FINAL PRESENTATION  6TH MAY 2016
OUR SITE – THE UNIVERSITY OF MADISON (WISCONSIN)
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## THE OWNER SURVEY – QUANTITATIVE

<table>
<thead>
<tr>
<th>Name</th>
<th>How important are security systems to your building?</th>
<th>Is cost a driving factor for your building?</th>
<th>How much do you value a collaborative environment in the building?</th>
<th>How much do you want your building to connect with the campus environment?</th>
<th>How much do you value technological innovations in the building?</th>
<th>How much do you value the quality of the indoor environment? (Natural ventilation, air quality and etc.)</th>
<th>How important is building flexibility?</th>
<th>How sustainable do you want your building to be?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daniel</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Hussain</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Michael</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Karolina</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Jana</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3.6</strong></td>
<td><strong>4</strong></td>
<td><strong>4.4</strong></td>
<td><strong>4.4</strong></td>
<td><strong>4.4</strong></td>
<td><strong>5</strong></td>
<td><strong>4.6</strong></td>
<td><strong>4.2</strong></td>
</tr>
</tbody>
</table>
OWNER GOALS AND VALUES

Indoor Quality 4.8
Flexibility 4.6
Collaborative Environment 4.4
Location Connectivity 4.4
Constructability 4.4
Techn. Innovation 4.4
Sustainability 4.2
Aesthetics 4.2
Cost 4.0
Security 3.6

5 - highest | 0 lowest
## PERFORMANCE OF OUR CONCEPTS

<table>
<thead>
<tr>
<th>Weighted Value</th>
<th>NATURE TO FUTURE Steel</th>
<th>NATURE TO FUTURE Concrete-Steel</th>
<th>THE sunNEST Steel</th>
<th>THE sunNEST Wood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score: 0 (low) to 4 (high)</td>
<td>2.27</td>
<td>2.08</td>
<td>2.5</td>
<td>2.77</td>
</tr>
<tr>
<td>Percentage: 50% Owner/50% Team</td>
<td>$ 999,600</td>
<td>$ 1,019,300</td>
<td>$ 863,400</td>
<td>$ 843,500</td>
</tr>
<tr>
<td>Rent per year</td>
<td>$453,590</td>
<td>$498,740</td>
<td>$338,921</td>
<td>$297,007</td>
</tr>
<tr>
<td>Yearly Rent per Point of Value</td>
<td>$453,590</td>
<td>$498,740</td>
<td>$338,921</td>
<td>$297,007</td>
</tr>
</tbody>
</table>
# THE OWNER SURVEY – QUALITATIVE

| Name   | How high do you like your ceilings? | Where would you prefer to have your classrooms or auditorium? | What generic feel of key materials would you like in your building? (wood, glass, aluminum, apparent concrete, ceramics, carpets, etc.) Please consider the building interior and the envelope. | Do you prefer wide open areas or closed isolated silo's? Do you fancy wide or narrow corridors? |
|--------|-----------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------
| Daniel | High ceilings on the main floor, all other floors can have typical floor-to-ceiling heights | Wherever makes most sense to put it considering the flow of students. | Don’t care. Make it beautiful. Use sustainable and local materials that are cheap and provide value to the building. Find a good material, and convince me why we should use it. | I prefer open areas, but areas should be designed to increase the efficiency of the building and movement within the building. |
| Hussain | The most optimal height | In the most optimal place | Hybrid materials, new and innovative materials | Wide and wide |
| Michael | As high as possible, given cost and size limitation | Depends on intended occupant flow through building. The auditorium should be easily accessible by large groups of people, allowing quick entering and exiting without significant backups or bottlenecks. | Depends on Cost, Big Idea, Sustainability. | Prefer iconic open areas, but still space for privacy in offices and smaller work venues. |
| Karolina | At least 2,5 m | Auditorium in the middle, classrooms on the perimeter. | Wood, steel, glass, paper maybe? Natural and sustainable materials are highly appreciated. | Yes for open and spacious areas. |
| Jana | please be more specific, are we talking about atrium ceilings, classroom ceilings, ...? | there is no such trade off between these rooms - you always have to fulfill the requirements given in the handbook | wood, glass, steel, concrete, for interior bright and light materials which are easy to clean and last at least 10-15 years | no dark corners, some open areas are ok but not all over the place, wider corridors are ok |
THE SOLUTION PROPOSAL REPORT (SPR)

OVERVIEW

Facade Proposal 

Parametric Design

There is no new tools such as parametric design and generative components we can create the facade surface that would respond to the needs of each location on the building. The building surface has the most important factors such as sun path and time zone in the parametric program. (e.g. golden ratio) and create the facade that will be designed intelligently. Thanks to parametric we can create complicated structures and change them without big effort because the main idea of parametric is to introduce support thinking into design. So we actually don't change the shape etc., but information and values that influence the product that we get.

The parametric design with wood material for the south facade (and very simple design) of the north facade is a very attractive and individual design system.

The material gives clear connection to the history and character of Huneanen - wood is a very local material.

