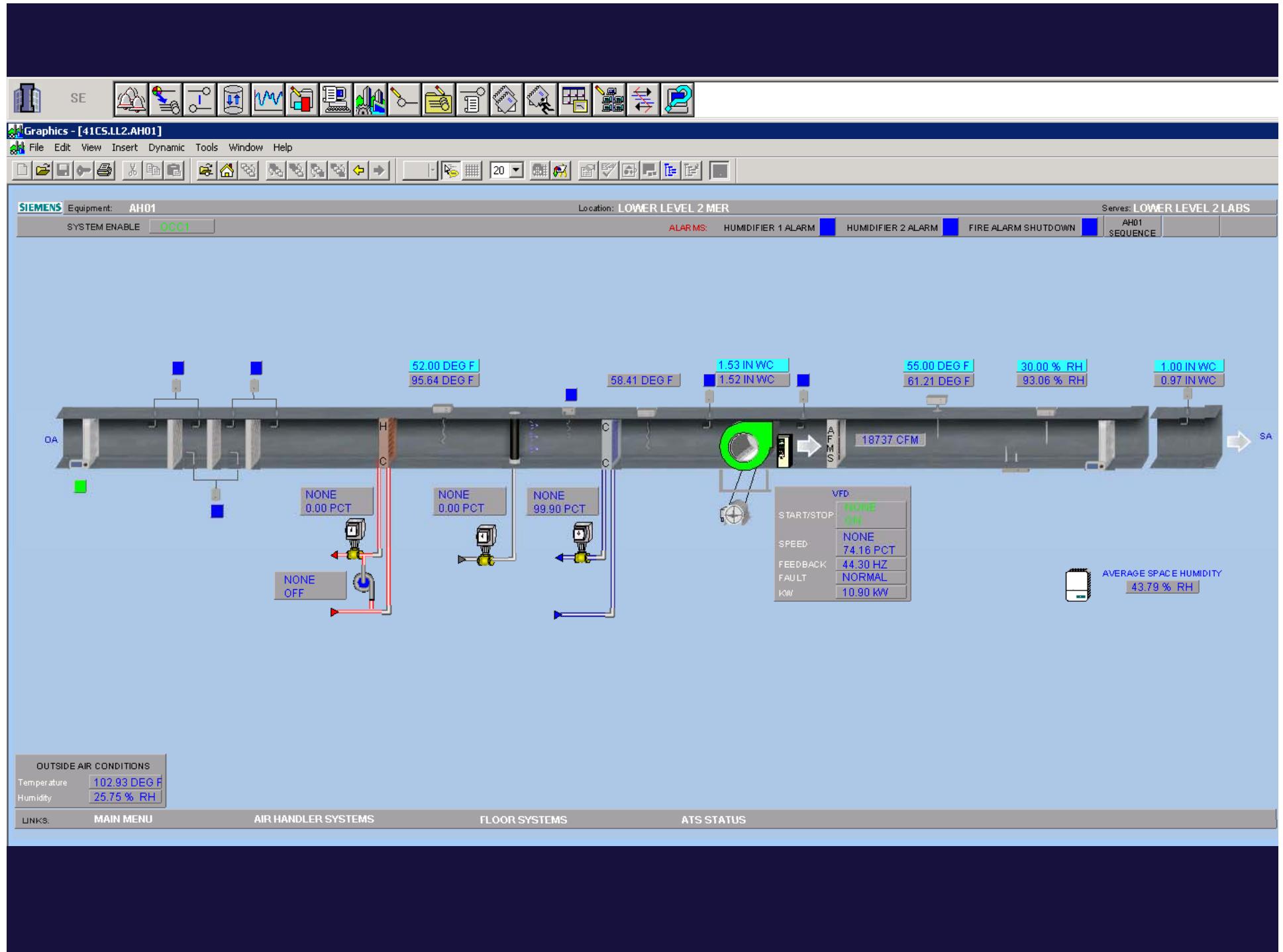
Locating temperature and humidity sensors at key locations

