

# The built field is not a solo act!

Stephen Kendall, PhD  
Professor of Architecture  
Ball State University, USA



# What does it mean that the built field is not a solo act?

**The built field is the result of distributed work**  
(All designing is partial)

**The built environment is never finished**  
(We always add to what is there, and set the stage for others who follow)

**But you may ask, isn't distributed design  
a subject for schools of management?!**



**What do these ideas have to do with architecture and studio education?**

**1. Studios are central to design education everywhere...**

**2. Studios are where the master-apprentice approach to design special buildings still dominates...**



**The reason I want to discuss this is because of my view that the quality of the commons - the everyday built environment - is too important to leave to the old model of studio education.**



The old studio model is very good ifor some kinds of teaching and learning, and should not be abandoned.

**BUT**

The studio model is not good for building transferrable skills.

Unlike in structural design classes...

Or in environmental systems classes...

Where are cooperative design skills taught...skills good for use in many circumstances?

**We need design exercises to help us do a better job making the built field bloom...**



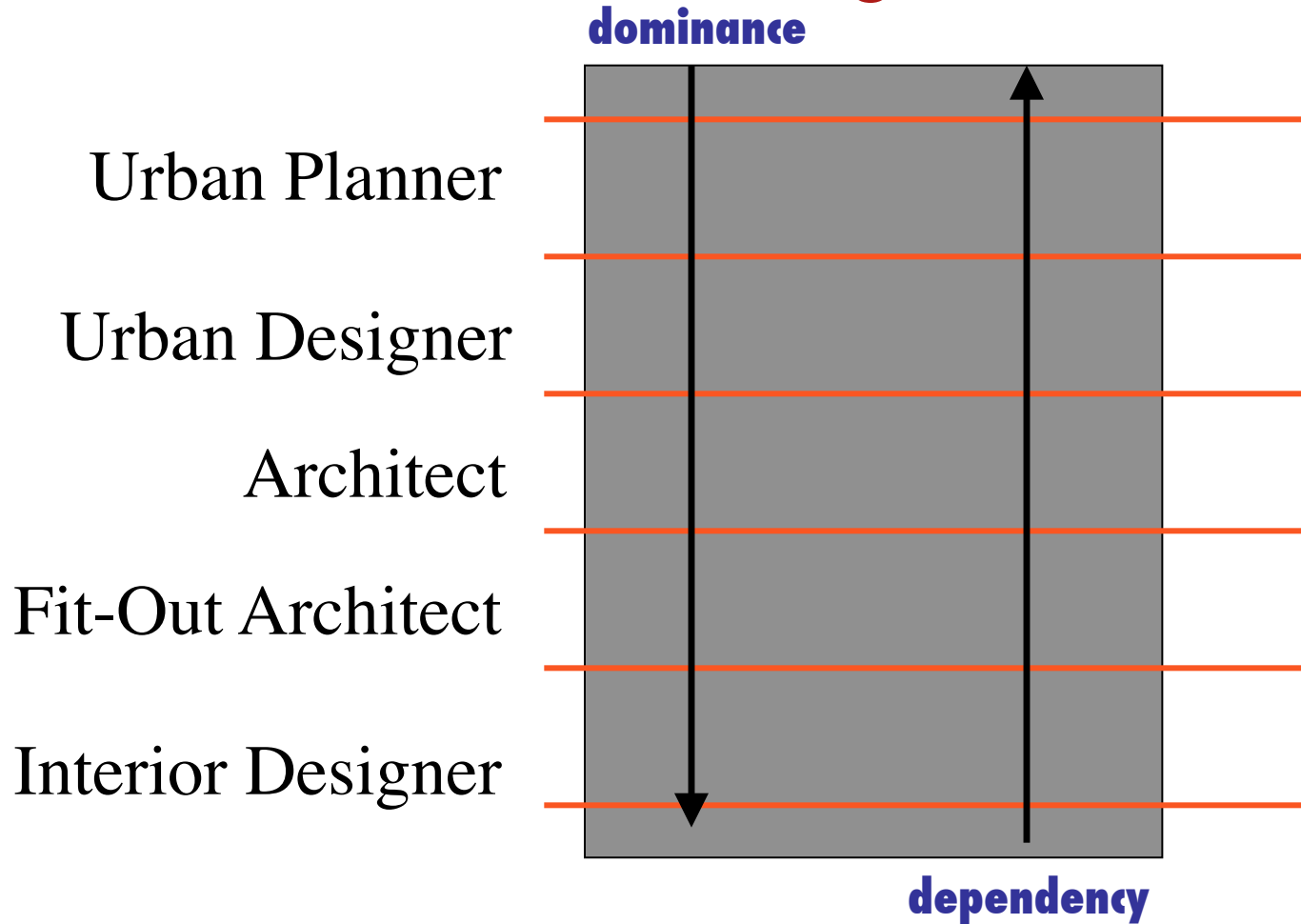
# Kinds of Exercises

based on a concept of levels, as for example:

Urban Structure	Urban Planning
Urban Design	Urban Designer
Base Building	Architect
Infill	Interior Architect
Furnishings	Product Designer



# Levels of intervention guide our work



# Kinds of Exercises

- *Documenting environmental themes, patterns and systems*
- *Taking account of how environment transforms;*
- *Revealing many actors;*
- *Designing constraints for others to follow, and to follow constraints set by others;*

# The Street Space Exercises

Bern, Switzerland

- Studying precedents as one basis for designing;
- Documenting themes
- Selecting constraints we want to emulate.



# The Street Space Exercises

Bern, Switzerland

## Kinds of Constraints

1. Ways of building
2. Defining Territories
3. Sharing territory
4. The street façade as part of the urban tissue
5. Thinking in section
6. Entries



