Teaching Architecture Students to Work with Distributed Design

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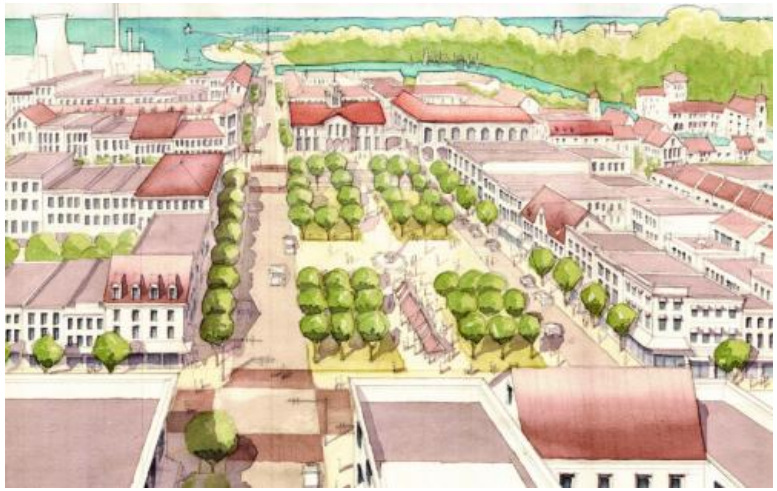
Ball State University, USA

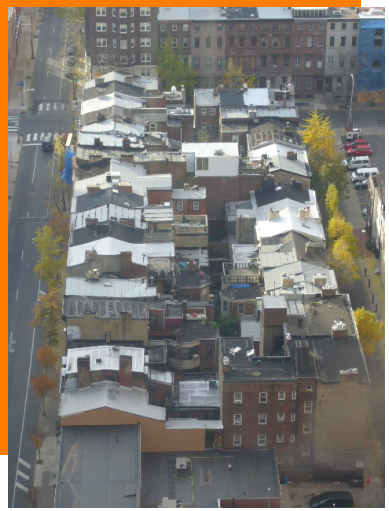
Key points in the paper:

No one designs everything
(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)

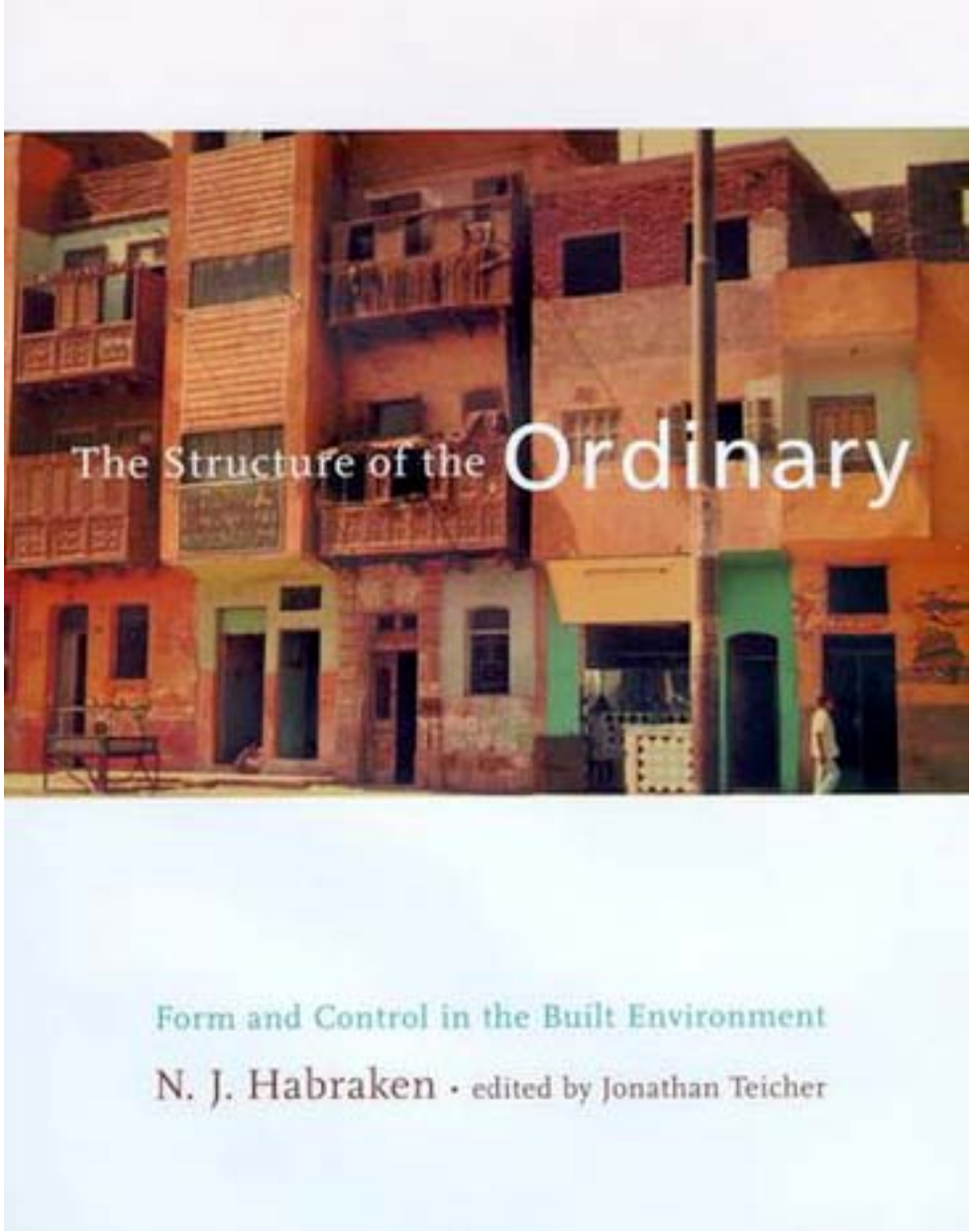
Why try to bring these ideas into studio education?