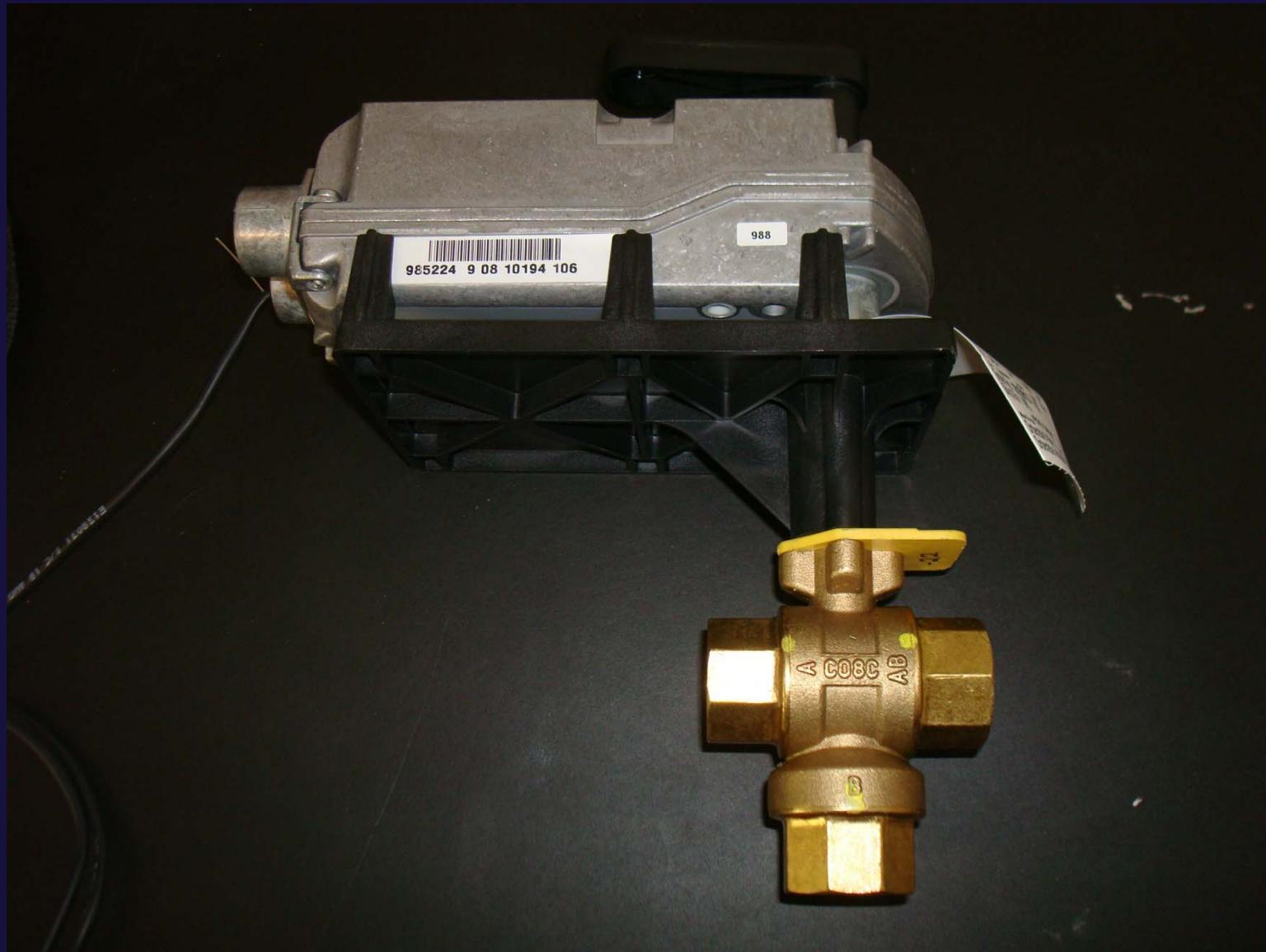
BMS monitoring of secondary chilled water supply temperature, indoor air temperature and humidity

Strap-on condensation sensors on the CHW supply piping that alerts BMS when condensation occurs and then resets secondary CHW temperature upward. If condensation persists, BMS isolates that specific zone.