# The Street Space Exercises

Bern, Switzerland

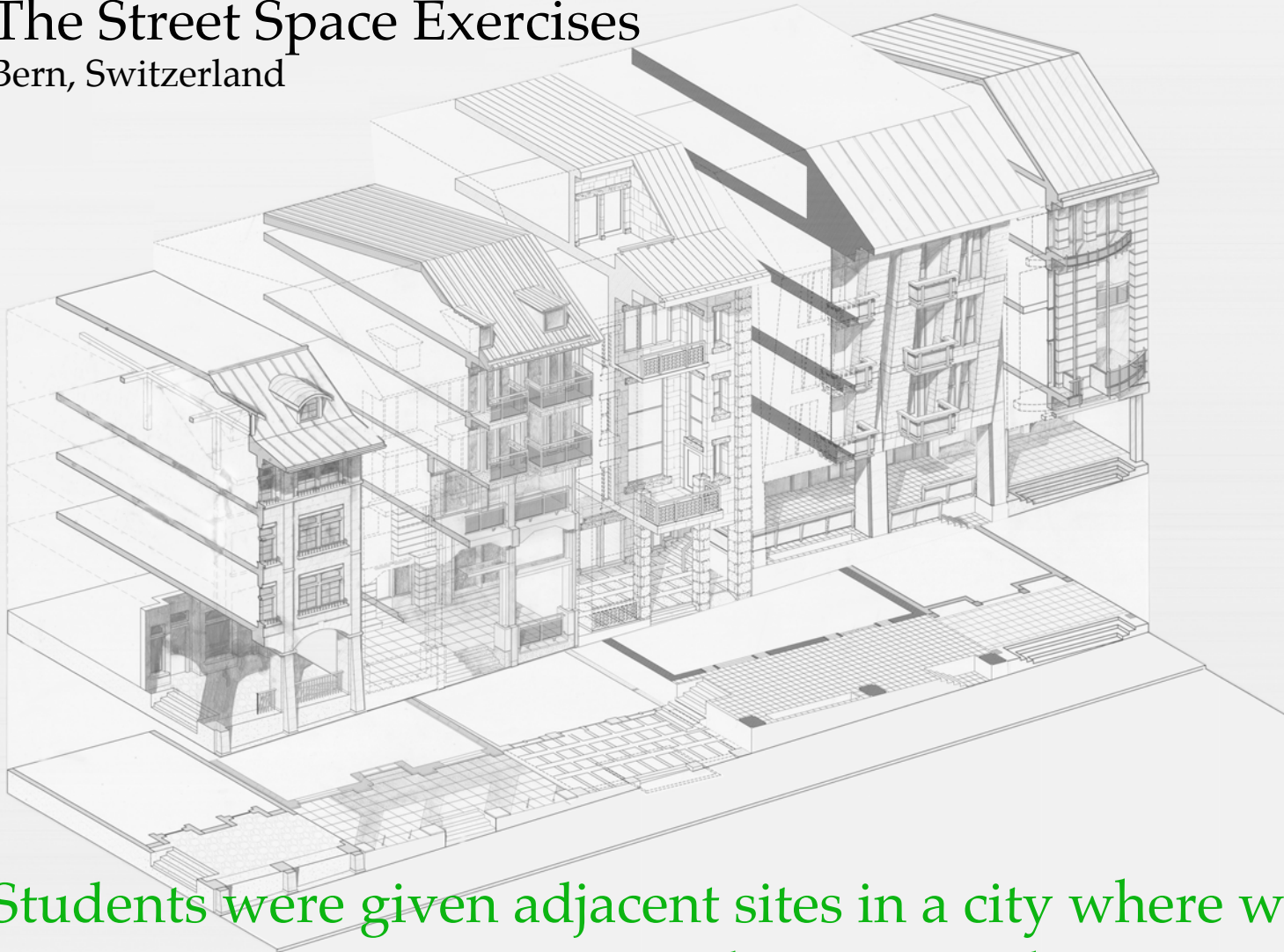
## Themes

Diagrams were Made to capture the basic themes of the Bernese arcade typology



# The Street Space Exercises

Bern, Switzerland



Students were given adjacent sites in a city where we would explore variations on the Bernese theme.

# The Street Space Exercises

Bern, Switzerland

## Explorations



Kendall / Teaching Architecture Students to Work with Distributed Design



**Another graduate studio: An urban design studio focused on a new academic quad on the Ball State campus, using collectively developed “form-based codes” to guide each student’s scheme.**



# The Academic Village

Studies of Form Based Codes and architecture in the University context

## Goals of the Study

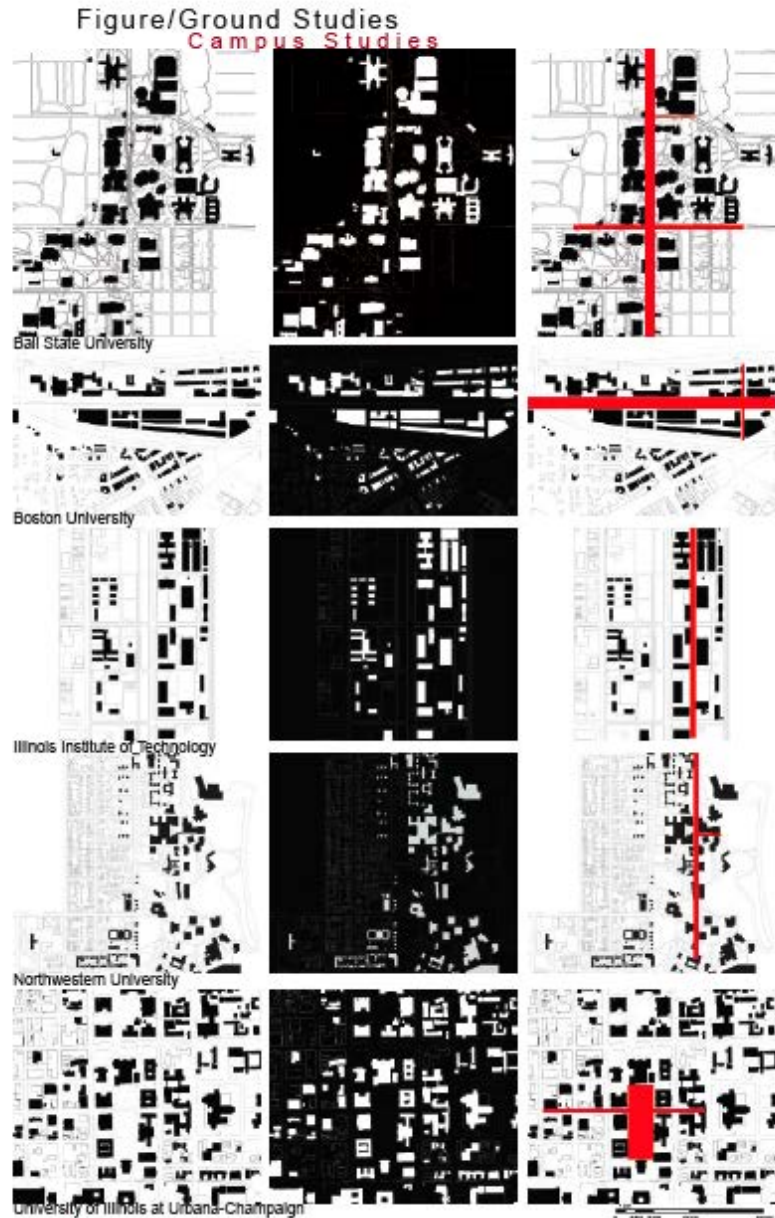
First, we studied the Ball State Campus for its history, context, patterns and themes - open space, building types, functions and so on.



# The Academic Village

Studies of Form Based Codes and architecture in the University context

We also compared the campus with other university campuses.



# The Academic Village

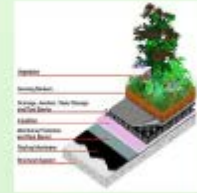
## Studies of Form Based Codes and architecture in the University context

We also studied issues of Sustainable and “green” architecture and technology.