The reason to do this is because of my view that the quality of the commons - the ordinary, everyday built environment - is the wellspring of architecture. The truly special grows from what is shared and goes beyond it.

That means that we need to know how to see and understand what is shared, in order to be able to handle it and make it better.



The Idea of Exercises

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

Kinds of Exercises

All of the exercises I have used have at least these common ideas:

Documenting environmental themes, patterns and systems;

The man-made environment is never finished;

Design is distributed;

Designers need to learn to both lead and follow - to set 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
3. Defining Territories
5. Sharing territory
7. The street façade as part of the urban tissue
9. Thinking in section
6. Entries

The Street Space Exercises
Bern, Switzerland

Values

I did not make a case that the Bern "theme" was correct in some objective way.

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

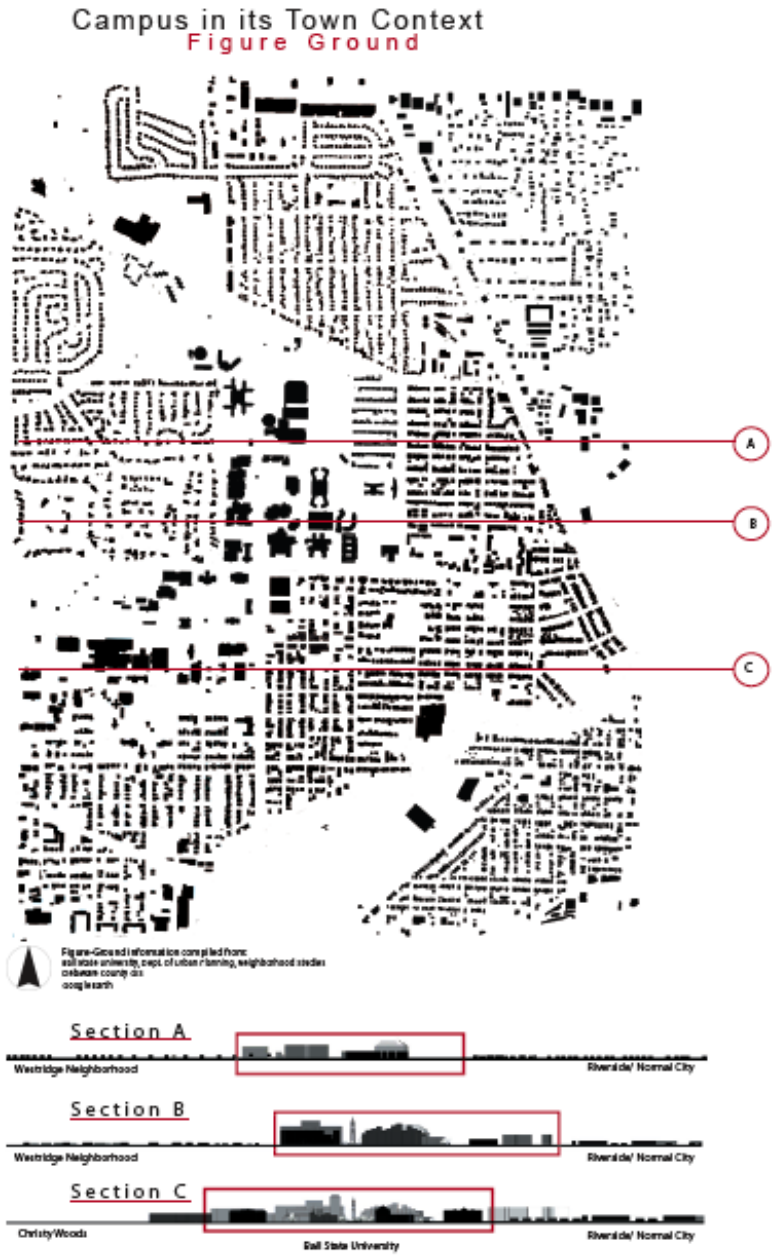
Explorations

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.

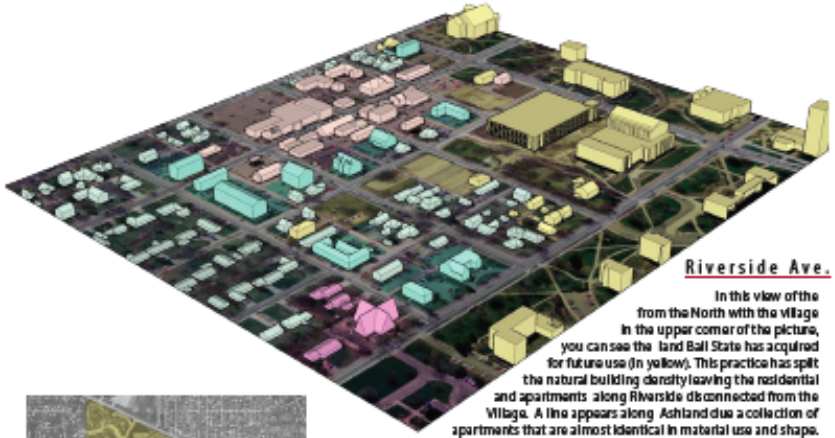


The Academic Village

Studies of Form Based Codes and architecture in the University context

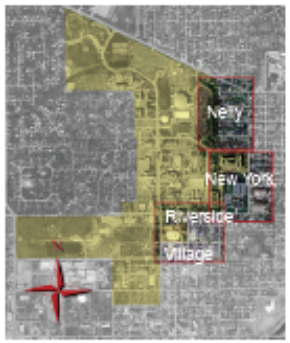
Village

The Village located along 5 blocks of University Ave. is the nearest commercial district to Ball State. There is a wide variety of uses and mixed use buildings within this core of a few blocks, however a few blocks from this core the use changes back to residential housing. To the South and East of the village, these residential houses are a mix of one to three stories with a variety of roof pattern, materials, and shapes. Parking lots fill the voids left by the buildings. A large parking garage owed by Ball State could help create more open spaces, but few people utilized this service because a fee is collected.