The natural weathering gives it a warm, embracing character and provides a well being, even democratic atmosphere. Because of the simplicity of wood, people feel always warm and welcome.

Major reached goals

- Energy efficiency
- Comfort

Table

<table>
<thead>
<tr>
<th>Owner’s Rating</th>
<th>Owner's Feedback</th>
<th>Key or last comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michelle</td>
<td>5</td>
<td>Yes</td>
</tr>
<tr>
<td>Jane</td>
<td>4</td>
<td>2 Yes</td>
</tr>
<tr>
<td>Daniel</td>
<td>6</td>
<td>2 Yes</td>
</tr>
<tr>
<td>Average</td>
<td>-</td>
<td>4.75</td>
</tr>
</tbody>
</table>

Using parametric design we can introduce 2 angular factors in the sun path, the height, and angle of the sun rays in different seasons during the year and the amount of light needed in each room.

We can create a pleasant roof-like space surrounded by irregular parametric panels.

LCA

Regarding LCA (Life Cycle Analysis), the materials used in this project will be environmentally friendly and sustainable.

RCM

Mandated opportunities

Depending on Completeness/Integrated with technology.

Variant 1: Wind WINDOUT conservation (for recommendation, free of restraint)

I have some of the real wood

LCA

No air pollution after demolition

LCM

No air pollution after demolition

LCA

No air pollution after demolition

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No air pollution after dem
Thanks to new tools such as parametric design and generative components we can create the facade surface that would respond the exact needs of each location on the building. We can introduce the most important factors such as sun path and room area to the parametric program (e.g. grasshopper) and create the facade that will be designed intelligently. Thanks to parametrics we can also create complicated structures and change them without a big effort because the main idea of parametric is to introduce algorithmic thinking into design. So we actually don't change the shape etc, but information and values that influence the product that we want to obtain.

Parametric design with wooden material for the south facade (and very simple design of the north facade) is a very innovative and individually design option.

The Material gives also connection to the history and character of Wisconsin -wood is a very local related material.

The natural weathering gives it a warm, embracing character and provides a well-being, even domestic atmosphere. Because of the originality of wood, people feel always well and invited.

<table>
<thead>
<tr>
<th>Major reached goals</th>
<th>Minor reached goals</th>
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</thead>
<tbody>
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<td><img src="image1" alt="Icon" /></td>
<td><img src="image2" alt="Icon" /></td>
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<td><img src="image3" alt="Icon" /></td>
<td><img src="image4" alt="Icon" /></td>
</tr>
<tr>
<td><img src="image5" alt="Icon" /></td>
<td><img src="image6" alt="Icon" /></td>
</tr>
<tr>
<td>Owner</td>
<td>Rating</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
</tr>
<tr>
<td>Karolina</td>
<td>5</td>
</tr>
<tr>
<td>Jana</td>
<td>4</td>
</tr>
<tr>
<td>Daniel</td>
<td></td>
</tr>
<tr>
<td>Hussein</td>
<td>5</td>
</tr>
<tr>
<td>Michael</td>
<td>5</td>
</tr>
<tr>
<td>Average</td>
<td>4.75</td>
</tr>
</tbody>
</table>
## PROS & CONS

<table>
<thead>
<tr>
<th></th>
<th>PROS</th>
<th>CONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ARCH</strong></td>
<td>Using parametric design we can introduce 2 changeable factors: the sun path (the height and angle of the sun rays in different seasons during the year) and the amount of the light needed in each room.</td>
<td>Kristian Fosholt thinks that is a more elegant solution to create a consistent façade language that accommodate the requirements for each orientation simply by adding, removing or slightly modifying façade elements and not having 2 really different facades.</td>
</tr>
<tr>
<td></td>
<td>We can create a pleasant nest-like space surrounded by irregular parametric panels</td>
<td></td>
</tr>
<tr>
<td><strong>MEP</strong></td>
<td>can be optimized to block high sun during summer and allows low sun during winter by optimizing overhang facade elements. (Passive means)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 unique design for each facade (South and North) helps a lot for design an entire high performance energy facade. The reason each design can be independently adjusted to the different solar needs for each orientation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For high performance spaces such as offices or classrooms, glare control means can be used</td>
<td></td>
</tr>
<tr>
<td><strong>LCFM</strong></td>
<td>Regarding A/MEP-Pros: Analyzing the sun path will probably reduce energy costs during Life Cycle, which would occur for not-optimal heating/cooling</td>
<td>Depending on Complexity/integrated technology: Risk of high effort for maintenance and unexpected repairs, which result in a higher rent.</td>
</tr>
<tr>
<td><strong>CM</strong></td>
<td>standardization opportunities</td>
<td>Depending on Complexity/integrated technology: high initial building costs</td>
</tr>
<tr>
<td>IMPORTANT QUESTIONS</td>
<td>OWNER'S ANSWER</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>1. Which option do you find most feasible/prefer?</td>
<td>Please provide the Design Team’s opinion on the pros/cons of each option. What is the cost difference and what is the tradeoff in performance for each option? What is the benefit of introducing the concrete of Option 1 vs. Option 2? As you point out, the differences in stiffness between the wall types will cause the concrete walls to take much more load - does that help with the building’s overall performance?</td>
<td></td>
</tr>
<tr>
<td>2. We are using steel beams for the long spans in the lobby. Would you prefer we use wood and add columns to shorten the span?</td>
<td>I personally feel steel is fine - introducing columns would need to be coordinated with AR. If you can span it with steel, and that achieves the AR vision for the space, I see that as an acceptable solution for the lobby.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
<td></td>
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<tr>
<td>…</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
QUOTES AND GOALS – INTRODUCTION

“What sort of shapes would you prefer? Wavy? Triangular? a mix of both?”