### sustainability

#### greenroofs& green roofs

The cost of installing a greenroof ranges from \$15-\$40 per square foot, and maintenance costs are usually included in the original budget. The soil substrate and chosen plant types incur the greatest cost. Though the initial greenroof costs are greater than those of a traditional roof, the ability of a greenroof to extend the life of the roof by at least 20 years and to reduce energy usage cause roof lifespan costs of a greenroof to be comparable to those of a conventional roof. Additionally, greenroofs control/slow water runoff and reduce carbon dioxide impact on the environment.



#### church street station evanston, illinois



multi-family residential  
roof area: 8,500 sq ft

- an "escape" from the bustle of the city
- improved view for neighboring buildings

#### schwab rehab hospital chicago, illinois



healthcare facility  
roof area: 10,000 sq ft

- accessible for patients
- horticulture therapy aids patient recovery

#### millenium park - soldier field - chicago, illinois



public-accessible park  
roof area: 1,067,220 sq ft  
230,580 sq ft

- covers unsightly parking garage

#### green roofs: white roofs

White roofs, by nature of their color, can reflect up to 80% of the sun's energy. Traditional black roofs can reach a temperature of 180 F on a sunny windless day - heat which can then be transferred into the building. White and light colored roofs tend to last longer than conventional black roofs as their high reflectivity properties prevent the continuous expansion and contraction that goes with great temperature shifts.



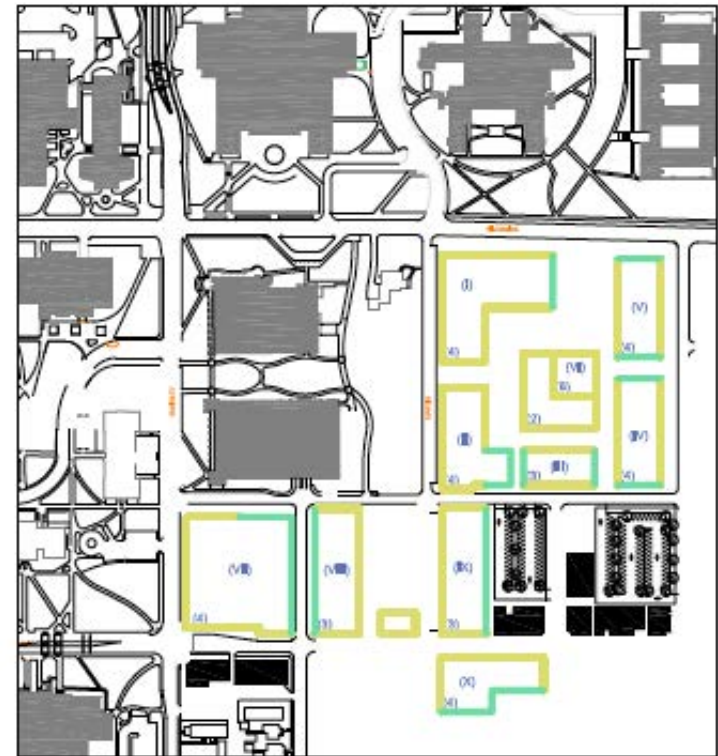
# The Academic Village

Studies of Form Based Codes and architecture in the University context

## Form Based Codes

Next, we developed  
FORM BASED CODES.

These “CODES” were  
developed by a consensus  
process.



Building front defines the sides of building which must appropriately address the adjacent space as a building front. Building back provides the framework in which one can locate service entries, but is not obligated to.

# The Academic Village

Studies of Form Based Codes and architecture in the University context

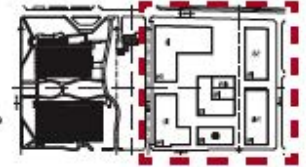
A plan and cross section of part of the new campus development area, showing the massing concept for new buildings and public space.

## East Quadrangle Open Space Plan

### Overall Scheme

The new academic quad will have an identity unique from other areas of the Ball State campus. Due to the integration of classroom, commercial, and research spaces, it is important for the open space among the proposed structures to facilitate open interaction between different functions within the quad.

The main internal space is raised ten feet above street level, allowing for a sub-terranean tunnel system to connect the four academic buildings while still maintaining street level access. This grade change also provides a visual distinction between the academic center of the quad and commercial and residential spaces.



### Site Section



## East Quadrangle Open Space Plan

# The Academic Village Studies of Form Based Codes and architecture in the University context

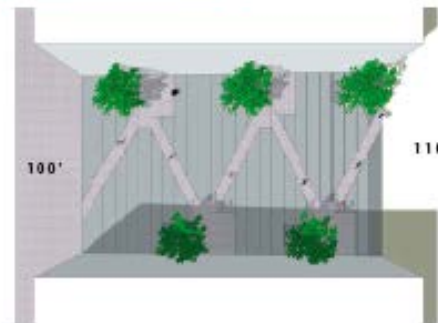


### Vertical Transition [1]

The transition space between the business school and the science building is part of a major axis that terminates at the research tower. This space will be a grand entry into the academic plaza at the top of the grade change.

In order to allow all users to equally appreciate this space, a ramp will be incorporated into the steps to create an interesting merging of the two paths of travel. This type of staircase was accomplished by Rem Koolhaas in the Illinois Institute of Technology Student Center, noted in the photos below.

### Grand Stairway



Aerial view of staircase



Perspective from Martin St.



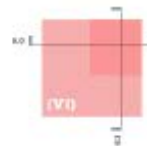
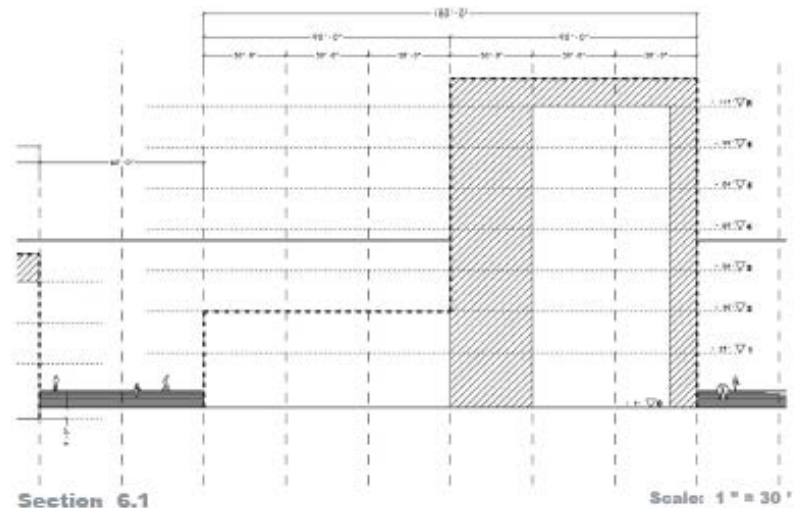
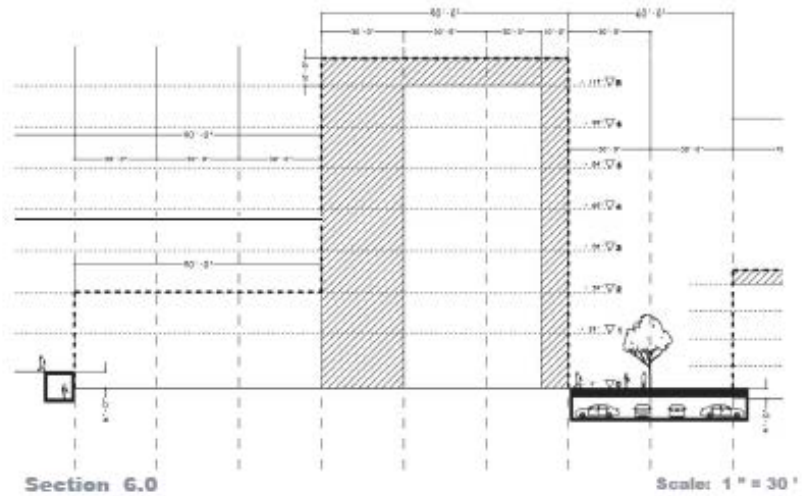
Images of Koolhaas staircase from University of Waterloo

details of some of the  
public spaces...

