TEAM PROCESS – THE THINKER TEAM

WHAT IF?

WHAT DO YOU THINK?

DON'T YOU THINK WE COULD...?

WHEN IS THIS MEETING GOING TO END?

WHAT DOES THE OWNER WANT?

COULD WE MAKE ONE LITTLE CHANGE?
TEAM PROCESS – GOALS

INNOVATIVE MATERIALS

ENERGY EFFICIENCY

ICONIC BUILDING
TEAM PROCESS - BEACON

PEER REVIEW

PEER REVIEW
TEAM PROCESS – WIND TURBINES

WIND TURBINES +
TRANSPARENT WALL + ROOF
TERRACE + L SHAPE
WINDOWS + 20 CANTILEVERS +
ATRIUM + FAKE BEACON
### TEAM PROCESS – DECISION MATRIX

#### Foot Print

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Flow - DD</th>
<th>Embrace-LS</th>
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<tbody>
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TEAM PROCESS – A JOURNEY TO OUR FINAL DESIGN
TEAM PROCESS – A SOLUTION THAT FITS EVERYONE

Wood + Aesthetic

Air Tightness

Material Efficiency

Prefabrication

Sustainability

CREE

SE

CM

MEP

LCFM
BIM COORDINATION – FROM THIS...
BIM COORDINATION – FROM THIS...
BIM COORDINATION – TO THIS...
Before opening, copy file to be opened

Rename copy using “Discipline_Month/Day_Shape_(C or S)”

Move file into appropriate archive folder and then open “UpToDate” file
### BIM COORDINATION – CLASH DETECTION

#### Clash Detection Interface

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**Items**

- **Item Name:** Fixed [536212]
- **Item Type:** Shell

- **Item Name:** Glulam-Southern Pine-Column [251305]
- **Item Type:** Shell

- **Windows:** (126)
- **Fixed:** (94)
- **Part vertical balcony door:** (72)

- **Segment**
- **Structural Columns:** (223)
- **Gulam-Southern Pine-Column:** (212)
- **CREE Glulam column 10"x10":** (53)

[Image of BIM coordination software interface showing clash detection]
BIM COORDINATION – CLASH DETECTION
SITE – OVERVIEW
SITE – VIEW TOWARDS WEST & LAKE MERCED
SITE – VIEW TOWARDS NORTHEAST
SITE – ACCESS

OPEN LOW NATURE

VIEW

BORDER

POSSIBLE FLOW FROM COMMUNITY AND NORTH CAMPUS

SLOPE

SITE

FLOW FROM CAMPUS

CAMPUS

MORE DENSE HIGHER GROUND

DENSE LOWER GROUND
SITE CONDITIONS– SEISMIC

San Andreas Fault

\[ S_s = 2.190 \, \text{g} \]
\[ S_1 = 1.044 \, \text{g} \]
SITE CONDITIONS– TEMPERATURE

Summer Design Temperature:
79°F Dry Bulb
63°F WB

Winter Design Temperature:
41°F Dry Bulb

Relative Humidity
74% (Average)
SITE CONDITIONS – WIND

Average of 10-15 mph from the west

Wind Directions Over the Entire Year

- W: 38%
- NW: 18%
- N: 6%
- NE: 5%
- E: 4%
- SE: 5%
- S: 8%
- SW: 8%
**SITE CONDITIONS – SOIL**

**NEHRP Site**  
Class C

**Lateral Soil Pressure**  
35 psf/ft

**Bearing Capacity**  
3,500 psf

**Water table**  
14' below grade  
Well-sorted fine-medium sand
DESIGN - ITERATIONS
ELEVATIONS - NORTH
ELEVATIONS - SOUTH
FLOOR PLANS - ENTRANCE
FLOOR PLANS - ENTRANCE
FLOOR PLANS – FIRST LEVEL
FLOOR PLANS – FIRST LEVEL
SECOND LEVEL – ATRIUM
FLOOR PLANS – SECOND LEVEL
SECOND LEVEL – VIEW TOWARDS LAKE
SECOND LEVEL – ATRIUM
ROOF LEVEL – ROOF TOP TERRACE
SECTIONS – CREE BUILDING TOWARDS AUDITORIUM
SECTIONS – CROSS AUDITORIUM
AUDITORIUM + (atrium) + CREE Building
AUDITORIUM – FEATURES

elevator shaft

- glulam roof girders
- concrete shear walls
- cellular steel floor beam
- micropiles

