Ridge 2010

Spring Presentation

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Site - University of Nevada, Reno

**Challenges**
- Earthquakes
- Gusts ~70mph
- Temperature Δ40 ° F
- Cacti
- Slope 0° – 42°

**Advantages**
- Location
- Views
- Solar Energy
Site - Climate Considerations

Days Distribution (average):
- 158 - Clear Days
- 93 - Partly Cloudy Days
- 114 - Cloudy Days
- 79% - Sunny
- 60% - Humidity

Temperatures (average):
- 20° - December: coldest
- 91.2° - July: warmest

Average Temperature Range
Reno, Nevada

Percentage of Possible Sunshine
Reno, Nevada

Δ40 ° F
Views - University of Nevada, Reno
2-9 Solar Orientation
Public building entrances will need to maximize their orientation to the south and southwest to facilitate year-round use.

The existing library steps serve as a prime example of orienting and designing access to serve as informal seating, thus encouraging campus community interaction.

2-8 Informal Seating
Accessways, stairs, and other site features can provide informal seating areas and places of interaction.
Site Connectivity: Campus Considerations

- Pedestrian Circulation
- Vehicular Circulation
Decision Matrix

**SUSTAINABILITY**
- Natural Lighting
- Campus Connectivity
- Quality of Indoor Space
- Creating Sustainability Awareness

**ECONOMY**
- Opportunity for Prefabrication
- Efficiency of Structural System

**DISCIPLINE BASED**
- Innovativeness of Structural Solution

<table>
<thead>
<tr>
<th></th>
<th>Steel</th>
<th>Concrete</th>
<th>Steel</th>
<th>Dual</th>
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<tr>
<td><strong>Pixel</strong></td>
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<tr>
<td><strong>R to B</strong></td>
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<tr>
<td><strong>R2B A</strong></td>
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“Ridge” to Bridge

Goals:
- Campus Connectivity
- Daylight Interaction
- Encourage Pedestrian Use
Floor Plan

Floor 2
Level: -10’-0”
Height: 12’-0”

- Bathroom
- MEP
- Storage
- Interaction Areas
- Seminar Rooms
- Small Classrooms
- Vertical Cores
- Instructional Labs
- Student Office Area
- Tech Support
Floor Plan

Floor 3
Level: 0'-0"
Height: 10'-0"

- Bathroom
- MEP
- Storage
- Faculty Offices
- Interaction/Lounge Areas
- Vertical Cores
- Department Chair Office
- Senior Administrative Assistants
Section BB

142'-0"

32'-2"
Façade Module Distribution

- East Facade
- West Facade
- North Facade
- South Facade
Façade Module Distribution

Module A
Material: Aluminum prefab.
East and West façade 16
North Façade 2
South Façade 12

Module A2
Material: Aluminum prefab.
East and West façade 0
North Façade 0
South Façade 4
Façade Module Distribution

**Module B**
Material: Aluminum prefab.
- East and West facade: 3
- North Façade: 0
- South Façade: 0

**Module C**
Material: perforated metal, brushed stainless steel; 1/8" radius circular openings; 1.5mm
- East and West facade: 39, 48
- North Façade: 6
- South Façade: 56

**Module D**
- East and West facade: 6, 8
- North Façade: 0
- South Façade: 9
Façade Integration

- Sun Shading Facade
- Interior Glass Facade
- Interior Division Walls
- Main Structural Elements Through Façade
Façade Integration

Sun Shading Façade: Aluminum Modules

Fill in panels: Perforated metal panels

Interior Glass Facade

Main Structural Elements

Catwalk
Top View
East Façade
North Façade
South Façade
West Façade
South-East
North-West
Student Interaction Areas
Student Interaction Areas
North Entrance
Catwalk
South Entrance
South Entrance
Main Stairway
Local Revit Model
Local Revit Model

Struct_Jadyn: Walls: Basic Wall: Foundation - 2'-6"
Local Revit Model
Local Revit Model
Central Revit Model

East/West Elevation

South Elevation
**Floor 1**
- 2’-6” Retaining Wall
- 10’x10’ Spread footing
- 8.5” Slab on grade

**Floor 2 & 3**
- 4 ½” NW 3VLI19 metal deck

**Loads**
- Dead: self weight+ MEP: 95 psf
- Live: corridors (reduced): 100 psf
- EQ + soil: base shear: 4000 kips
- Wind: basic wind speed: 100 mph

**Structural System**
- 32’-0”
- 65’-6”
- 44’-0”
- 29’-3”
- 27’-9”
Foundation System

Retaining Wall

- 2’-6”
- #8 @ 4”
- #6 @ 6” (longitudinal)
- #6 @ 6”
- #8 @ 4” (transverse)
- 18’-0”
- 30’-0”
- 3’-0”

Isolated Column Footing

- 10’-0”
- 16”x 16”x ½” base plate
- 4 anchor bolt
- \( A_s \text{ required} = 9.6 \text{ in}^2 \)
Floor 2

Challenges
- W24x 94 Auditorium-Span
- HSS 20x 12x ⅝ Perimeter Beams
- HSS 10x 10x ⅝ Slanted elements

Columns
- W12x 50
- W12x 58
- W12x 72
- W14x 68
- W14x 90

Beams
- W12x 26
- W14x 30
- W14x 22
- W14x 38
- W18x 50
- W21x 50

Dimensions:
- 32’-0”
- 33’-6”
- 28’-0”
- 44’-0”
- 23’-3”
- 20’-6”
- 27’-11”
- 29’-0”
Floor 3

32'-0"
33'-0"
28'-0"