“Depends on the Big Idea - Certainly Iconic and Aesthetically Pleasing in Nature...” (Michael)
The Story
of
the sunniest
Place
in the World.
MAYBE FOR THREE MONTHS OF THE YEAR...
SITE ENVIRONMENTAL CONDITIONS

Annual Temperature Gradient

Max
Av.
Min.

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Long Cold Period
2300 HOURS BELOW 0°C
SITE ENVIRONMENTAL CONDITIONS

WIND FROM NW/SW - AVG. 25 km/h

SNOW AVG. 15 inches in Winter
CONCEPT DEVELOPMENT – OUT OF THE EARTH

move the box to the hill

rise the box up

we can count 10 ft from the connection line between the hill and the box
CONCEPT DEVELOPMENT

- turn the box by 45° to have only one point facing the north
- push in the middle part make the north part angular
- extend the wings
push in the part of the fourth floor to obtain a terrace

extend the middle to make it a part of a hill

HERE WE HAVE OUR SHAPE!
CONCEPT DEVELOPMENT
Do you want to have an additional staircase in the entrance hall to provide a pleasant open space?

“Yes, stairs improve the health of the user. Make the stair inviting.” (Daniel)

Where would you prefer to have your classrooms or auditorium?

“Auditorium in the middle, classrooms on the perimeter.” (Karolina)
1ST FLOOR PLAN

Room Legend

- **main entrance area**
- **auditorium**
- **restroom men**
- **restroom women**
- **staircase**
- **server room**
- **mechanical**
- **technical support**
- **auditorium storage**
- **storage**
- **corridor**
- **trash-room**
4TH FLOOR PLAN

Room Legend
- collaboration area
- faculty office
- restroom men
- staircase
- storage
- corridor
Do you prefer wide open areas or closed isolated silos?

“I prefer open areas, but areas should be designed to increase the efficiency of the building and movement within the building.” (Daniel)

How much natural light would you like in rooms?

“Offices and classrooms need direct light. Corridors can be lit indirectly - through adjacent rooms for instance.” (Karolina)
COLLABORATION AREAS - WRITABLE WALLS
“...These spaces are very important to the students on campus. In fact, the writable walls are becoming standard in all the new buildings and renovated classrooms on campus.” (Daniel)

“I love the this idea too. Very very cool ;)” (Hussain)
COLLABORATION AREAS - PROJECTORS

3rd floor plan
4th floor plan
“I am a huge fan of **SMART Boards**, and would love to see them incorporated...” (Michael)

“**SMART boards/projectors are excellent equipment pieces for education. I am glad they are being incorporated into the building...**” (Daniel)
THE sunNEST – SECTION

- Roof: 60 ft
- Level 4: 42 ft
- Level 3: 28 ft
- Level 2: 14 ft
- Level 1

LAKE

HILL
How many building entrances would you like to have?

“Optimally the building should be accessible from all sides.”

(Karolina)
ACCESS TO THE BUILDING

ACCESS FROM THE ROAD

PARKING

BACK ACCESS

MAIN ENTRANCE

ENTRANCE FROM THE AMPHITHEATER
WHAT WE ARE DEALING WITH....

<table>
<thead>
<tr>
<th>Lateral Load</th>
<th>21 psf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gravity Load</th>
<th></th>
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<tbody>
<tr>
<td>Snow</td>
<td>35 psf</td>
</tr>
<tr>
<td>Classroom</td>
<td>40 psf</td>
</tr>
<tr>
<td>Office</td>
<td>50 psf</td>
</tr>
<tr>
<td>Patio/Corridor</td>
<td>100 psf</td>
</tr>
</tbody>
</table>

\[ \Phi = 41^\circ \]
\[ \Upsilon = 130 \text{ pcf} \]

\[ \Phi = 35^\circ \]
\[ \Upsilon = 125 \text{ pcf} \]
**Gravity:** Glulam Frame and Concrete- Wood Composite Slabs

**Lateral:** Concrete Core and Shear Walls
3D STRUCTURAL SKELETON

Gravity: Glulam Frame and Concrete- Wood Composite Slabs
Lateral: Concrete Core and Shear Walls
LOAD PATH
FLOOR OVERVIEW
THE TYPICAL

1. Glulam Frame - 20’ x 20’

**Column:**
- 10” x 12” (Levels 1-2)
- 8” x 8” (Levels 3-4)
  (SP-No.47 N2M12 - 4+ Laminations)

**Beam:**
- 8.5” x 16.5” (24F-V4/SP)

**Joist:**
- 2” x 10” @ 12” Spacing
AN OPEN LOBBY IS ALWAYS NICE
OWNERS INPUT

We are using steel beams for the long spans in the lobby. Would you prefer we use wood and add columns to shorten the span?