N-S  E-W
AUDITORIUM – ETABS MODEL & LOADS

Gravity:
- Assembly Areas (auditorium): 60 psf
- Rooftop terrace (garden): 100 psf
- Everywhere else: 50 psf

Lateral:
- F3 = 276 k
- F2 = 150 k
- F1 = 55 k

- Pinned at base
- Moment releases on all members
- 3 rigid diaphragms on the floors
- Intermediate reinforced concrete moment frames
AUDITORIUM – SECTION

- **roof**
- **stepped floor**
- **3'6"**
- **12"**
- **glulam girders**
- **space for MEP**
- **cladding**
- **cellular steel beams**
- **34'**
- **20'**
AUDITORIUM – GLULAM GIRDERS ROOF

TIMCO hybrid connection screws
AUDITORIUM – INSIDE APPEARANCE
AUDITORIUM – STEEL GIRDERS FLOOR

Cellular steel beam dimensions:

- Total height: 3'
- Flange width: 1' 4"
- Flange thickness: 5"
- Web thickness: 2"
AUDITORIUM – STEEL MEMBER DESIGN

0.998
AUDITORIUM – CONNECTION DETAILS

GLULAM GIRDER:
- Joist hanger
- 8 x 8“ screws
- threaded sleeves cast in wall

STEEL GIRDER:
- headplate
- 6 x 8“ screws
- threaded sleeves cast in wall
AUDITORIUM – WALL DESIGN

Responding to overturning moment (gravity + lateral):

Shear walls in Project N-S direction

Shear walls in Project E-W direction

(6) #10, two rows

(3) #8, one row

Tension - blue
Compression - red

tension piles

N-S

E-W
AUDITORIUM – FOUNDATION

5'-0" x 5'-0" square footing

(14) 4" φ steel micropiles

3'-0" TYP

5'-0" TYP

3'-0" TYP

(All footings 2' thick)
### EQ Along Project E-W

<table>
<thead>
<tr>
<th>Story</th>
<th>Deflection $\delta$ (in)</th>
<th>$C_d*\delta/h_{sx}$</th>
<th>Allowable Drift Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1.23</td>
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<td>1</td>
<td>0.324</td>
<td>0.00935</td>
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</table>

### EQ Along Project N-S

<table>
<thead>
<tr>
<th>Story</th>
<th>Deflection $\delta$ (in)</th>
<th>$C_d*\delta/h_{sx}$</th>
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<tr>
<td>1</td>
<td>0.456</td>
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</table>

(Note: $C_d = 4.5$, $h_{sx} = 13'$)
CREE BUILDING– FEATURES

cross-laminated timber (CLT) core

retaining wall

replacement steel columns/ girders at 1st level

N-S

E-W

strip footing

steel cantilever beams

hybrid slab module

corridor slab
CREE BUILDING – ETABS MODEL & LOADS

gravity:
- Corridors (above 1st floor) 80 psf
- Roof live load (reduced) 13.4 psf
- Elevator/ Stairwell 100 psf
- Everywhere else 50 psf

lateral:
- F3 = 219 k
- F2 = 158 k
- F1 = 81 k

- Pinned at base
- Moment releases on all members
- 3 rigid diaphragms on the floors
- Light-frame wood wall lateral system
CREE BUILDING – BASIC ELEMENTS

6“ concrete slabs for corridors

10“x20“ gluam columns

Modules in 3 different lengths:

3“ concrete slab
15“x 10“ concrete girders
12“x 9.5“ gluam beams
CREE BUILDING - CANTILEVER
Steel beams holding up cantilever W 14x48
Steel beams replacing columns
W 24x250

Steel columns supporting beams
W 12x50

Central steel column supporting beams
W 12x65
CREE BUILDING – STEEL MEMBER DESIGN
CREE BUILDING—INSIDE COMPUTER LABS
Sloped floor with retaining wall