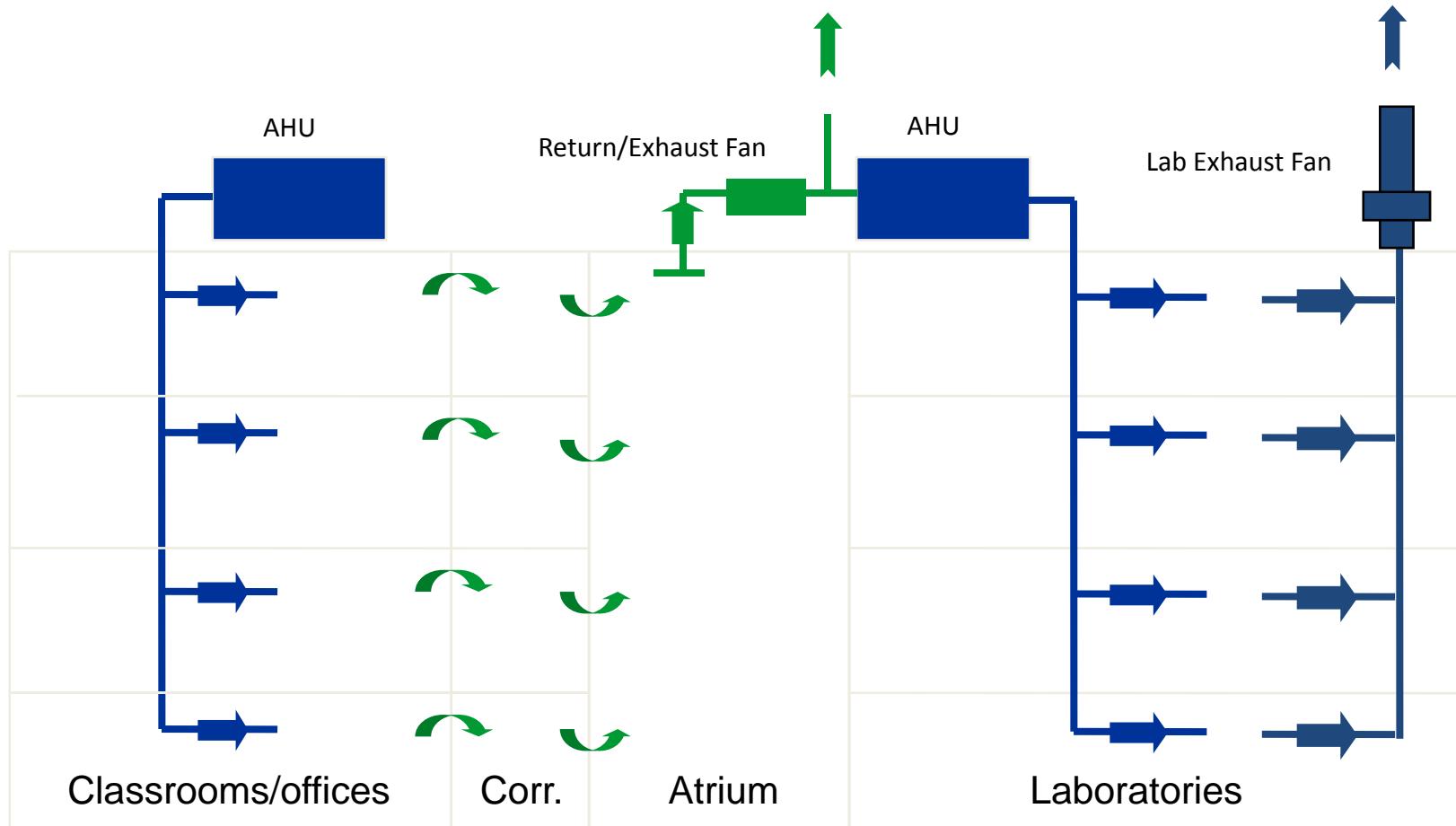




RADIANT SYSTEM DIVERTING VALVE

SYSTEMS SUMMARY

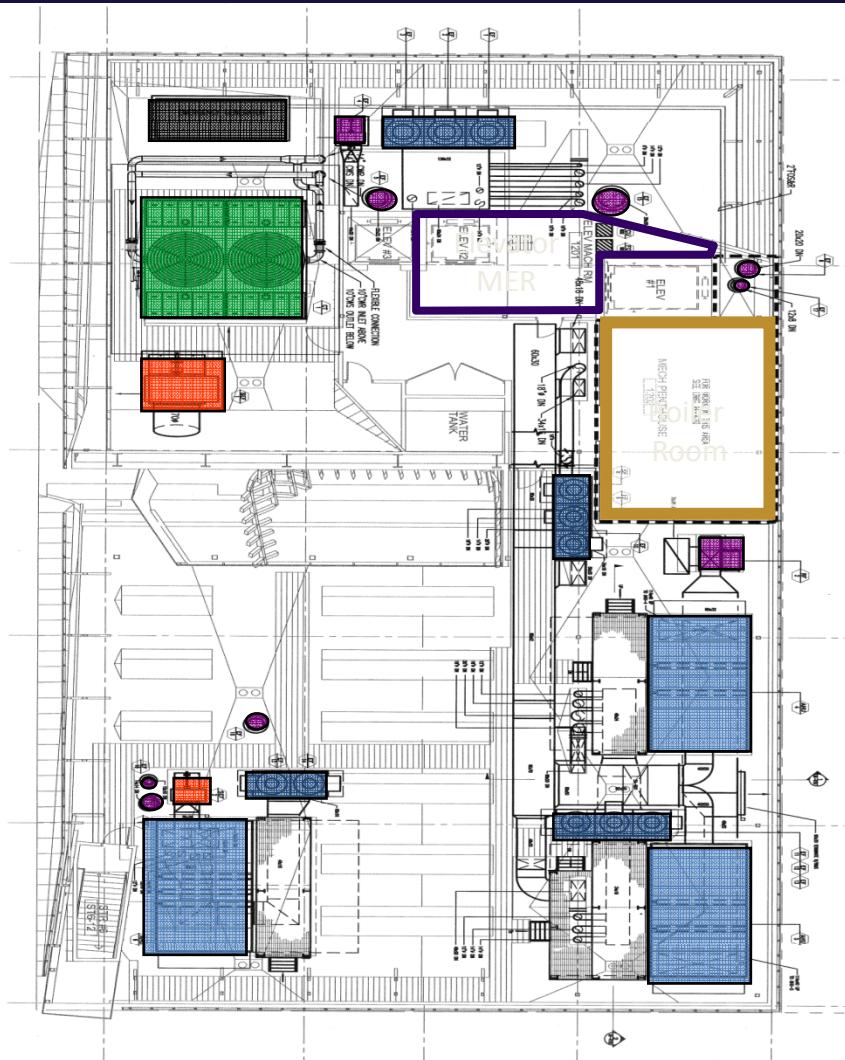
AIR DISTRIBUTION



Overview of Mechanical Systems

Space Description	Overhead VAV supply	Radiant Ceiling Panels		Radiant Floor		Finned Tube Radiation	Fan Coil Units
		Heating	Cooling	Heating	Cooling		
Laboratories	*	*					
Classrooms/Offices	*	*	*				
Main Entrance Lobby	*			*			
Multi-purpose Seminar Room & Gallery Space	*			*	*		
Art rooms (all subcellar and 9 th floor levels)	*					*	
Auditorium	*						
Retail, Data, Elev.							*

Roof Plan Layout



MOCK-UP



INSTALLATION



Components

- Metallic Ceiling Panel
- Cooling Element (Coil)
- Thermal Insulation
- Stainless Steel Flexible Connectors