“... If you can span it with steel, and that achieves the AR vision for the space, I see that as an acceptable solution for the lobby.” (Michael)

“Why not create a mixture of steel and timber?”

(Jana)
AN OPEN LOBBY IS ALWAYS NICE

2 Entrance - Steel

Wide Flange Beam
- W18X76
- W10X39
3 Transfer Beam

Transfer Beam
8.5” x 24.5”

Mmax=250 k.ft
Umax_T=0.66 < L/240
Umax_L=0.32 < L/360
HEART OF THE BUILDING
### Retaining Wall
- **Level 1 & 2**: 12”
- **Level 3 & 4**: 8”

### Shear Wall
- **All Levels**: 12”
EARTH, WIND (& FIRE)

<table>
<thead>
<tr>
<th>Wind</th>
<th>21 psf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>60 psf/ft</td>
</tr>
</tbody>
</table>
THE SOIL MEETS THE sunNEST

\[ \text{Mmax} = 35 \text{ k.ft/ft} \]
\[ \text{Umax} = 0.17 \text{ in} \]

Surcharge Loads from Foundations Above

Depth (ft)

Horizontal Load, \( \phi \)H (lbs/ft width)

Surcharge Loads from Foundations Above

\[ \text{1680 lbs/ft} \]
\[ \text{*60 PSF/ft Depth} \]
FOLLOWING THE LOAD PATH

¾" KWIK HUS-EZ BOLT
BY HILTI @ 12" O/C, 4"
NOMINAL EMBEDMENT
PLACE IN LINE WITH
JOISTS

294 lb/ft

6x6 LEDGER BEAM

JOIST

23.5 kip/ft

23.5 kip/ft

17'-0"
CONCRETE AND WOOD WORK TOGETHER

(F’c = 4 ksi)

Wooden Beam

#4 @ 12” Reinforcing

HBV - Shear Connector

3”

TABS System

High System Rigidity & Strength

Low Weight

Thermal Insulation

Equalise Room Moisture
THE SOIL SHEAR

\[ \Phi \cdot V_n = 774 \text{ kips} \]

\[ V_u = 566 \text{ kips} \]

\[ U_{roof} = 0.48'' < \frac{H}{500} = 1.34'' \]

20'-0"

10'-0"

W42
P1

W7
P1

W7
P1

W42
P1

GG
3

3

F

3

E

2.5

78

191

566
LAYING THE FOUNDATION

Footing Schedule

<table>
<thead>
<tr>
<th>Mark</th>
<th>Length</th>
<th>Width</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Spread)</td>
<td>5'-0&quot;</td>
<td>5'-0&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>2 (Mat)</td>
<td>20'-0&quot;</td>
<td>11'-0&quot;</td>
<td>42&quot;</td>
</tr>
<tr>
<td>3 (Strip)</td>
<td>Wall Length</td>
<td>2'-0&quot;</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>
RESTING ON THE HILL

Footing Schedule

<table>
<thead>
<tr>
<th>Mark</th>
<th>Length</th>
<th>Width</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Spread)</td>
<td>5'-0&quot;</td>
<td>5'-0&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>3 (Strip)</td>
<td>Wall Length</td>
<td>2'-0&quot;</td>
<td>12&quot;</td>
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</table>
# System 1 Alternative

<table>
<thead>
<tr>
<th>MEAN</th>
<th>SYSTEM</th>
<th>ILLUSTRATION</th>
</tr>
</thead>
</table>
| VENTILATION | - AHU with heat recovery  
- VAV Mixed ventilation + Hybrid ventilation | ![Ventilation Illustration] |
<p>| COOLING | - Cooling by air + Hybrid Ventilation | ![Cooling Illustration] |
| HEATING | - Floor heating | ![Heating Illustration] |</p>
<table>
<thead>
<tr>
<th>MEAN</th>
<th>SYSTEM</th>
<th>ILLUSTRATION</th>
</tr>
</thead>
</table>
| VENTILATION | - Displacement ventilation underfloor in entire building  
|          |   - AHU with heat recovery                  | ![Ventilation Illustration](image1) |
| COOLING | - Supplied by ventilation system            | ![Cooling Illustration](image2)   |
| HEATING | - Heat convector underfloor                 | ![Heating Illustration](image3)   |
“Yes for [Alternative] 1” (Micheal & Karolina)

How high do you like your ceilings?