Isolated footings for steel column: 8’ x 8’ x 30”

Strip footings for CREE columns: 4’ wide x 18” thick
Pins on steel beams and core replacing columns
CREE BUILDING – HORIZONTAL CONNECTIONS

Tieing together slabs with rebars

FLOOR DIAPHRAGM

Connecting slabs with steel elements
- V3 Grade
- No. 2 Southern Pine in parallel layers, No. 3 Southern Pine in perpendicular layers
- 5 layers (3 parallel layers, 2 perpendicular layers)
- Layers thickness 1 3/8” (6 7/8”)
### EQ Along Project E-W

<table>
<thead>
<tr>
<th>Story</th>
<th>Deflection δ (in)</th>
<th>$C_d\delta/h_{sx}$</th>
<th>Allowable Drift Ratio</th>
</tr>
</thead>
<tbody>
<tr>
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(Note: $C_d = 4.0$, $h_{sx} = 13’$)

### EQ Along Project N-S

<table>
<thead>
<tr>
<th>Story</th>
<th>Deflection δ (in)</th>
<th>$C_d\delta/h_{sx}$</th>
<th>Allowable Drift Ratio</th>
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<td>1</td>
<td>0.324</td>
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</tbody>
</table>

### Drift Ratios for EQ along Project E-W

- Drift Ratio
- Drift Limit

### Drift Ratios for EQ along Project N-S

- Drift Ratio
- Drift Limit
At maximum drift, ~4” relative displacement
Expansion joint needed to:
- Allow glazing to move freely across top of CREE Building
- Allow floors in atrium to move freely (atop corbels)

Expansion joint:
- Polytetrafluoroethylene (PTFE) “teflon” sliders
- Stainless steel plates to allow for 5” of movement in all directions
ATRIUM – ROOF SEISMIC JOINT

W 8x40
Teflon sliders

(Concrete atrium floors on teflon sliders on haunches)
ATRIUM – FLOORS

1st LEVEL

- Glulam columns 12”x12”
- Concrete floor 8”

2nd LEVEL

- Steel and timber stairs
- Concrete haunches for expansion joint
MEP DESIGN DRIVERS

Occupant Comfort

Design Set Point Temperatures
- 75°F DB (Summer)
- 70°F DB (Winter)
- 50% RH

Energy Efficiency

Discipline Integration

A

MEP

SE

CM
TRICKLE VENTILATION

“Provides natural ventilation, but not suitable for the majority of the building’s high-load spaces”

ACTIVE CHILLED BEAMS

“Increases energy efficiency by decoupling ventilation from cooling, but does not integrate well with shallow CREE ceiling space”

UNDERFLOOR AIR DISTRIBUTION

“Offers a higher level of versatility and occupant comfort, but reduces constructibility while increasing first costs”
Displacement Distribution

- Capitalizes on occupant heat
- Lower supply air temperature
- Lower air velocity
- Responds quickly to high flux loads

Variable Air Volume Distribution

- Individual zone control
- Interlock with operable windows
- Common system - Reduced first costs
- Facilitates operations & maintenance
**DESIGN DRIVERS – MEANS & METHODS**

**Interlock between zoned VAV System + Operable Windows**
- Greater occupant control
- Greater tolerance of variations
- Greater comfort
- Greater energy conservation
- Greater **Value for Money**

**Tight construction to reduce infiltration**
- CREE is designed to meet Passivhaus Standards
- Fewer drafts
- Greater occupant comfort
- Reduction in heating & cooling energy

**System zoning & separation**
- Reduces energy consumption
- Reduces distribution losses
Mechanical Room for CREE Block [AHU 1, Chiller]
Mechanical Room for Auditorium Block [AHU 2, Chiller]
“How to integrate ductwork with the CREE system?”
**ENVIRONMENTAL IMPACT - SUSTAINABILITY TARGET VALUE**

**From this (March):**

![Graph showing carbon accrual over project life from March to May.](image)

**To this (May):**

![Graph showing carbon accrual over project life from March to May.](image)