Riverside Ave.

In this view of the from the North with the village in the upper corner of the picture, you can see the land Ball State has acquired for future use (in yellow). This practice has split the natural building density leaving the residential and apartments along Riverside disconnected from the village. A line appears along Ashland due a collection of apartments that are almost identical in material use and shape. The east of Dicks St. the density changes again to a collection of slab houses with very slender roofs. At the corner of Dicks and Riverside, a large 3 story A-frame church building drastically contrast this short residential neighborhood, however helps transition the connection along Riverside from one story residential housing to the 2 and 3 story houses and eventually Ball Sate buildings.

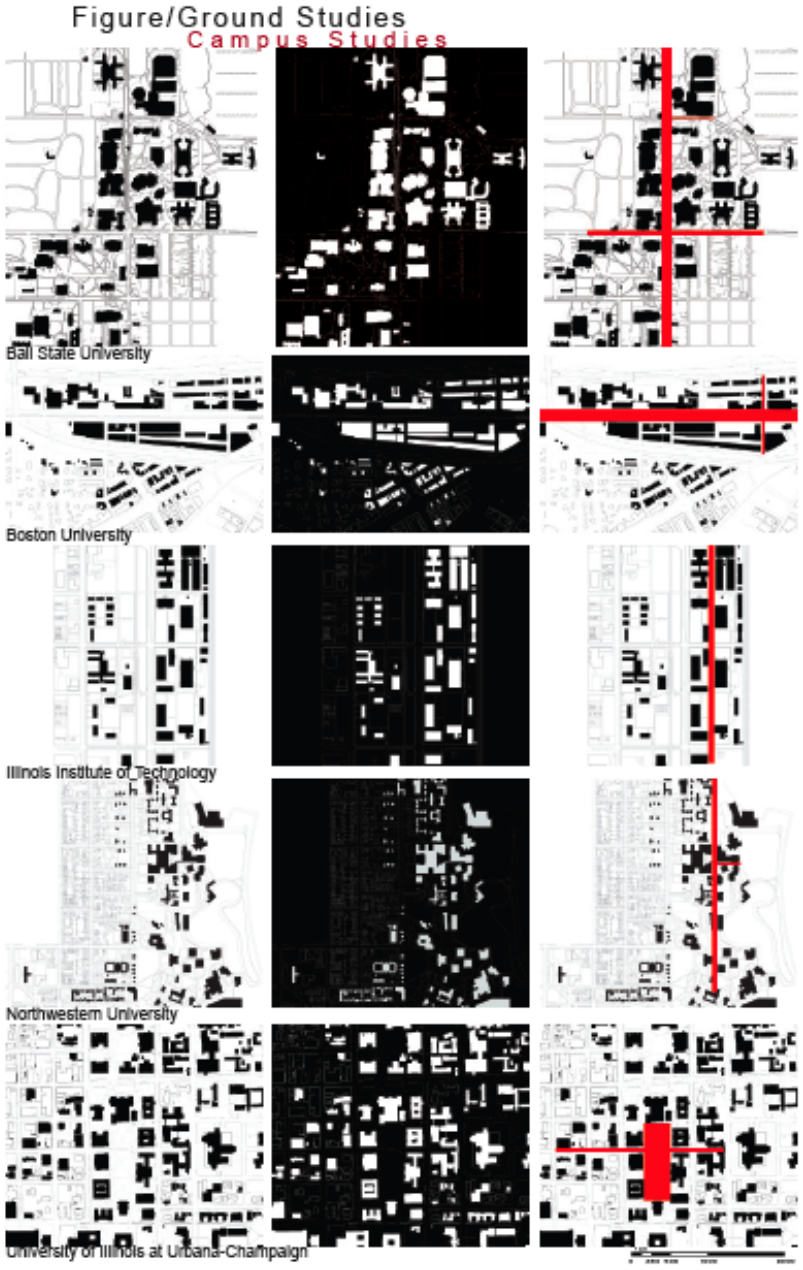


All data was extracted from the Delaware County GIS Map found at http://www.sidwellmaps.com/website/delawareco/

The Academic Village

Studies of Form Based Codes and architecture in the University context

We also compared the campus with other university campuses.



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Studies of Form Based Codes and architecture in the University context