# The Academic Village

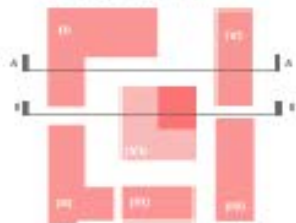
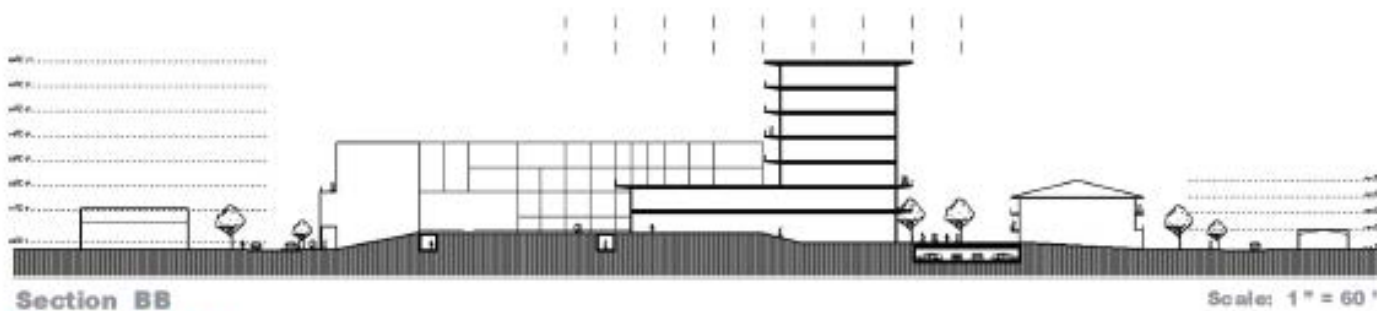
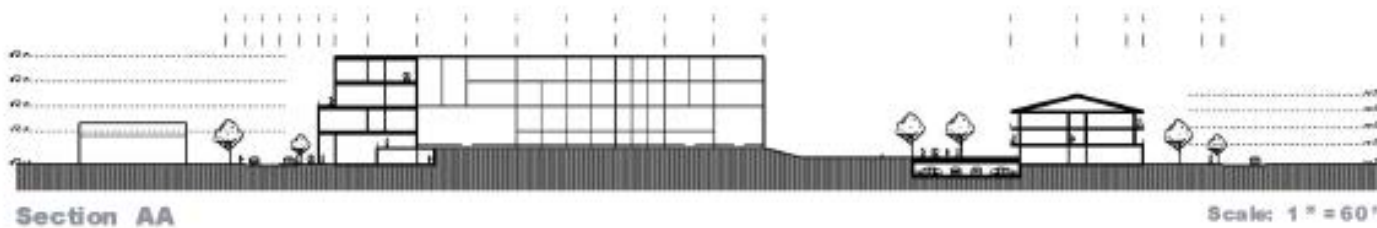
Studies of Form Based Codes and  
architecture in the University context

Cross sections showing  
maximum and minimum  
building bulk and the  
required floor-to-floor  
dimensions all buildings  
would follow.



# The Academic Village

Studies of Form Based Codes and  
architecture in the University context



## Form Based Codes



# The Academic Village

Studies of Form Based Codes and  
architecture in the University context

**Seven  
different  
projects  
sharing  
common  
themes**



**Kendall / Teaching Architecture Students to Work with Distributed Design**



"An occasional disciplinary boundary dissolve and information exchange, Che and many of his colleagues began to find a whole new way of working was needed. He kept in connection to the groups, the fields, and the students we know, he says, which is fine when the research path is clear. "When you don't know where you are going, in my experience, is when chance encounters are very important."

- Sarah Che, Stanford University James Russell, AIA

"The success of all this is part of how it 'grows' it can be changed? ... she benches, tables, shelves, and other components are based on standard fixtures but have been customized to be easily moved."

- David Nelson, Foster and Partners, James Russell, AIA

"... what might an wall have been a sign that said 'Interact Here!'"

- David Nelson, Foster and Partners, James Russell, AIA



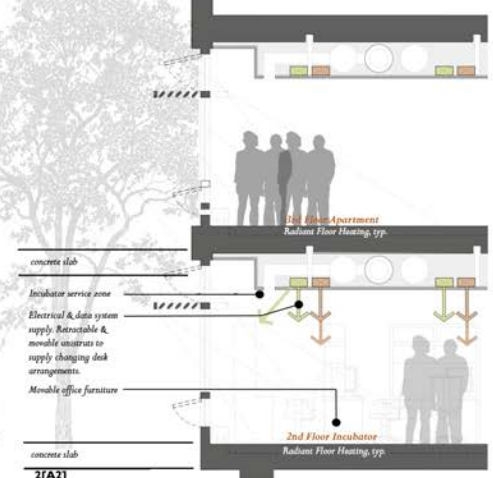
## Open building: creating a universal frame to allow maximum flexible space Creating 'chance encounters' thru dynamics



**The Clark Center**  
Stanford University  
**Foster + Partners MBT Architecture**  
Novato 111 Berry Street, Suite 1100  
San Francisco, CA 94107  
London: 020 7141 4450

"Twofold awarded to foster cross-disciplinary collaboration in the life sciences on in construction or on the boards at universities across the country. Stanford, however, may be unique in the degree to which architecture is used to make the chance encounters Che and his colleagues envisaged actually happen. For the scenarios involved, the green ideas hatched in a conference at Ball Laboratories or at a jam session during half way a job building at Oxford University had already taken a specific quality."