**Key Lessons:**

- Little changes = big difference
  - eg. Concrete vs. Glulam
- STV & Carbon drive design reflection and awareness
- Garbage in, garbage out – though still a design tool
## ENVIRONMENTAL IMPACT - LEED CERTIFICATION

<table>
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<th>Category</th>
<th>Possible Points</th>
<th>Points Awarded</th>
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<td>Water Efficiency</td>
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<td>Energy &amp; Atmosphere</td>
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<td>17</td>
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<td>Materials &amp; Resources</td>
<td>14</td>
<td>7</td>
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<tr>
<td>Indoor Environmental Quality</td>
<td>15</td>
<td>11</td>
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<tr>
<td>Innovation in Design/Regional Priority</td>
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<td>0</td>
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<td><strong>Total Points</strong></td>
<td><strong>62</strong></td>
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ENVIROMENTAL IMPACT - ENERGY MODEL

### Major Areas of Energy Consumption

- Space Heat
- Lighting
- Plug Loads
- Hot Water
1.- Identify Hazards
- Electrical
- Excavation and Trenching
- Falls
- Stairway Ladder
- Scaffolding
- Heavy Construction Equipment

2.- Risk Matrix

<table>
<thead>
<tr>
<th>Risk Identity &amp; Cause</th>
<th>Risk Score</th>
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<tbody>
<tr>
<td>Risk ID</td>
<td>Category</td>
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<tr>
<td>Probability of Occurrence (P)</td>
<td>Impact (Cost &amp; Time)</td>
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</table>

3.- Risk Map

Stanford Accident Cost Accounting System

Risk Mapping – 3D Risk Mapping Concept
SITE LAYOUT – OUR FIRST ITERATION

- Waste Material
- Scaffold Stockpile
- Material Compound
- Offices
- Material Compound
- Scaffold Stockpile
- Trade
- Trade
- Trade
- Subs Sq
- Check Point
- Field Offices
- Fence
### Risk Mapping

#### 3D Risk Mapping Concept

**Table: Risk Identity & Cause**

<table>
<thead>
<tr>
<th>Risk ID</th>
<th>Category</th>
<th>Risk Description</th>
<th>Risk Score</th>
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</thead>
<tbody>
<tr>
<td>11</td>
<td>Heavy Construction Equipment</td>
<td>Crane Dropping on Building</td>
<td>15</td>
</tr>
<tr>
<td>1</td>
<td>Electrical</td>
<td>Arcing</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>Stairway Ladder</td>
<td>Second Floor Drop</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>Scaffolding</td>
<td>Second Floor Drop</td>
<td>10</td>
</tr>
<tr>
<td>13</td>
<td>Heavy Construction Equipment</td>
<td>Getting hit by a Truck</td>
<td>9</td>
</tr>
<tr>
<td>14</td>
<td>Heavy Construction Equipment</td>
<td>Getting hit by a Truck</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
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<td>Overheating</td>
<td>8</td>
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<tr>
<td>3</td>
<td>Electrical</td>
<td>Electrical Leakage</td>
<td>8</td>
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<tr>
<td>5</td>
<td>Excavation and Trenching</td>
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<tr>
<td>4</td>
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<td>Falling Objects</td>
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<td>12</td>
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<td>Crane Dropping on Person</td>
<td>5</td>
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<tr>
<td>7</td>
<td>Stairway Ladder</td>
<td>First Floor Drop</td>
<td>4</td>
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<tr>
<td>9</td>
<td>Scaffolding</td>
<td>First Floor Drop</td>
<td>4</td>
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</table>

**Risk Before Mitigation**

- Average risk score: **8.5**
SITE LAYOUT – OPTIMIZED TO INCREASE PRODUCTIVITY AND REDUCE RISK
# Risk Mapping – 3D Risk Mapping Concept

## Risk Identity & Cause

<table>
<thead>
<tr>
<th>Risk ID</th>
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<th>Risk Description</th>
<th>Risk Score</th>
</tr>
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<tbody>
<tr>
<td>8</td>
<td>Stairway Ladder</td>
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<tr>
<td>10</td>
<td>Scaffolding</td>
<td>Second Floor Drop</td>
<td>10</td>
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<tr>
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<td>Excavation and Trenching</td>
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<tr>
<td>11</td>
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<td>Crane Dropping on Building</td>
<td>0</td>
</tr>
</tbody>
</table>