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

The Academic Village

Studies of Form Based Codes and architecture in the University context

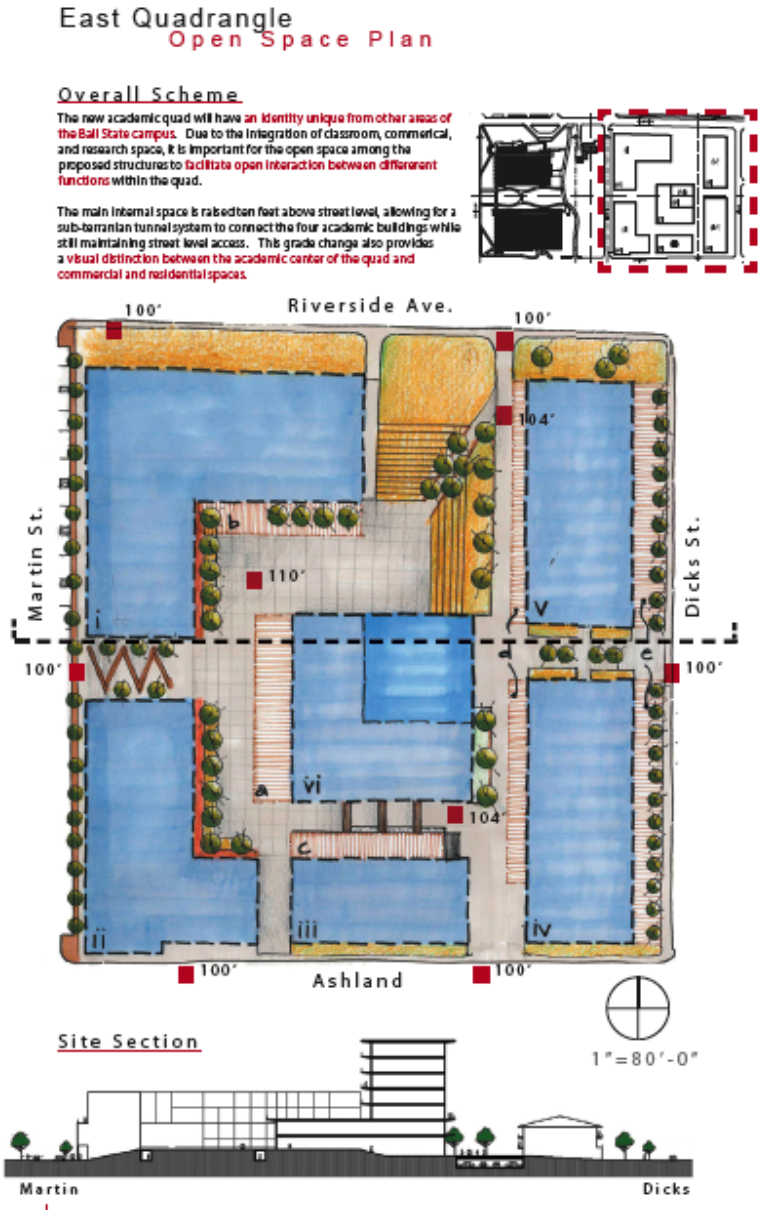
Form Based Codes

Next, we developed FORM BASED CODES. These “CODES” were developed by a consensus process.

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.



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Studies of Form Based Codes and architecture in the University context

details of some of the public spaces…

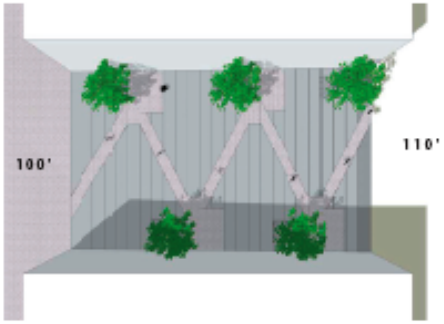
East Quadrangle
Open Space Plan

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 Institue of Technology Student Center, noted in the photos below.

Grand Stairway



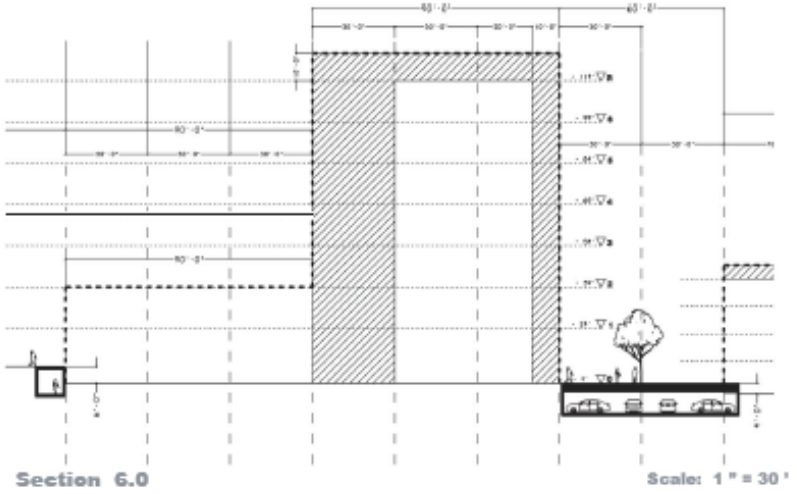
Aerial view of staircase

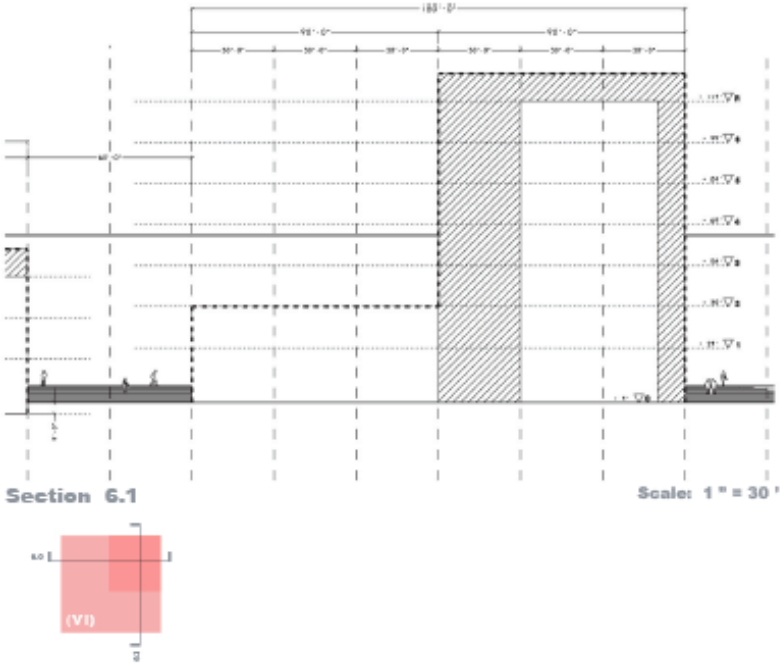
Perspective from Martin St.