RADIANT CEILING SPACES



LAB



CLASSROOM

GRAND STAIR



MAIN LOBBY WITH RADIANT FLOOR

February 23, 2011

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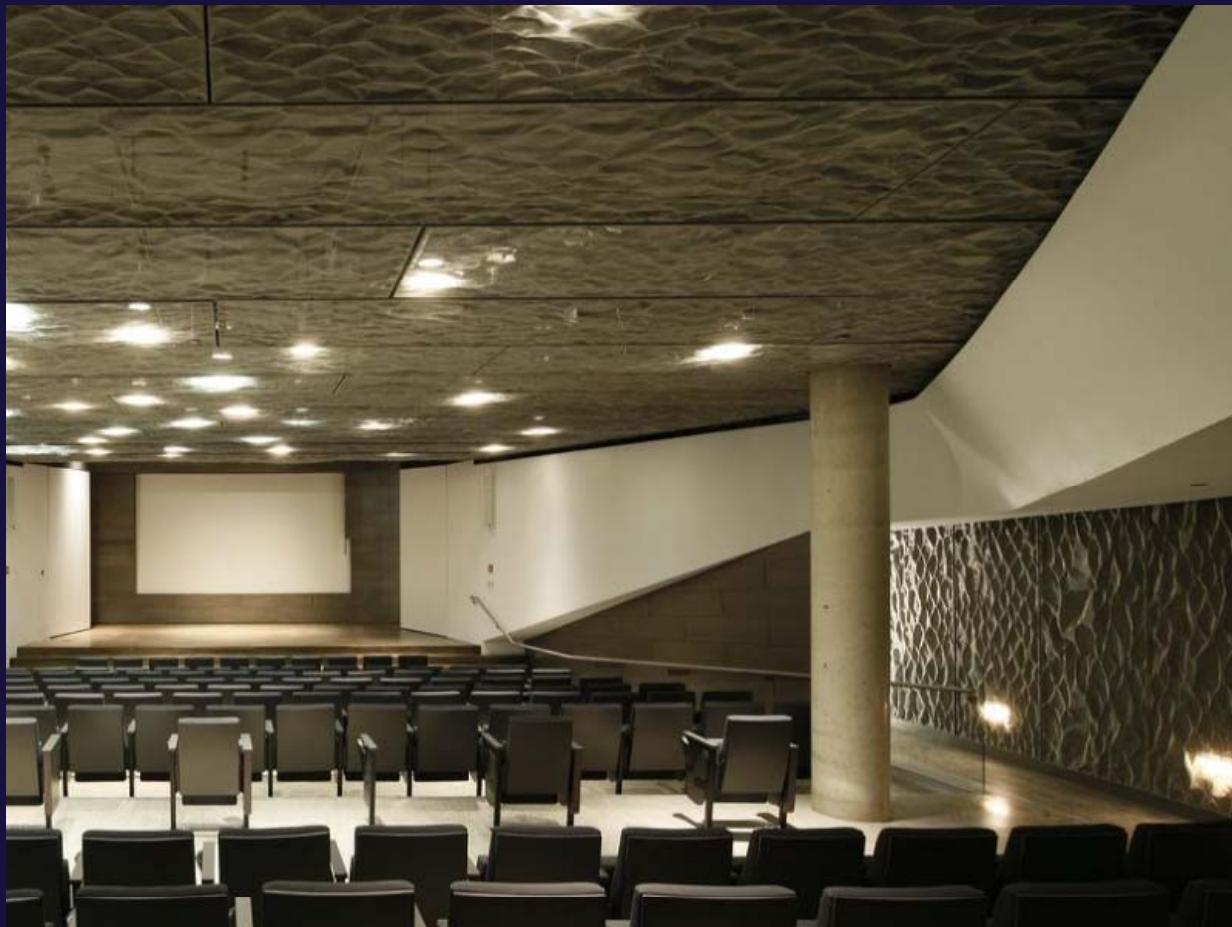
FLUIDS LAB



MAIN GALLERY



AUDITORIUM



GRAND STAIR



OWNER'S PERSPECTIVE

Initiatives

Energy Efficiency

Radiant heating and cooling panels are more efficient than forced air.

Thermal Comfort

- Radiant heating/cooling provides enhanced occupant comfort.
- Primary source of heating and cooling is from radiant panels, lessening drafts.

Operational Concerns

- Condensation
- Flexible connectors between panels
- Potential for chilled water and heating water to mix
- Ability to meet cooling load

Performance

- Experienced secondary chilled & hot water intermingling
- Several minor leaks on flexible connectors
- Successfully able to meet cooling and heating loads utilizing radiant panels

Thermal Comfort & Efficiency

- Excellent thermal comfort for occupants
- Official thermal comfort survey coming in next few months
- Measurement & verification system operational for past two months