“At least 2.5 m [8ft]” (Karolina)
FLOOR SANDWICHES

SECTION A-A’
MIXED VENTILATION
AIR QUALITY - MATERIALS SELECTION FLOORS
MATERIALS SELECTION – WALLS CEILINGS PAINT

AirRenew® M2Tech®
Indoor Air Quality (IAQ)
Gypsum Board

Activ’Air®

Natura® Zero-VOC and
Zero Emissions Paint
AIR QUALITY – GREEN WALLS IN ENTRANCE AREA
CONSERVED MOSS

Entrance Area 1st/2nd Floor

Collaboration spaces – 3rd Floor
CONSERVED MOSS – SOLUTION FOR LESS EXPOSED AREAS

+ Good Impact on people's psychology
  ➔ increasing productivity
+ Filtering small particles in air
+ Sound emission
+ No light needed
+ Almost no O&M costs
+ Thin Wall Sandwich
+ Natural waste

- No CO2 Impact
GREEN WALLS – LIVING PLANTS
LIVING PLANTS – SOLUTION FOR WELL EXPOSED SPACES

Collaboration Area 4th Floor

➔ Impact on CO2 concentration

➔ O&M costs of $ 70,000 during Life Cycle and thick Wall Sandwich Are worth the money.
“...I love the idea, especially that the wall are spread over the building.” (Hussain)

“I enjoy the presence of plants within a building and I think they have a positive effect on air quality, so I'm glad to see the team is considering this.” (Daniel)
“...The auditorium should be easily accessible by large groups of people, allowing quick entering and exiting...” (Michael)
AUDITORIUM – ACOUSTIC ANALYSIS

RT - Reverberation Time

STI - Speech transmission Index

BEFORE ACOUSTIC ADAPTATION
raw state:

AFTER ACOUSTIC ADAPTATION
with finish materials:
AUDITORIUM – MATERIALS POST ACOUSTIC ADAPTATION

WOODEN ACOUSTIC PANELS on the walls

CARPET on the floor

Insulated SUSPENDED CEILING

CURTAINS to hide the balconies
AUDITORIUM – HYBRID VENTILATION

mini coil to satisfy indoor comfort criteria and support stack effect

INLET HYBRID VENTILATION

Sound path for air exhaust

Roof 60 ft
Level 4 42 ft
Level 3 28 ft
Level 2 14 ft
Level 1

20 ft 38 ft 18 ft 34 ft
AUDITORIUM – VENTILATION SYSTEM

RETURN AIR
IN AUDITORIUM
WOODEN WALL

SUPPLY AIR DIFFUSER
UNDER SEATS
AUDITORIUM STRUCTURE

9" Slab w/ Slab Bands

<table>
<thead>
<tr>
<th></th>
<th>16” x 96”</th>
<th>#11 @ 5” o/c</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16” x 36”</td>
<td>#11 @ 5” o/c</td>
</tr>
</tbody>
</table>
“What outdoor activities would you like to be present near to the building?”

“Gathering places, a focal point...” (Michael)
AMPHITHEATER DESIGN
THE HEART OF OUR BUILDING
ADDITIONAL INCOME

COMMUNICATION

COLLABORATION

Examples | Cost
---------|------
Auditorium | $1,200 per Weekend
Large Classroom | $350 per Weekend
Seminar Room | $100 per Weekend
Amphitheater | $330 per Reception

Estimated Sum per Year | $50,000

Occupancy on Weekends:

Class Time: 35%
Holidays: 50%
OPTION 1 – SLATE

1.75
OPTION 2 – CORTEN STEEL
OPTION 3 – WOODEN PANELS
OPTION 4 – GREENERY

4.25
OPTION 5 – PARAMETRIC FACADE

4.75
SOUTH FACADE
FACADE - SUN PATH
PARAMETRIC DESIGN

KINETIC FACADE CONNECTED TO BAS SYSTEM

SUN PATH in the exact location

SURFACE divided into kinetic panels

single KINETIC PANEL
TOTAL HEATING LOAD: 8,37 W/SF W/SF
TOTAL HEAT LOAD: 2,18 W/SF
Gravity: Glulam Frame and Concrete- Wood Composite Slabs
Lateral: Concrete Core and Shear Walls
3D STRUCTURAL SKELETON

**Gravity:** Glulam Frame and Concrete- Wood Composite Slabs  
**Lateral:** Concrete Core and Shear Walls
MATERIAL – PREFABRICATED ELEMENTS

- Glulam Column
- Wall Panels
- Floor Joist
- Glulam Floor Beams
- Wood Connectors
- Simpson Strong-Tie
- Steel Beams
- Gerdau Construction Products
- Facade Cladding
- ThermoWest Excellence in Wood
MATERIAL LOCATION – GENERAL

Site Location

Thermory - Wood Facade Suppliers

40 mi

140 mi

80 mi

40 mi

140 mi

80 mi
THE sunNEST – NORTH FACADE

Roof
60 ft

Level 4
42 ft

Level 3
28 ft

Level 2
14 ft

Level 1
EQUIPMENT SELECTION – LOCATION

- Site Location
- Crane Suppliers - Ideal Crane Rental, Inc.
- Concrete Pump Supplier - Lincoln Contractors Supply
- Construction Equipments Supplier - Sunbelt Rentals (Lift, Excavators, Dump Trucks)
- Local Wisconsin Labor District Council