- James S. Russell, AIA, Architectural Record



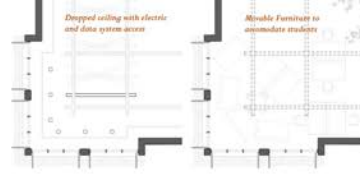
## Cross-Disciplinary Collaboration in Business Sciences at Ball State University

The Miller College of Business Entrepreneurship Incubator Facility & Student Housing Complex  
Creating architectural "pockets" of innovation, working innovation and ideas

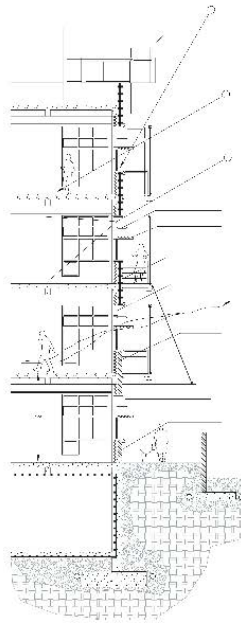
The original intention in the Miller College of Business complex housing an cross-disciplinary collaboration approach. The idea is to create a space where students can work together on projects, share ideas, and learn from each other. The building is designed to be flexible and adaptable, allowing for a variety of uses and activities. The space is designed to be open and collaborative, with a focus on creating a community of learners and innovators.

The idea of cross-disciplinary learning has enabled the proposed use an open building plan. Floor space is not defined, providing a space for use as desired. In a design to accommodate change and growth, the entrepreneurship incubator, the common space could also serve as a meeting space for students. The building is designed to be flexible and adaptable, allowing for a variety of uses and activities. The space is designed to be open and collaborative, with a focus on creating a community of learners and innovators.

The proposed plan to find a novel and practical relationship between the internal programmatic functions. On the first floor is an abundance of movable furniture and open space. The second floor houses the cross-disciplinary open space which the third floor houses students. Each floor serves a different function, the proposed use is early studies, faculty and best practices ideas in an of architectural responsiveness and "use and care" students become accustomed to a variety of activity over different periods of the day.



#### d. Sustainability



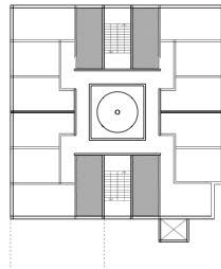
- Lighting studies were conducted to ensure the accuracy of sunshading devices of the facade such as louver systems, translucent glass, and neighboring balconies
- Operable windows controlled by users of the space allow for natural ventilation to accommodate the comforts of the individual resident
  - A band of opaque, operable windows is maintained throughout all windows in each unit
  - These windows are located just above head height allowing for wind to enter through lower windows circulate the space and exit the building
- There are green roofs located on top of each building
  - Reduces heating and cooling loads due to temperature regulation
  - Alleviates storm water draining directly into the system
  - Suppresses carbon in the atmosphere; introduces fresh oxygen

#### e. Facade

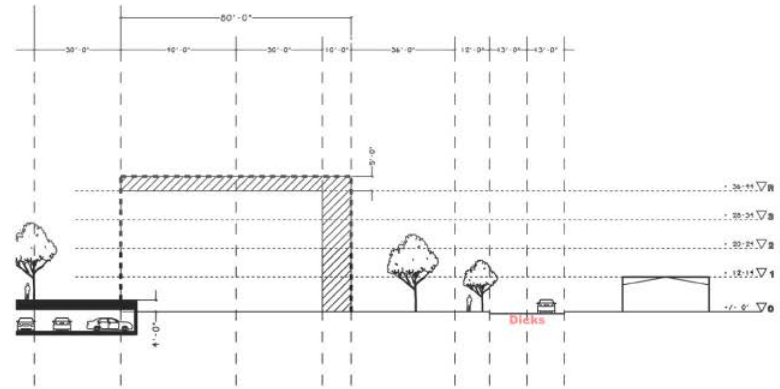
- Exterior materials consist of brick on the bottom third of the building and a metal panel system on the top two - thirds
  - Anywhere the two aforementioned materials come together the metal panel system overlaps the brick giving sense of "old meets the new" (see band of trim for the windows located above the woman's head in the perspectives)
  - This overlapping of materials runs congruently with my concept of the site; the idea of many layers merging at this one particular point or inhabiting the in between (i.e. town + gown relationship or university + village overlap)
- High panels of translucent glass filter out harsh sunlight giving adequate daylight no matter the time of year

#### f. Capacity to Accomodate Various Scenarios

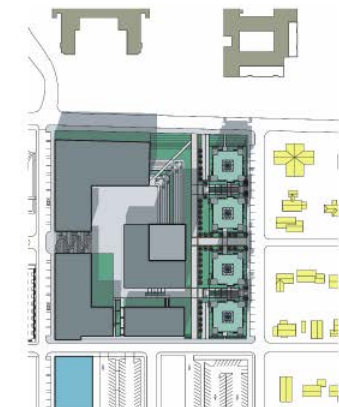
- To the right is a possible layout for a dormitory building with the same structural grid and center atrium as an ordering element



#### h. Compliance with "form-based codes



- g. The form based codes established an approximate floor to floor height of 12' - 14' for a three story structure resulting in a maximum building height restriction of 44'.
  - This rule was broken due to a lack of housing density created on the site due to the orientation of the buildings resulting in a height of 57' from the street level to the top of the corner towers
- The rules established for building footprints compromised in a manner conducive to its overarching goals
  - The general rules for setbacks and sightlines were followed except the 2 large housing chunks were divided into four buildings
  - These buildings remain joined by sub grade parking as suggested by the rules

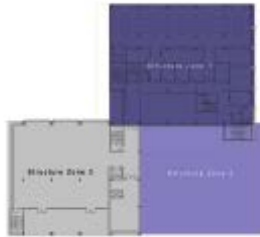


Another scheme

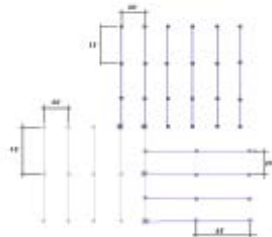
## Structure

Type: Steel

The Research Center uses a steel structural system comprised of three major zones, where the tower has its own zone. Zone 2 runs perpendicular to zones 1 and 3 due to large lecture halls on the ground floor that require larger spans.



Structural Zones  
NTS



Structural Grid  
NTS

## LIFE SCIENCE RESEARCH CENTER

bridging discovery and education



### Life Science Complex

The research center is part of a building life science education campus on the northeast corner of Block 200 campus. The campus floor plan shows the research center, lecture hall, and laboratory. The research center is located in the center of the campus.



### Sub-Grade Connections

The research center shares an underground parking lot with the lecture hall, lecture hall, and laboratory. These underground parking lots are located in the center of the campus, with a parking lot along Avenue D. Further, the research center for supplies and materials is also shared along both exterior buildings.

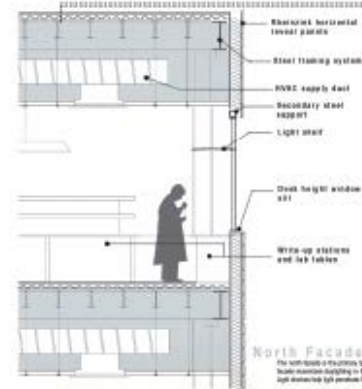


### Programmatic Layering

The research center shares an underground parking lot with the lecture hall, lecture hall, and laboratory. These underground parking lots are located in the center of the campus, with a parking lot along Avenue D. Further, the research center for supplies and materials is also shared along both exterior buildings.