**Risk After Mitigation**

- Average risk score 5.4
SCHEDULE – BUILDING PHASING

100 – General Area
200 – CREE Building
300 – Auditorium
400 - Atrium
SCHEDULE – LOCATION BASED SCHEDULE

Construction Starts

Start

October

November

December

January

February

March

April

May

June

July

August

September

Area 200 – Class Building

Area 300 – Auditorium

Area 400 – Atrium

Earthwork Finished

Cree Bldg Dried In

Atrium Dried In

Auditorium Dried In

Construction Finish

Computer Labs

Finish

Fri 9/30/16

AREA 200 – CLASS BUILDING

AREA 300 – AUDITORIUM

AREA 400 – ATRIUM

Gene

RAL

N

Contractual Finish

Fri 9/30/16
**SCHEDULE** – LOCATION BASED SCHEDULE (BY FLOOR)

**Construction Start**
- Qtr 4, 2015
- Wed 9/30/15

**Computer Labs**
- Qtr 1, 2016

**Contractual Finish**
- Qtr 3, 2016
- Fri 9/30/16

**271 Activities**

**6 Milestones**
- Earthwork Finished
- Auditorium Dried In
- Atrium Dried In
- Cree Bldg Dried In
- Auditorium Structure
- Atrium Structure

**100 – GENERAL AREA**

**200 – 2ND FLOOR**

**200 – ENTRANCE LEVEL**

**200 – 1ST FLOOR**

**Interior Finishes**
Assuring contractors continuity in time
## Setting the Targets

### Overall Budget and Target

<table>
<thead>
<tr>
<th>Category</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Grant</td>
<td>$8,500,000</td>
</tr>
<tr>
<td>Grant Year</td>
<td>2013</td>
</tr>
<tr>
<td>Construction Year</td>
<td>2015</td>
</tr>
<tr>
<td>Expected Inflation</td>
<td>2.00%</td>
</tr>
<tr>
<td>BUDGET</td>
<td>$8,200,000</td>
</tr>
<tr>
<td>TARGET</td>
<td>$7,250,000</td>
</tr>
</tbody>
</table>

### Target Distribution

- Substructure: 8%
- Shell: 39%
- Interiors: 14%
- Services: 34%
- Sitework: 5%
## ESTIMATE VS. TARGET VALUES

### ESTIMATE AND TARGET VALUE - SUMMARY

<table>
<thead>
<tr>
<th></th>
<th>ESTIMATED VALUE</th>
<th>TARGET VALUE</th>
<th>VALUE DELTA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL</strong></td>
<td>$7,730,000</td>
<td>$7,250,000</td>
<td>$(480,000)</td>
</tr>
<tr>
<td>Substructure</td>
<td>$292,000</td>
<td>$566,000</td>
<td>$274,000</td>
</tr>
<tr>
<td>Shell</td>
<td>$3,855,000</td>
<td>$2,445,000</td>
<td>$(1,410,000)</td>
</tr>
<tr>
<td>Interiors</td>
<td>$653,000</td>
<td>$1,012,000</td>
<td>$359,000</td>
</tr>
<tr>
<td>Services</td>
<td>$2,680,000</td>
<td>$2,834,000</td>
<td>$154,000</td>
</tr>
<tr>
<td>Sitework</td>
<td>$250,000</td>
<td>$392,000</td>
<td>$142,000</td>
</tr>
</tbody>
</table>

### COST ESTIMATE

- **Substructure**: 3% of $292,000 = $8,760
- **Shell**: 4% of $3,855,000 = $154,200
- **Interiors**: 8% of $653,000 = $52,240
- **Services**: 50% of $2,680,000 = $1,340,000
- **Sitework**: 35% of $250,000 = $87,500
TARGET VALUE DESIGN – ESTIMATE PROGRESSION