Madison

4 mi 6 mi 8 mi
# Equipment Selection – Excavation

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>9,600 BCY</td>
</tr>
<tr>
<td>Adjusted Scope</td>
<td>12,768 BCY</td>
</tr>
<tr>
<td>Production Time</td>
<td>6 Min/Truck</td>
</tr>
<tr>
<td>Haul Time</td>
<td>46 Min</td>
</tr>
<tr>
<td>Cost for Labor and Equipment</td>
<td>7 $/BCY</td>
</tr>
<tr>
<td>Cost - Excavation</td>
<td>$89,376</td>
</tr>
<tr>
<td>Cost - Dump Truck</td>
<td>$249,600</td>
</tr>
<tr>
<td>Revenue - Soil Recycle</td>
<td>$38,304</td>
</tr>
<tr>
<td><strong>Total Excavation Time</strong></td>
<td>0.4 Months</td>
</tr>
<tr>
<td><strong>Total Cost (Labor &amp; Equipment)</strong></td>
<td>$339,000</td>
</tr>
<tr>
<td><strong>Net Excavation Cost</strong></td>
<td>$301,000</td>
</tr>
</tbody>
</table>

**CAT 330D Hydraulic Excavator**
- Bucket Size - 1 BCY
- Cost - 6 $/BCY

**10 Wheeler CAT Dump Truck**
- Bucket Size - 10 BCY
- Cost - 100 $/DAY
Articulating Boom Lift
Reach - 60 ft.
Price - Daily $467 Weekly $1,130

Industrial Forklift
Operating Capacity - 3000.0 lb
Price - Daily $214 Weekly $552

Truck Mounted Concrete Pump
Boom Length - 136' 6"
Piston Side Output - 141 yd³/hr
Price - Daily $292
# Equipment Selection – Crane

<table>
<thead>
<tr>
<th></th>
<th>Tower</th>
<th>Crawler</th>
<th>All Terrain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>Potain MDT 178</td>
<td>Manitowoc 11000</td>
<td>Grove GMK 5100</td>
</tr>
<tr>
<td><strong>Flexibility</strong></td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Operation speed</strong></td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Space needed</strong></td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td><strong>Price (5 months)</strong></td>
<td>$313000</td>
<td>$235,800</td>
<td>$327,000</td>
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<tr>
<td><strong>Reach (Ft.)</strong></td>
<td>180</td>
<td>250</td>
<td>180</td>
</tr>
<tr>
<td><strong>Capacity (Ton)</strong></td>
<td>5</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
SITE CONSTRAINTS

- Narrow Curve
- Active site location
- High water table
- Close proximity to lake
- Tight site
- Single access road
- Cold weather
- Sloped site
SITE LOGISTICS

Required Reach = 180 ft

- Staging area
- Laydown area
- Washing zone
- Traffic light
- Roundabout
- Parking
- Concreting area
- Recycling area
MAINTAINING SITE CONNECTIVITY
MINIMIZING CONSTRUCTION IMPACT

POLLUTION PREVENTION:

- Silt fences
- Stockpiling the soil to prevent erosion
- Dust control measures
- Recycling areas
MINIMIZING CONSTRUCTION IMPACT

SECURITY FIRST

RESPECT THE COMMUNITY:
- Communication
- Site observation deck
- Noise restrictions barriers
- Local labour

CARE ABOUT THE APPEARANCE:
<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>Build Atlantic Team Project</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>12 Build The sunNEST</td>
<td></td>
<td>120 Construct Foundation</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1201 Construct Sub-Structure</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>12010 Excavate</td>
<td>12010 Excavate</td>
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<td></td>
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<tr>
<td></td>
<td>1201033 Excavation and Retaining wall C L3</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>120102 Excavation and Retaining wall B L21</td>
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<td></td>
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<td></td>
<td>120101 Excavation and Retaining wall A</td>
<td>120103 Excavation and Retaining wall C L21</td>
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<td>12011 Build Standard Foundation</td>
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<td>1201101 Construct Spread Footing</td>
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<td>120110123 Foundation Elements B L3</td>
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<td>12011033 Foundation Elements C L3</td>
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<td>1201110 Foundation Elements A</td>
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<td>1201104 Foundation Elements D</td>
<td></td>
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<tr>
<td>12012 Pour slab on grade</td>
<td></td>
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<td>120122 Pour slab on grade</td>
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<td>1202 Construct Floor 2</td>
<td></td>
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<td>1203 Construct Shell</td>
<td></td>
<td>12033 Construct Shear Walls</td>
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<td>120331 Construct Auditorium Shear Walls A</td>
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<td></td>
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<td>12034 Construct Elevator Walls</td>
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<td>120342 Construct Elevator Wall B</td>
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<td>120343 Construct Elevator Wall C</td>
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<td>120345 Construct Wood Walls</td>
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<td></td>
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<td>120352 Construct Bearing walls B</td>
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<td>120353 Construct Bearing walls C</td>
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<td>12124 Construct Floor</td>
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<td>12126 Construct Columns</td>
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<td>121264 Construct Column D</td>
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</tbody>
</table>