Images of Koolhaas staircase from University of Waterloo

The Academic Village

Studies of Form Based Codes and architecture in the University context





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

The Academic Village

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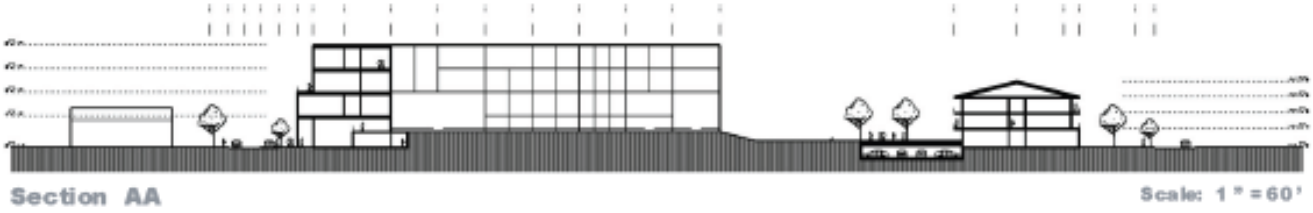
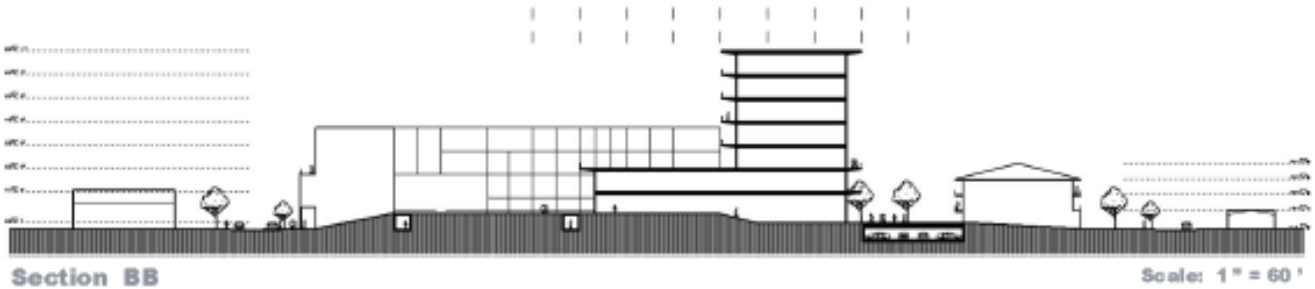
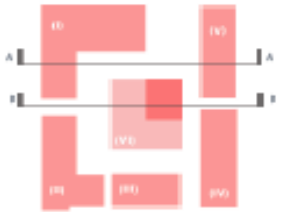
architecture in the University context

Form Based Codes







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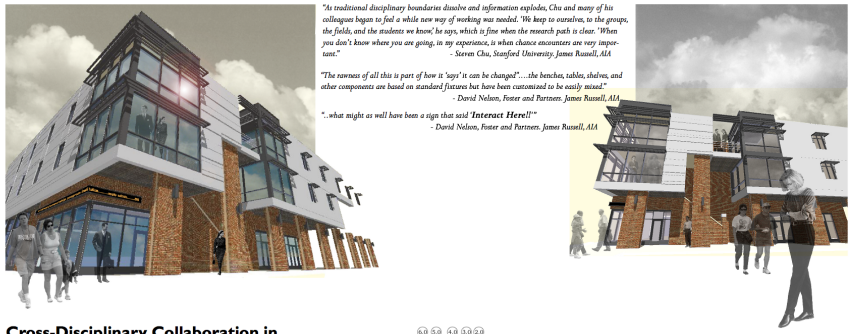
Studies of Form Based Codes and
architecture in the University context

The Site



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 interaction, invoking innovation and ideas

"As traditional disciplinary boundaries dissolve and information explodes, Chu and many of his colleagues began to feel a while new way of working was needed. 'We keep to ourselves, 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.' - Steven Chu, Stanford University. James Russell, AIA

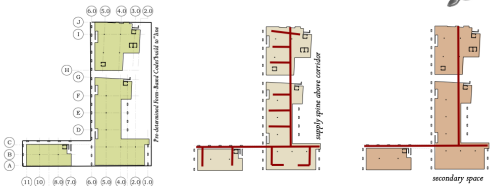
"The rawness of all this is part of how it 'says' it can be changed"....the benches, tables, shelves, and other components are based on standard fixtures but have been customized to be easily mixed." - David Nelson, Foster and Partners. James Russell, AIA

"...what might as well have been a sign that said 'Interact Here!!'" - David Nelson, Foster and Partners. James Russell, AIA

The proposed extension to the Miller School of Business explores learning in a cross-discipline, collaborative approach. Students in the business college experience learning on multiple levels while breaking the rigid mold of conservative classroom learning. Business students are no longer bound to books, uncomfortable seats and dry-erase boards but rather indulged in an environment of extreme "hands-on" learning. Learning is now doing. Initially, the programmatic requirements looked for a facility to harbor a growing number of entrepreneurship students looking for space to get their proposed businesses started. Currently, the space given to these students has been horribly ear-grown. What is in store for the future is an environment within this proposal that become open to many other non-business college disciplines.

The idea of cross-disciple learning has molded this proposal into an open-building plan. Floor space is not defined, programs within a space are not declared. It is designed to accommodate change and growth. For the entrepreneurship students, the environment draws parallel ideas from the Clark Center at Stanford University. Students are given an open space, movable desks, tables, chairs, filing cabinets, communication equipment which can be easily moved, adjusted and changed to fit the ever-evolving needs of students and faculty. Data system, heating, venting, air conditioning and electric supply drop down from the ceiling to connect students to essential utilities. When change is needed, the utility supply can retract back to the ceiling, the furniture rearranged and process continues.

The proposal seeks to find a social and structural relationship between its three internal programmatic functions. On the first floor is an abundance of intended flexible retail space. The second floor houses the cross-discipline open plan space while the third floor houses students. While each floor serves completely different functions, the proposal tries to unify student, faculty and local socialization thru its use of architectural transparencies and "in-and-outs". Students become immersed in a variety of activity over different periods of the day.



Building Structure
Cast in place concrete structure with prefabricated concrete core planels. Columns @ 30' intervals in two-way grid.

MEP - HVAC
Accessible thru floor slabs via elevator core. Heating & cooling supplied by university energy - facility tapped into existing infrastructure

Primary Circulation
Open building plan - primary circulation intended for single loaded corridor, secondary space to be arranged by tenant.