Ground Floor Plan



### North Facade

The research center shares an underground parking lot with the lecture hall, lecture hall, and laboratory. These underground parking lots are located in the center of the campus, with a parking lot along Avenue D. Further, the research center for supplies and materials is also shared along both exterior buildings.



Second Floor Plan



SECTION A

## HVAC

The HVAC consists of two major shafts and one major branch along the service "comidor". The base has a separate system to cut back on energy required for 100% air intake in the laboratory tower.

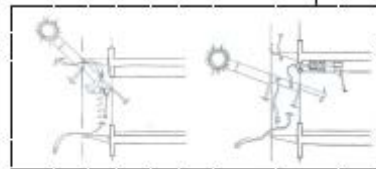


Second floor HVAC  
NTS



Section showing HVAC

The roof facade of the greenhouse areas is double skinned, where the air pocket minimizes summer heat gain and maximizes passive heating in the winter. This facade helps regulate the temperatures in the greenhouses.

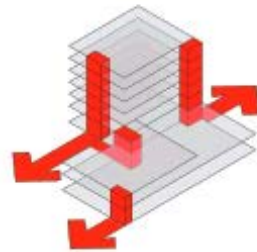


## Egress

Each floor above the ground level has two means of fire-rated egress. The second floor (shown) has four due to an additional wing. All upper floors follow the same egress plan for the laboratory tower section.



Second floor evacuation plan  
NTS



Egress Towers

A third proposal

### Sustainability Daylighting

The most significant sustainable principle addressed is daylighting. Daylighting not only reduces the need for electric lighting, but also increases the level of productivity and enjoyment in the building spaces.

With the use of an atrium (lightwell), 100% of offices and labs have either direct or indirect access to daylight.



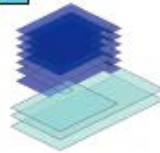
- Programmed space with direct access to daylight
- Programmed space with indirect access to daylight

### Sustainability Separate HVAC

The laboratory tower requires 100% fresh air intake for every cycle. The tower area is served by an HVAC system following this requirement, whereas the base uses a separate system that allows for recirculated, eliminating unnecessary energy spent in filtering and circulating fresh air.



- Primary air circulation system (100% fresh air intake)
- Secondary air circulation system

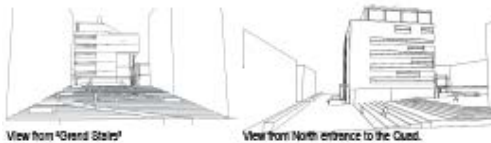


### Sustainability Green Roof

The laboratory tower requires 100% fresh air intake for every cycle. The lower area is served by an HVAC system following this requirement, whereas the base uses a separate system that allows for recirculated, eliminating unnecessary energy spent in filtering and circulating fresh air.



### Snapshots through Site



### Facade+Materials



The facade consists of an interplay between the materials brick and rhinotank. The base is composed mainly of brick, whereas the tower is mainly of rhinotank. The brick addresses references to history and tradition, whereas rhinotank addresses ingenuity and change.



North Elevation

East Elevation

South Passageway

Northeast Plaza

Interior Atrium

SECTION B

Third-Fourth Floors

Fifth Floor

Sixth Floor

Closed Lab  
Labs are laboratory studies made for more specialized and focused research

Flexible offices  
Offices able to be repurposed or subdivided to suit additional program space

Greenhouse  
The first "greenhouse" on the US and will have possibilities for variety of research



# HOSPITALS ON THE TIME AXIS

**Preparing Hospitals for Inevitable Churn:**  
A Proposed New Hospital Pavilion at the University of Chicago Medical Center

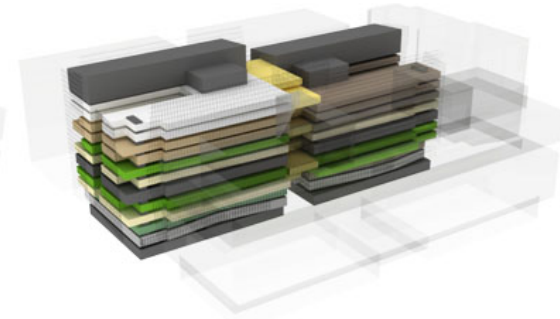
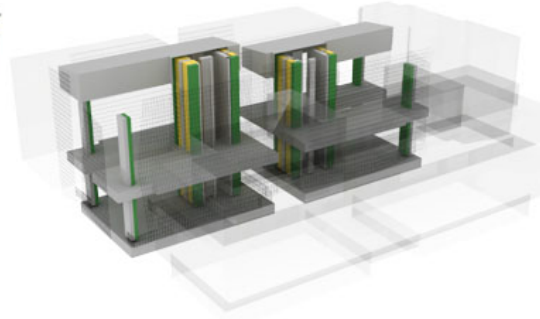
Ball State University Department of Architecture  
Graduate Studio 501 / Fall 2009  
Professor Stephen Kendall, PhD



Building wall section  
south facade

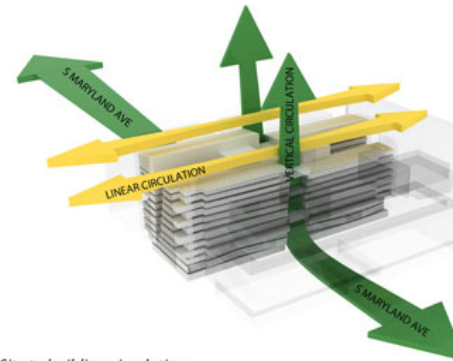
MEP/vertical circulation

- Circulation/Stairs
- Mechanical Chase
- Circulation/Elevators

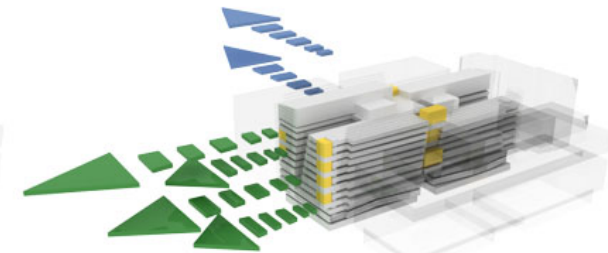


Programmatic stacking

- Mechanical
- Retail/Mechanical
- Emergency
- Diagnostic & Treatment
- Clinical
- Future Shell
- Patient Care
- Public/Lobby
- Office/Lab

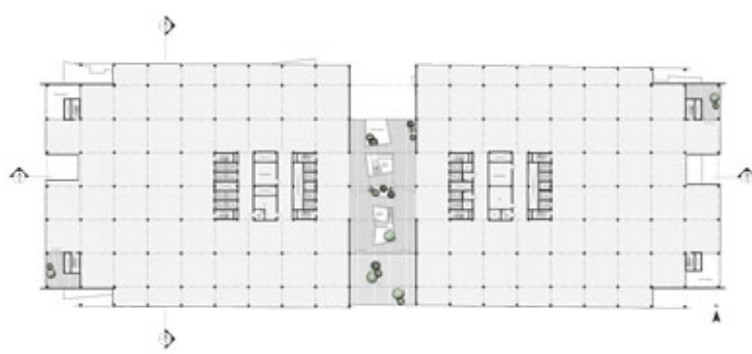


Site to building circulation



Views from garden pods

**Graduate Student work – a base building for a 1.2 million sq ft project on the University of Chicago Medical Center campus / Fall 2009**