CM ATLANTIC 123
Resource levelling
3D STRUCTURAL SKELETON
CLASH DETECTION & AVOIDANCE
### Winter

<table>
<thead>
<tr>
<th></th>
<th>Estimated Value</th>
<th>Target Value</th>
<th>Value Delta</th>
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<tbody>
<tr>
<td><strong>TOTAL</strong></td>
<td>$7,900,000</td>
<td>$9,950,000</td>
<td>$2,050,000</td>
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<tr>
<td>A Substructure</td>
<td>$1,030,000</td>
<td>$866,000</td>
<td>$(164,000)</td>
</tr>
<tr>
<td>B Shell</td>
<td>$1,229,000</td>
<td>$2,614,000</td>
<td>$1,385,000</td>
</tr>
<tr>
<td>C Interiors</td>
<td>$1,312,000</td>
<td>$1,350,000</td>
<td>$(37,800)</td>
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<tr>
<td>D Services</td>
<td>$2,677,500</td>
<td>$2,888,830</td>
<td>$(211,400)</td>
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<tr>
<td>E Equipment and Furnishing</td>
<td>$578,000</td>
<td>$265,800</td>
<td>$(312,310)</td>
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<tr>
<td>F Specialty Construction</td>
<td>$ -</td>
<td>$525,600</td>
<td>$ -</td>
</tr>
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<td>G Building Sitework</td>
<td>$77,250</td>
<td>$532,950</td>
<td>$455,700</td>
</tr>
<tr>
<td>H General Conditions</td>
<td>$995,000</td>
<td>$898,000</td>
<td>$(97,000)</td>
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</table>

### Spring

<table>
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<th></th>
<th>Estimated Value</th>
<th>Target Value</th>
<th>Value Delta</th>
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</thead>
<tbody>
<tr>
<td><strong>TOTAL</strong></td>
<td>$7,640,000</td>
<td>$9,950,000</td>
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<td>A Substructure</td>
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<td>B Shell</td>
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<td>C Interiors</td>
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<td>D Services</td>
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<td>$233,590</td>
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<td>$77,250</td>
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<td>$455,700</td>
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<td>H General Conditions</td>
<td>$816,910</td>
<td>$898,000</td>
<td>$81,210</td>
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</tbody>
</table>
REPLACE STRATEGY

- MEP Systems
- Fittings

$220,000

- Rittings
- Fixtures

$225,000

- Roof Covering
- Sanitary
- Monitoring
- Fire Installations
- Elevators

$860,000

Year

0  5  10  15  20  25

Continuation of the Contract?
PPP Project Contract

between

1. University of Wisconsin
   Represented by: Karolina Ostrowska
   Jana Unterschitz
   Michael Seaman
   Danail Cotene
   Hussain Persianfar
   hereinafter called “University”

and

2. Atlantic Team as Project Company
   Represented by: Dominika Muras
   Zili Wang
   Harrison Slotman
   Alejandro Mata Gonzales
   Tiago Barrosa
   Afshadi Samandi
   Klara Schleitzer
   hereinafter called “Team Atlantic”.

“The decision of how to proceed after completion of the contract will be made in year 20.”
HOW TO PROCEED AFTER 25 YEARS OF CONTRACT?

1. Extend the Contract
   → Renegotiation

2. Transfer of Ownership
   → Against residual value
**ADDITIONAL REPLACEMENT – IN YEAR 25**

- **$220,000**
  - MEP Systems
  - Fittings

- **$225,000**
  - Rittings
  - Fixtures

- **$860,000**
  - Roof Covering
  - Sanitary
  - Monitoring
  - Fire Installations
  - Elevators

- **$500,000**
  - Inner Partitions/Openings
  - Ceilings
  - Exterior/Facade

**Year**

0  5  10  15  20  25

**Continuation of the Contract?**
SITE LOGISTICS

Required Reach = 180 ft

- Laydown area
- Staging area
- Washing zone
- Traffic light
- Concreting area
- Recycling area
- Roundabout
- Parking

LCFM ATLANTID 136
“The University provides the site [...] to Team Atlantic. After the construction the site has to be rebuilt into the state, it was before the building.”
## RISK STRATEGIES

<table>
<thead>
<tr>
<th>AVOID</th>
<th>TRANSFER</th>
</tr>
</thead>
</table>
| - Planning Risks, regarding building program or statics | - Subcontractor delays
|          | - Subsoil risks: e.g. Historical finds |

<table>
<thead>
<tr>
<th>REDUCE</th>
<th>CARRY</th>
</tr>
</thead>
</table>

Diagram showing strategies:
- **Avoid**
- **Transfer**
- **Reduce**
- **Carry**
# Risk Strategies

<table>
<thead>
<tr>
<th>Avoid</th>
<th>Transfer</th>
</tr>
</thead>
</table>
| Planning Risks, regarding building program or statics | Subcontractor delays  
| | Subsoil risks: e.g. Historical finds |

| Reduce | Carry |

---

LCFM  
AtlantiD  
139
RISKS WE HAVE TO CARRY

Comparative Risk Cost Amount

Comparative Probability

Construction Phase
Operation Phase

- Insolvency Of Team Atlantic
- Damage of mech. Equipment
- Early Snow
- Flood
- LCC Increase
- Vandalism
- Landslide
- Lack of techn. Innovation
- High Watertable
- Energy/Water Estimation
- Material Cost Increase
EARLY SNOW

Construction Phase
Operation Phase

Addressed in Schedule
1 month contingency

Watertight and watering point
“[...] Team Atlantic will deposit various verifications of their creditworthiness and install a bank guarantee [...]”
“[...] The responsibility of Team Atlantic starts with entering the building. It includes e. g. all facility management tasks, operation, maintenance, repairs and cleaning. [...]”