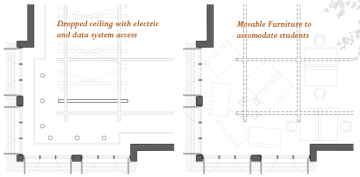
Open building: creating a universal frame to allow maximum flexible space
Creating 'chance encounters' thru dynamics

The Clark Center
Stanford University

Foster + Partners
Riverside
22 Hester Road
London SW11 4AN

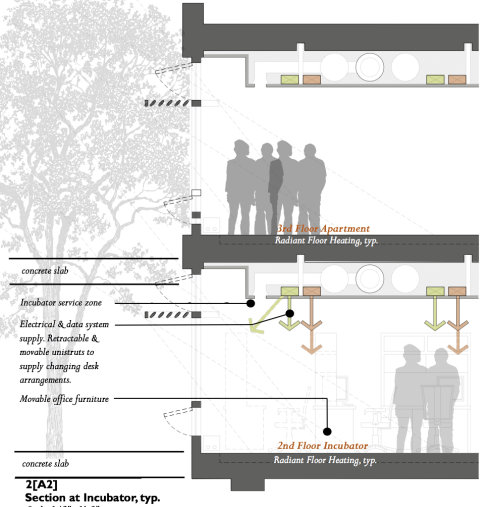
MBT Architecture
185 Berry Street, Suite 5100
San Francisco, CA 94107
(415) 896-0800

"Facilities intended to foster cross-disciplinary collaboration in the life sciences are 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 Chu and his colleagues envisaged actually happen. For the scientists involved, the great ideas hatched in a cafeteria at Ball Laboratories or at a famous dining hall atop a lab building at Oxford University had already taken a mythic quality."
-James S. Russell, AIA Architectural Record



Reflected Ceiling Plan, typ.
Scale: NTS

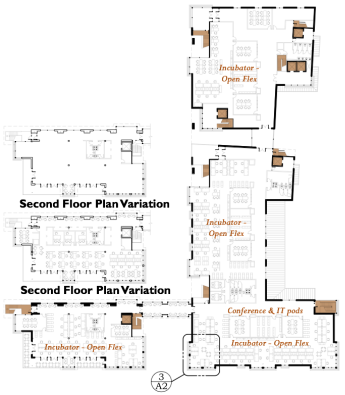
Incubator Utility Dynamics
Scale: NTS



2[A2] Section at Incubator, typ.
Scale: 1 / 2"=1'-0"

Proposed East Quad Plan
Scale: NTS

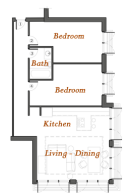
Ground Floor Plan
Scale: 1"=30'-0"
vertical circulation



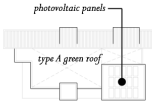
Second Floor Plan Variation

Second Floor Plan Variation

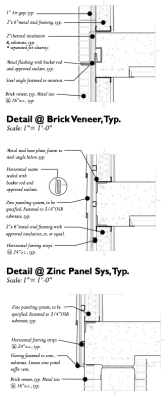
Second Floor Plan
Scale: 1"=30'-0"
vertical circulation



Typical 2 Bed Unit
Scale: NTS
1200 sqft gross area



Third Floor Plan
Scale: 1"=30'-0"
vertical circulation



Detail @ Brick Veneer, Typ.
Scale: 1"= 1'-0"

Detail @ Zinc Panel Sys, Typ.
Scale: 1"= 1'-0"

Detail @ Brick-Zinc Trans, Typ.
Scale: 1"= 1'-0"

Secton [1-A1]
Scale: 1"=20'-0"

Secton [1-A2]
Scale: 1"=20'-0"

A1 sheet

A2 sheet

One of the student proposals

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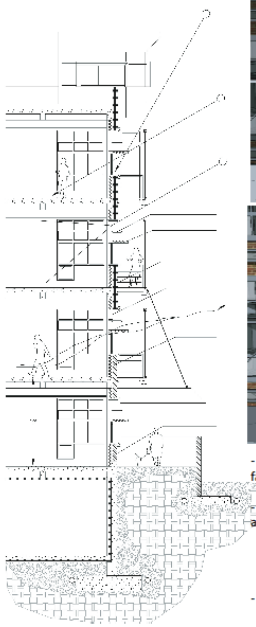
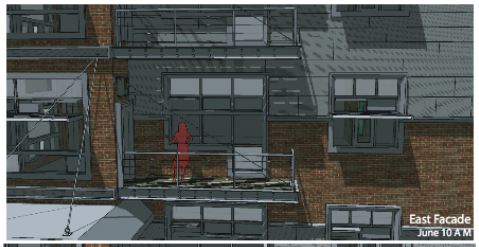
d. Sustainability





- 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 accomodate the comforts of the individual resident
  - A band of opaque, operable windows is maintaned 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

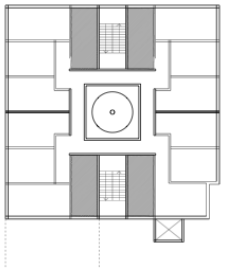
e. Facade

- 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)

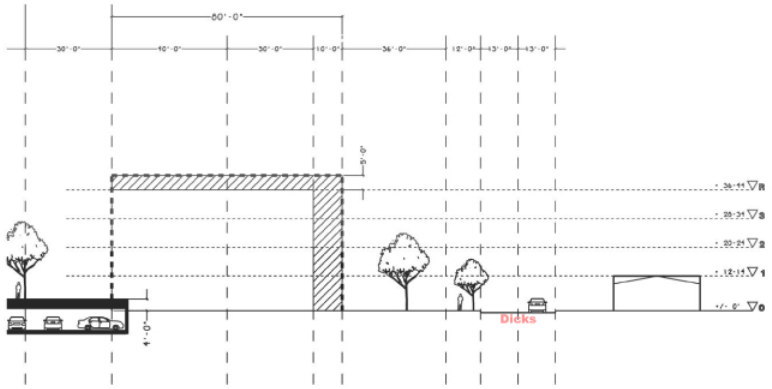
- High panels of translucent glass filter out harsh sunlight giving adequate daylight no matter the time of year