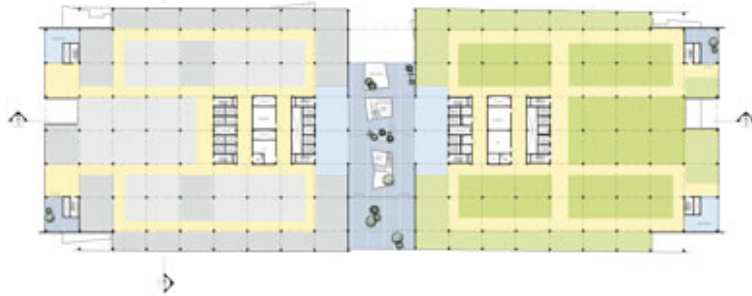
4th floor shell plan



7th floor shell plan

**Capacity studies of two floors of the base building showing not only capacity for health care functions but other uses as well.**

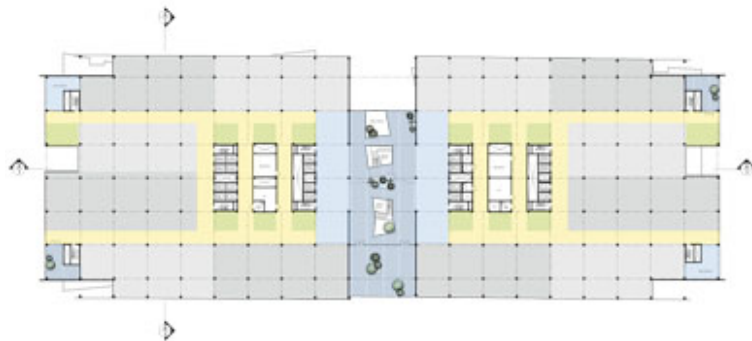
**I advocate that clients ask their service providers for such studies.**



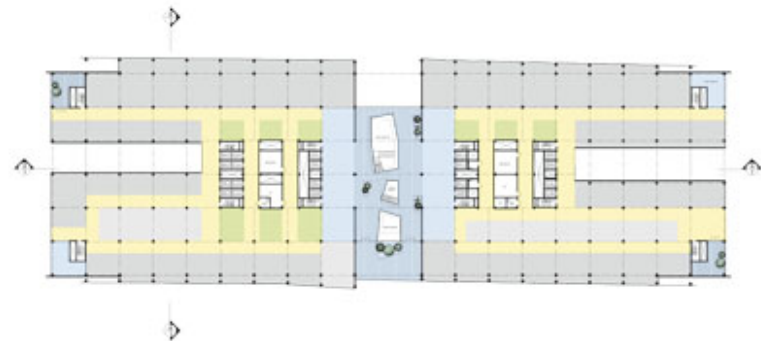
4th floor capacity #1  
clinical/research