The whole Amphitheater area fall also into the responsibility of Team Atlantic, as well as the Entrance area.”
§ 6 RESPONSIBILITIES DURING THE OPERATION PERIOD

- The University
- Team Atlantic
"...The University is owner of the property and Team Atlantic is owner of the building. The University is renting the building, that the daily university actions can be practiced." (Contract)
THE BREAK EVEN POINT
CLIENT AFFINITY – DEFINITION

 Owners

 SOLUTION

 Communication
 Transparency
 Understanding

 FEEDBACK

 Team Atlantic

 CONVERGENCE

 Goals
THE SOLUTION PROPOSAL REPORT (SPR)

OVERVIEW

Facade Proposed: Parametric Design

Thanks to new tools such as parametric design and generative components, we can create the facade system that will respond to the exact needs of each location on the building. We can introduce the most important factors such as sun path and wind area in the parametric program (e.g., grasshopper) and create the facade that will be designed intelligently. Thanks to parametrics, we can create complicated structures and change them without any effort because the main idea of parametrics is to introduce parametric thinking into design. So we actually don’t change the shape etc., but information and values that influence the product that we need to change.

Parametric design with wood materials for the south facade (and very simple design of the north facade) is a very attractive and individual design system.

The material gives an connection to the history and character of Wurundjeri — wood is a very local, re-located material.

The natural weathering gives it a warm, embracing character and provides a well being, even domestic atmosphere. Because of the availability of wood, people feel at home and believe.

Major achieved goals | Minor achieved goals

PROS | CONS

ARCH

Using parametric design we can introduce 2 design parameters: the sun path and angle of the sun rays in different seasons during the year and the amount of the light needed in each room.

We can create a pleasant, well-lit space with adjusted parametric panels.

NAT

Each face is optimized to be max high, allowing both sides to be visible by optimizing overlapping facade elements. (Please refer to)

2 unique design for each facade (South and North) helps a set for design an entire high-performance energy facade. The lesson on each design is to independently evaluate their dimensions and features.

For high-performance spaces such as office or生产车间, glare management can be used.

LCPM

Regarding (SPR)皮: Analyzing the sun path will greatly reduce energy losses during the day and increase energy output from the building.

Depending on Computer/Imagined results, the design of the facade elements. (Please refer to)

CM

externalization opportunities

Depending on the complexity of the design, the initial building costs may increase.

Ventil: With ENDFIND conservation for recommendations, 20% of vegetation

1. Las of the real wood, 50% changes in wood texture and the wood can be used after 5-10 years.

LCPM

Height reduction after fixation: = 100% stability

No special effort for maintenance/cleaning:

It is a normal inspection every year.
CLIENT AFFINITY – COMMUNICATION TRACKING

- **Proposed Solutions per Report**
- **Total Reactions per Report**
- **Average: Reactions per Solution**

Weeks, a Solution Proposal Report has been sent

- **Amount**
  - Minimum: 0.00
  - Maximum: 34
  - Average: 2.43

- **Average**
  - Minimum: 0
  - Maximum: 5.00

Weeks:
- Week 3 (8th Feb)
- Week 5 (22nd Mar)
- Week 7 (8th Mar)
- Week 10 (1st Apr)
- Week 12 (15th Apr)
- Week 13 (22nd Apr)
CLIENT AFFINITY – GOAL CONVERGENCE

5 - highest | 0 lowest

Indoor Quality | 4.8
Flexibility | 4.6
Collaborative Environment | 4.4
Location Connectivity | 4.6
Constructability | 4.4
Techn. Innovation | 4.3
Sustainability | 4.2
Aesthetics | 4.3
Cost | 4.4
Security | 4.0

ATLANTI
LESSONs WE’VE LEARNED

“The art of design, but more importantly the art of people.” - Harrison

“One of the biggest learnings was the importance of flexibility within a teamwork environment” - Tiago

“Planning is not just important, it’s beyond necessary!” - Afolabi

“Be always patient and willing to compromise.” - Klara

“I have learned a lot from my teammates. And working with people across the world is challenging, but very fun!” - Zili

“Being patient. Teamwork. Thinking from other disciplines’ perspectives.” - Dominika
THANK YOU.

To Renate Fruchter, our mentors, families, partners, friends and owners:
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  Michael Seaman
  Jana Unterschütz