TVD - TRACKING TARGET OVER TIME

TARGET

ESTIMATE

DELTA


$(1,000,000) - $1,000,000 - $2,000,000 - $3,000,000 - $4,000,000 - $5,000,000 - $6,000,000 - $7,000,000 - $8,000,000 - $9,000,000

$(-)
<table>
<thead>
<tr>
<th>DATE</th>
<th>EVENT</th>
<th>ESTIMATE</th>
<th>DELTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-Feb</td>
<td>Target Value Set</td>
<td>$7,250,000</td>
<td>$-</td>
</tr>
<tr>
<td>15-Feb</td>
<td></td>
<td>$6,780,000</td>
<td>$470,000</td>
</tr>
<tr>
<td>22-Feb</td>
<td>Crit</td>
<td>$6,439,000</td>
<td>$811,000</td>
</tr>
<tr>
<td>1-Mar</td>
<td></td>
<td>$6,347,000</td>
<td>$903,000</td>
</tr>
<tr>
<td>8-Mar</td>
<td>Winter Presentation</td>
<td>$6,347,000</td>
<td>$903,000</td>
</tr>
<tr>
<td>15-Mar</td>
<td></td>
<td>$6,347,000</td>
<td>$903,000</td>
</tr>
<tr>
<td>22-Mar</td>
<td></td>
<td>$6,347,000</td>
<td>$903,000</td>
</tr>
<tr>
<td>29-Mar</td>
<td></td>
<td>$6,347,000</td>
<td>$903,000</td>
</tr>
<tr>
<td>5-Apr</td>
<td>Fish Bowl</td>
<td>$6,347,000</td>
<td>$903,000</td>
</tr>
<tr>
<td>13-Apr</td>
<td>Auditorium Structural System Introduced</td>
<td>$7,200,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>20-Apr</td>
<td>Meeting With Cree</td>
<td>$7,200,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>27-Apr</td>
<td></td>
<td>$7,435,000</td>
<td>(185,000)</td>
</tr>
<tr>
<td>3-May</td>
<td></td>
<td>$7,435,000</td>
<td>(185,000)</td>
</tr>
<tr>
<td>10-May</td>
<td>Final Presentation</td>
<td>$7,730,000</td>
<td>(480,000)</td>
</tr>
</tbody>
</table>
WHY THE ESTIMATE EXCEEDS THE TARGET VALUE

CREE STRUCTURE
- First building of its kind
  - Inexperienced labor
  - Learning curve
- Unique cross-laminated timber core

AUDITORIUM
- Cantilevered auditorium
- Rooftop terrace
- Seismic challenges

ATRIUM
- Extensive use of curtain wall
- Large glazed skylight
Energy Savings

BIG IDEAS TO OPTIMIZE LIFE CYCLE COSTING
## LIFE CYCLE COSTING – ROOFTOP TERRACE

<table>
<thead>
<tr>
<th></th>
<th>Space Efficiency</th>
<th>$/Assignable SF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from 0.88</td>
<td>from $ 291</td>
</tr>
<tr>
<td></td>
<td>to 0.94</td>
<td>to $ 274</td>
</tr>
</tbody>
</table>

Variation of Space Efficiency and $/Assignable SF costs before and after the implementation of the rooftop terrace.
LIFE CYCLE COSTING – ROOFTOP TERRACE CONCRETE VS. WOOD

LCC Concrete:  $149,336
LCC Wood:      $213,640

Replacement after 20 years
ADDITIONAL INCOME – AUDITORIUM
LIFE CYCLE COSTING – ADDITIONAL INCOME

Total rental over life cycle

- Seminar / PC Lab: $1,200,987 (-$23,903)
- Auditorium: $515,802 (-$37,282)
- Classrooms: $988,785 (-$23,903)
- Cafe: $738,824 (-$4,565)
- Rooftop Terrace: $237,409 (-$4,565)

Seminar / PC Lab
Auditorium
Classrooms
Cafe
Rooftop Terrace
ADDITIONAL INCOME – CASH FLOW (NET PRESENT VALUE)