7th floor capacity #1  
clinical/ research

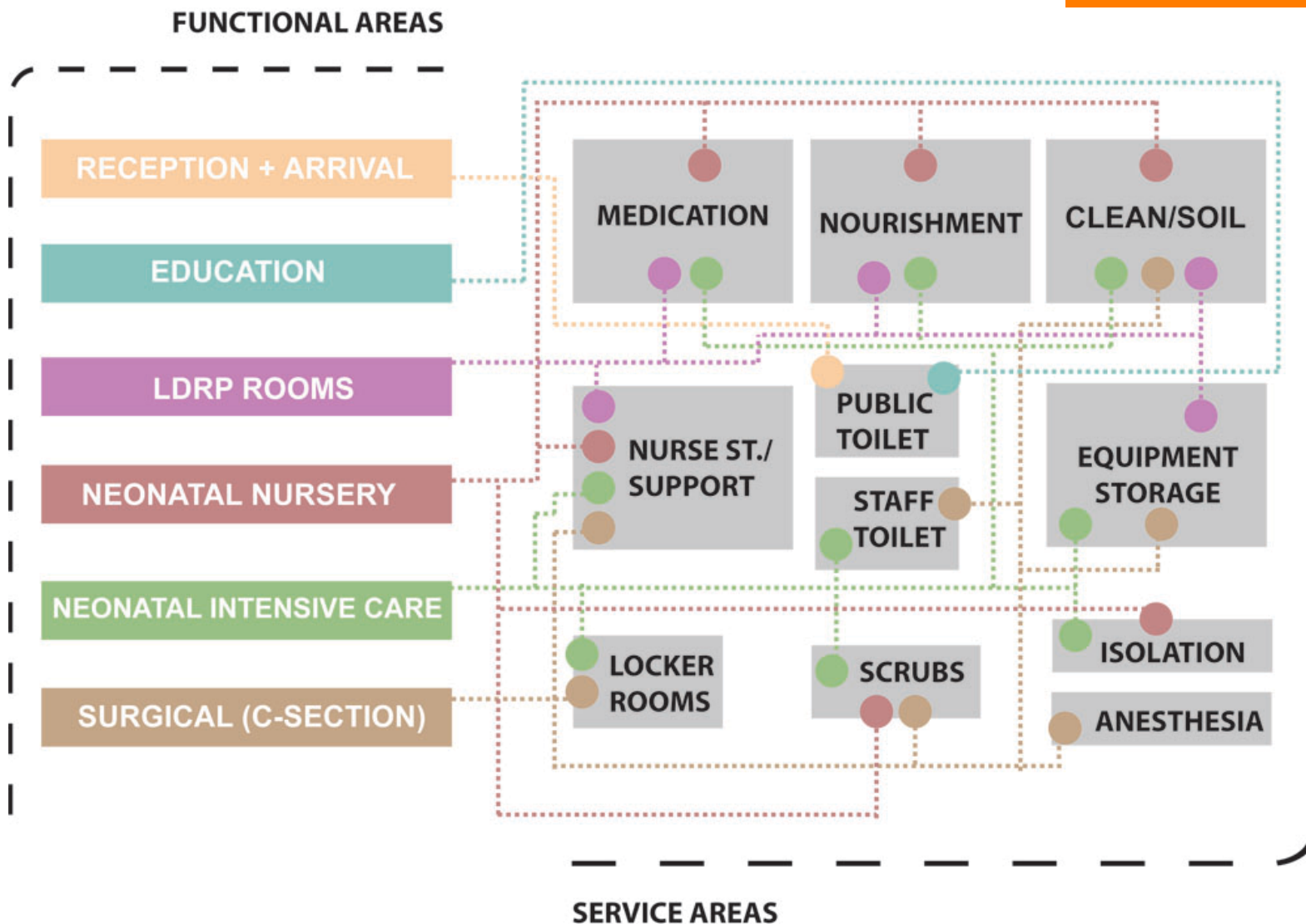


4th floor capacity #2  
convention center

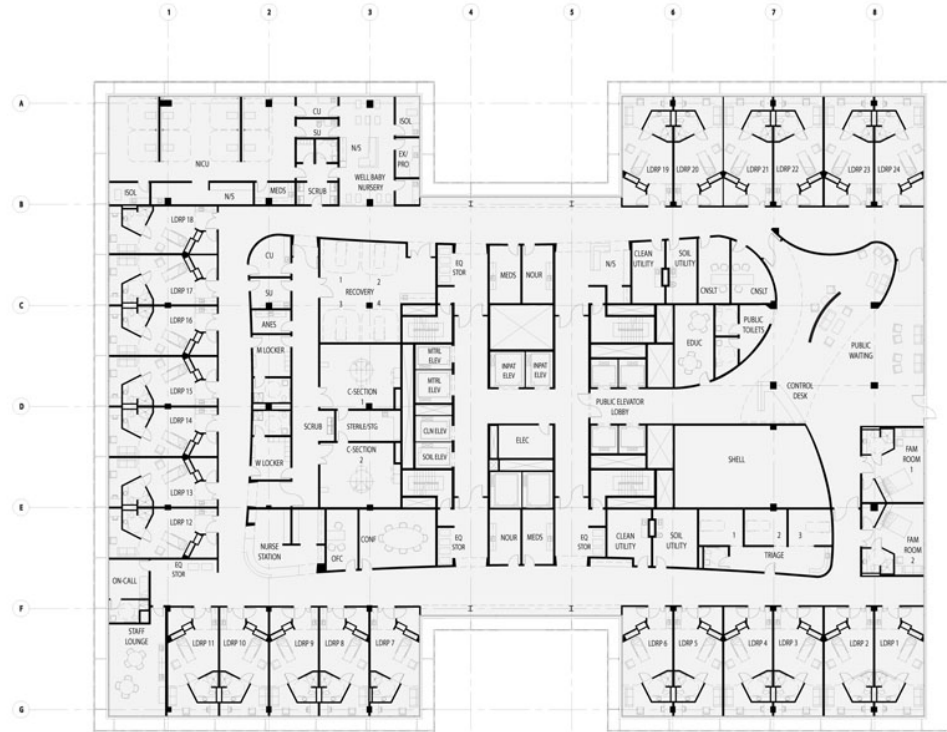
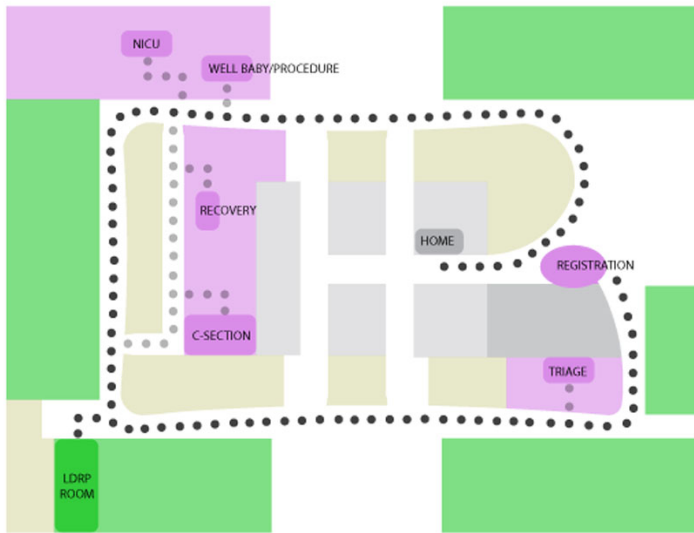


7th floor capacity #2  
hotel and suites





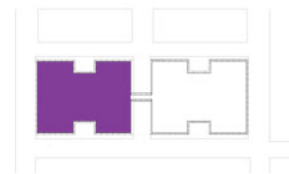
**Mapping the functions and adjacencies for the OBGYN Department – a part of the fit-out programming exercise, independent of the base building.**



7th floor plan, birthing center

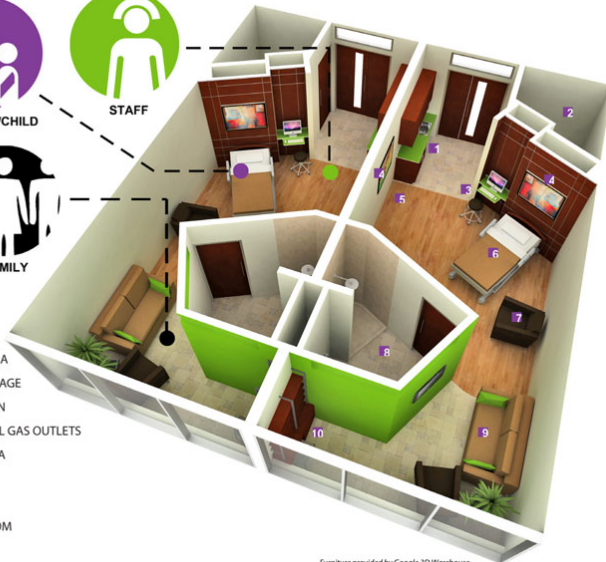


Patient circulation



Location diagram

## Patient circulation



- 1 SINK AND SCRUB AREA
- 2 DELIVERY CART STORAGE
- 3 NURSE WORK STATION
- 4 CONCEALED MEDICAL GAS OUTLETS
- 5 NEWBORN CART AREA
- 6 MOTHER CARE
- 7 DELIVERY PARTNER
- 8 TOILET/SHOWER ROOM
- 9 SOFA SLEEPER
- 10 FAMILY ZONE DESK/STORAGE

Furniture provided by Google 3D Warehouse

**The fit-out scheme for the labor and delivery department, done in the last 4 weeks of last semester. This team did their fit-out scheme in the base building designed by another team...**

**Students do not easily accept the idea that designing constraints for others to use is challenging and creative.**

**Students understand constraints or rules as things to be pushed or broken, to find their limits, rather than to find out what they offer and enable.**



At an open building workshop I taught at National Taiwan University of Science and Technology

**But eventually, students found  
that working with constraints  
did not suppress good design!**



At an open building workshop  
I taught at the University of Pretoria

Constraints are always embedded in socio / political situations.

It's important to find ways to give students opportunities to both **make and use** constraints. That is, to be both leaders and followers, and to know when to do both...





*Because students will find that they cannot always impose their own values on others, they need methods - design methods - that enable them to help those they work with reach agreement under quite variable conditions of practice.*

## **WE NEED DESIGN SKILL EXERCISES**

because built environment is about change and transformation as much as about permanence.

## **WE NEED DESIGN SKILL EXERCISES**

because we are not soloists...

**LET US RECOGNIZE CHANGE AND DISTRIBUTED CONTROL AND LEARN TO WORK WITH THESE FACTS OF LIFE.....**