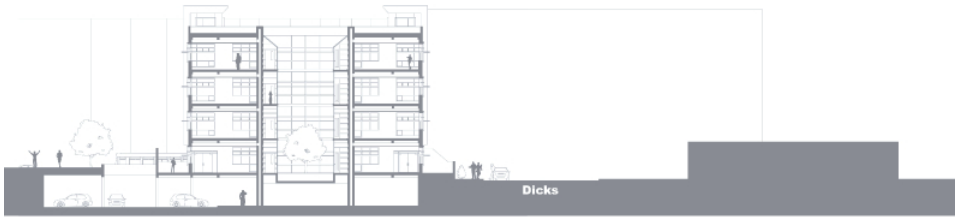
f. Capacity to Accomodate Various Scenarios

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

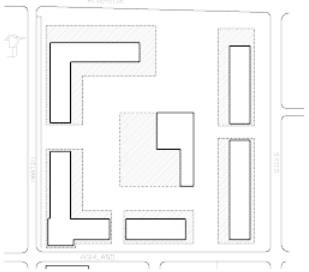


h. Compliance with "form-based codes





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 restrication 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



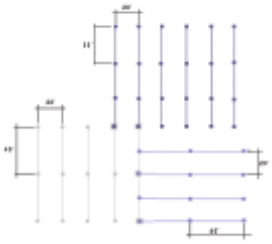
Another scheme

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

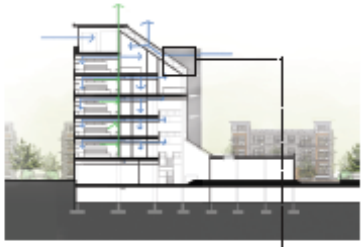


Structural Grid
NTS

HVAC

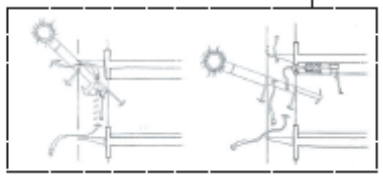
The HVAC consists of two major shafts and one major branch along the service "corridor." The base has a separate system to cut back on energy required for 100% air intake in the laboratory tower.

Second floor HVAC
NTS



Section showing HVAC

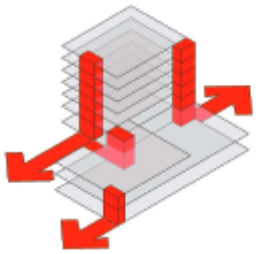
The roof/facade of the greenhouse areas is double skinned, where the air pocket minimizes summer heat gain and maximizes passive heating in the winter. This facade helps regulate the temperatures in the greenhouses.



Egress

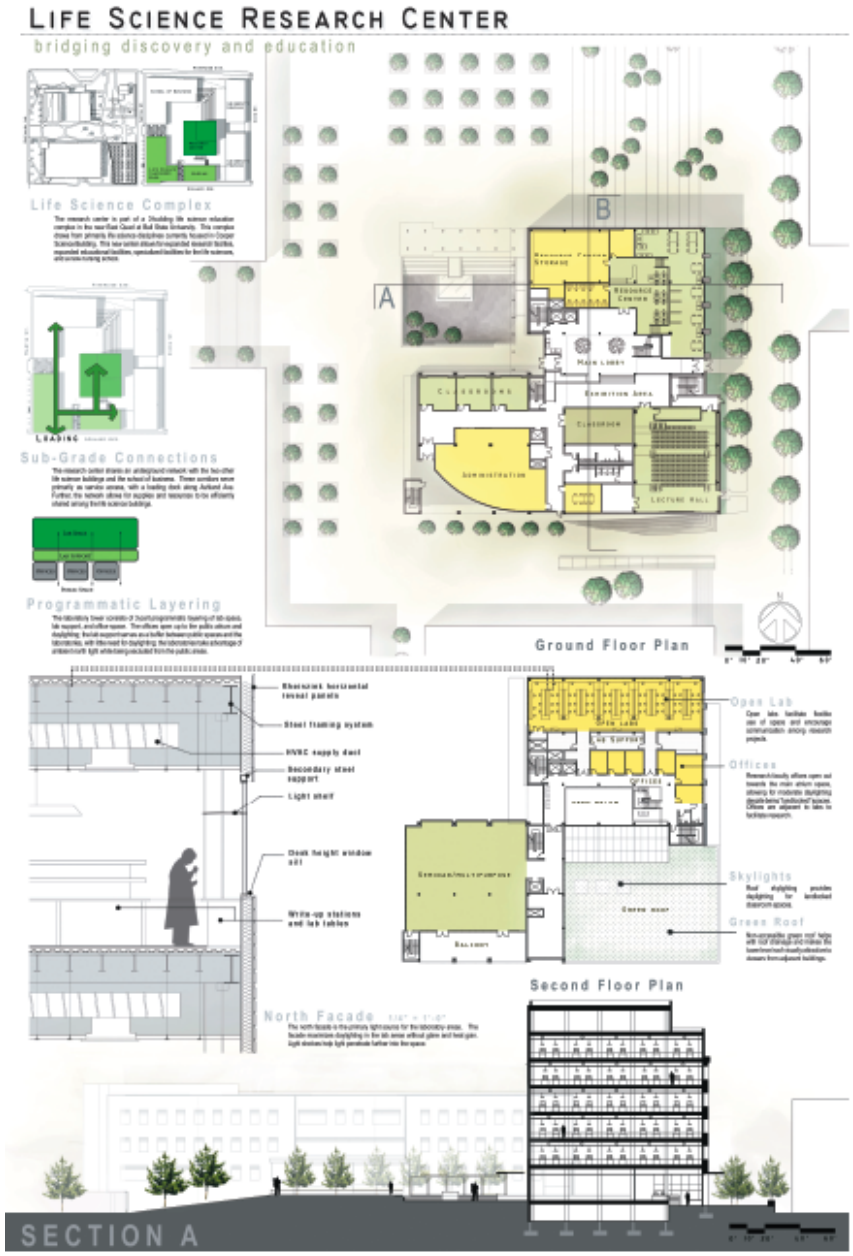
Each floor above the ground level has two means of fire-rated egress. The second floor (shown) has four due to an additional wing. All upper floors follow the same egress plan for the laboratory tower section