$13,078,725,59
$10,558,235,98
TOTAL LIFE CYCLE COSTING

<table>
<thead>
<tr>
<th></th>
<th>Conventional</th>
<th>Income</th>
<th>Cree Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>$7,074,000</td>
<td>$7,730,000</td>
<td>$7,730,000</td>
</tr>
</tbody>
</table>
LIFE CYCLE COSTING – ROOFTOP TERRACE
ADDITIONAL INCOME – TEMPORARY CAFE
<table>
<thead>
<tr>
<th>Basic Steel Shape</th>
<th>1</th>
<th>Iconic Status &amp; Aesthetics</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>All program requirements met</td>
<td>3</td>
<td>Meets Program Requirements</td>
<td>3</td>
</tr>
<tr>
<td>Recycled Steel</td>
<td>1</td>
<td>Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>Daylighting and Trickle Ventilation</td>
<td>2</td>
<td>Quality of Indoor Space &amp; Comfort</td>
<td>3</td>
</tr>
<tr>
<td>Bike Path Skybridge</td>
<td>1</td>
<td>Connection to Campus</td>
<td>2</td>
</tr>
<tr>
<td>Stays within footprint and meets basic assignable SF</td>
<td>1</td>
<td>Space Efficiency</td>
<td>2</td>
</tr>
<tr>
<td>Open collaboration space inside</td>
<td>2</td>
<td>Promotes Collaboration &amp; Innovation</td>
<td>3</td>
</tr>
<tr>
<td>Modular Steel Erection and Early Computer Access</td>
<td>2</td>
<td>Constructability</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL POINTS= 13**

<table>
<thead>
<tr>
<th>Value for Cost</th>
<th>22 =TOTAL POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREE System, Natural Feel with Stucco and Wood, Monumental Cantilever</td>
<td>All program requirements met</td>
</tr>
<tr>
<td>LEED Gold, CREE System, Reduced CO₂, Less Wasted Material</td>
<td>Large atrium, Rooftop Terrace, Daylighting, Warmth of Wood</td>
</tr>
<tr>
<td>Bike Path Skybridge, Stucco/Wood façade, Temp. Café Competition</td>
<td>Rooftop terrace, cantilevered auditorium, widened atrium</td>
</tr>
<tr>
<td>Large Atrium, Rooftop Terrace, Temporary Café</td>
<td>CREE Modularization, Schedule Streamlined, Early Computer Lab Access</td>
</tr>
</tbody>
</table>

**VALUE FOR MONEY**
LEAPFROG SUSTAINABILITY – IT’S ALL ABOUT PROCESS

Little Effort…

• Known Materials and Tools
  • Wood
  • Concrete
  • Transportation
  • Connections
  • Local materials

…Big Impact

• Simplicity
• Rapidly erected and enclosed
• Completely renewable
• More efficient use of materials
TEAM REFLECTIONS

Bjarke
“The integration of all the professions early is extremely difficult, but well worth it in the end”

Donata
“Getting insight on other discipline’s driving ideas for design furthers understanding of how to best integrate everything to achieve a balanced building design”

Mike
“It is important to embrace criticism and respond to it in our subsequent design iterations”

Ethan
“Change is part of design. Don’t let it stop progress and trying new things”

Enrique
“Working with people is hard, working with incredibly talented people is even harder; but/and in the end that is what makes the entire experience worth it and your final product better”

Nolan
“Increased integration among all parties involved in the project’s development not only results in a better design, but a shared sense of responsibility and pride as well”

Sijia
“Different cultural backgrounds benefited teamwork greatly by providing diverse and collaborative personalities, along with new ideas”
ACKNOWLEDGEMENTS

WE WANT TO THANK

OUR INDUSTRY MENTORS
Kyle Adams
David Bendet
Geoff Bomba
Eric Borchers
Fernando Castillo
Armin Dariz
Greg Luth
John Nelson
Nabih Tahan
Bryce Tanner
Brandon Sullivan

OUR OWNERS
Karolina Ostrowska
Michael Seaman
Lauren Scammell

OUR UNIVERSITY MENTORS
Renate Fruchter
Fernando Castillo
Norman Hallermann
Willem Kymmel
Andreas Leps
Eduardo Miranda
THANK YOU!