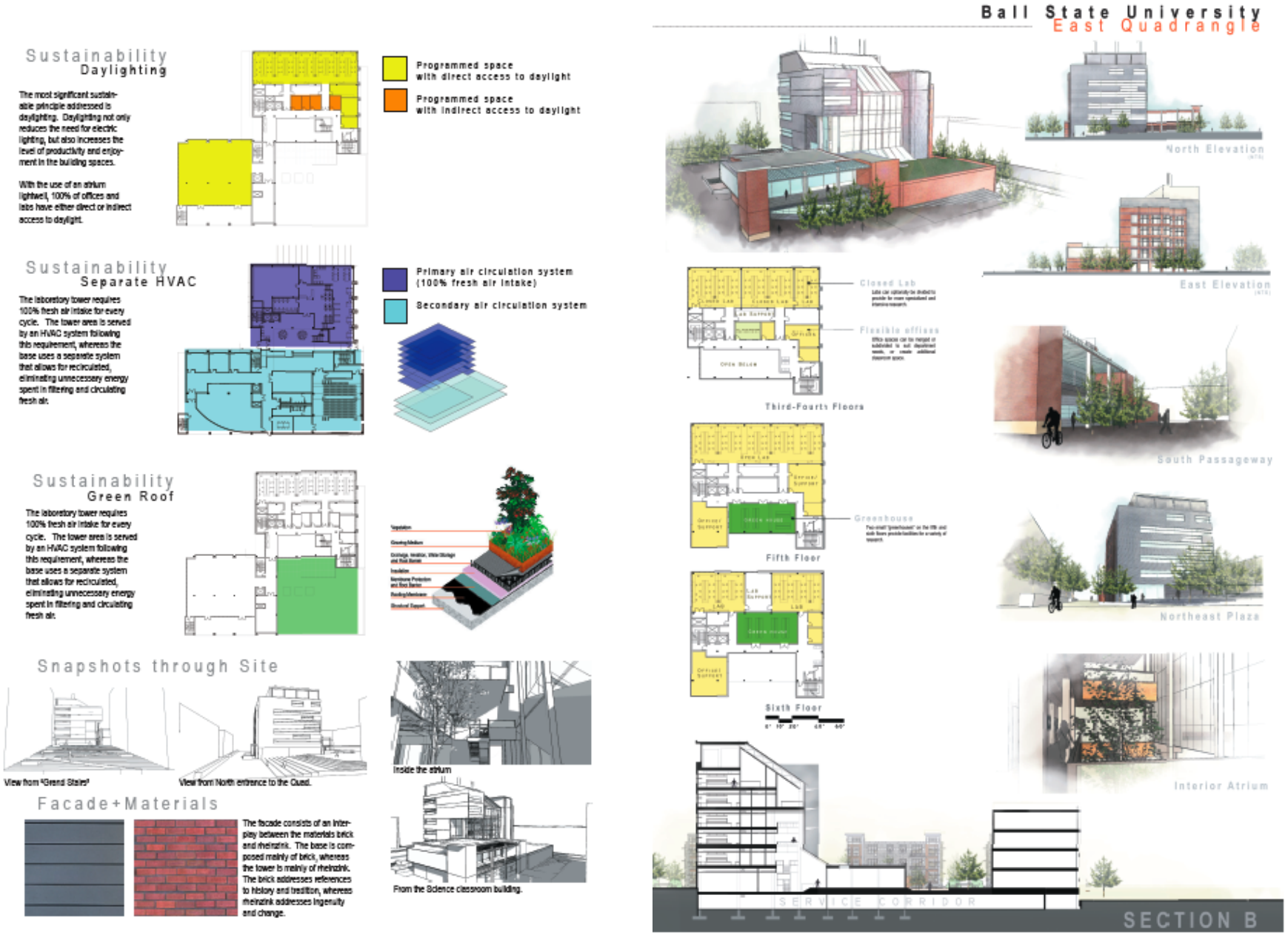
Second floor evacuation plan
NTS



Egress Towers

A third proposal





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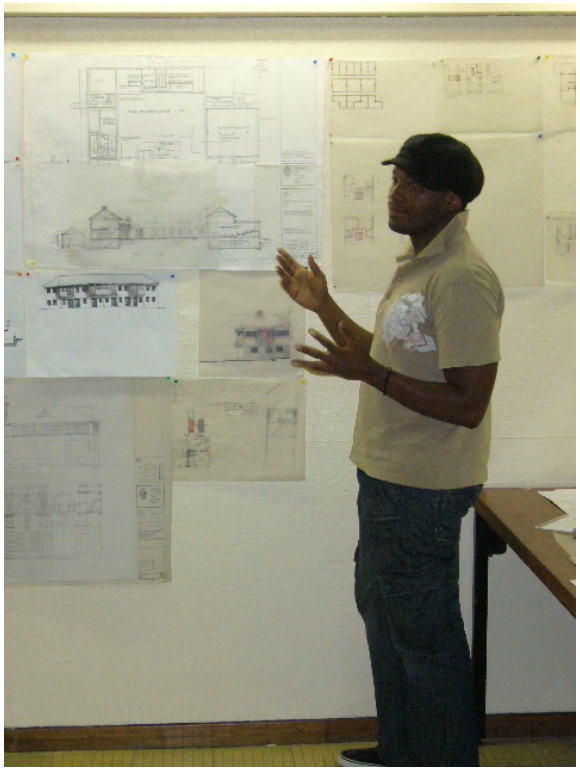
Conclusions

Quality of student work

Students become impatient



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

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

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

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

The question arose about making **"good" constraints**. I have my own ideas and convey them, but also believe students need to be free to establish their own, always recognizing that others they work with or for may have different values.

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 others reach agreement. A design is, after all, what is agreed should be built. Exercises are a teaching method in support of that.

Thank you!