Columns
- W12x 50
- W12x 58
- W12x 72
- W14x 68
- W14x 90

Beams
- W12x 26
- W14x 30
- W14x 22
- W14x 38
- W18x 50
- W21x 50
- W21x 73

Challenges
- W24x 94 Auditorium-Span
- HSS 20x 12x ⁵⁄₈ Perimeter Beams
- HSS 10x 10x ⁵⁄₈ Slanted elements
Roof

Columns
- W12x 50
- W12x 58
- W12x 72
- W12x 90
- W14x 68
- W14x 90

Beams
- W12x 26
- W14x 30
- W14x 22
- W14x 38
- W18x 50

Challenges
- W24x 94 Auditorium-Span
- HSS 10x 10x 5/8 Slanted elements
Cantilever Solution

- Perimeter Trusses integrated into the façade
- HSS 10x 10x ⅝ diagonals
- Interior cross bracing for lateral support
Lateral Load Path

North-South Direction
Lateral Load Path

East-West Direction
Gravity - Truss and Bridge

P = 875 kips

Δ = 0.50in

P = 675 kips

Δ = 0.21in

100’-0”

140’-4”

P = 875 kips

Δ = 0.50in
Gravity - Lateral System Interaction

Gravity Loads

Braces Resist Lateral Loads

HSS 10x 10x ⅝ TYP.
HSS 14x 14x ⅝ for Truss Brace
Lateral System N-S

$P = 300$ kips

$\Delta = 0.21\text{in}$

$\Delta = 0.05\text{in}$

$\Delta = 0.02\text{in}$

$\text{IDR}_{\text{max}} = 0.1\%$
Lateral System E-W

- $P = 300$ kips
- $\Delta = 0.1\text{in}$
- IDR = 0.1%

Dimensions:
- 13'-6"
Lateral System E-W

- \( P = 200 \text{ kips} \)
- \( \Delta = 0.5 \text{ in} \)
- \( \Delta = 0.26 \text{ in} \)
- \( \Delta = 0.12 \text{ in} \)
- IDR\(_{\text{max}} = 0.15\% \)
Mode Shapes

Mode 1:
T1 = 0.23 sec

Mode 2:
T2 = 0.16 sec

Mode 3:
T2 = 0.15 sec
Skylight

Queen-Post Truss System

- $F_{pt} = 7$ kips
- $F_{cable} = 105$ kips

$\Delta = 2.54\text{in}$

$\Delta = 0.85\text{in}$
Structural Connections

Typical Connection

- **Horizontal**
  - HSS 20x 12x $\frac{5}{8}$

- **Slanted**
  - HSS 10x 10x $\frac{5}{8}$

- **W14x or W12 Column**

- **3/8” Plate**
  - 3-7/8” A325
  - 1/4” Weld

- **“blind bolts”**
Structural Connection

Alternate Option

Plan

W12x or W14 Column

Elevation

HSS elements

W12x or W14 Column

HSS
Soil Profile applies to the low of the slope
Site Plan

<table>
<thead>
<tr>
<th>Site Area</th>
<th>Description</th>
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<tbody>
<tr>
<td>Site Area</td>
<td>3.6 acres</td>
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<tr>
<td>Heat Relief Area</td>
<td>400 SF</td>
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<tr>
<td>Parking</td>
<td>50-55 spots</td>
</tr>
<tr>
<td>Assembly Fabrication/Materials Laydown</td>
<td>12000 SF</td>
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<tr>
<td>Site Trailers</td>
<td>1000 SF</td>
</tr>
<tr>
<td>Restrooms</td>
<td>4 Units</td>
</tr>
<tr>
<td>Recycling &amp; Waste Control</td>
<td>6x20 CY bins</td>
</tr>
<tr>
<td>Crane Space</td>
<td>2 locations</td>
</tr>
</tbody>
</table>

Cactus Garden

Building Footprint
Cactus Garden Transplant

HOW TO TRANSPLANT A CACTUS

Moving a cactus need not be a daunting task. By following these easy-to-follow steps, you can successfully move a cactus in the landscape. Attempt to transplant the cactus to an area that is similar to the original site in regard to light exposure, freeze potential, excessive heat, soil type and texture, irrigation method and schedule, orientation, and other abiotic factors. Cacti should not be moved during the winter or when nighttime temperatures are below 60°F (16°C) because rooting will be delayed or inhibited by the cold soil temperatures and the plant may die.

Step 1:
Select a healthy cactus. Choose a plump specimen that is free of blemishes, obvious disease, bruises and abrasions (Fig. 1). If the plant has been lying on the ground, check for sunburning.

Step 5:
If the plant is large or heavy, the next step may require two people. Take a garden hose and wrap it around the

Truckee River Rock & Nursery
3 reviews - more info »
5200 West 4th Street
Reno, NV 89523-9013
(775) 746-2707
truckeeriverrock.com

“Additional Information: Large Selection of Nursery Stock Hours Of Operation: Open 7 Days ...” superpages.com

Directions Search nearby Save to... more▼
Cost and Schedule Process

Scope

- Revit 2010
- Google Sketchup 6
- AutoCAD 2009
- Teleplace
- Navisworks Manage 2010
- Vico Office

Estimate

- Vico Estimator 2008
- Vico Office
- Excel 2010

Schedule

- Vico Control 2008
- MS Project 2007
- Navisworks Manage 2010

Object Assemblies

- Vico Estimator 2008
- Excel 2010

Quantity Takeoff

- Tocoman iLink 4
- Vico Office
- Revit 2010

Scope-Task Definition

- Navisworks Manage 2010
Assemblies

Team models building, assigning correct object types

Construction manager creates quantity takeoff based on object types

Define assemblies with team

Construction manager creates assemblies database and enters quantities. Production method resultant is assembly duration, and resource resultant is assembly cost.
Estimate

Winter Quarter Target Value

- Sitework: $288,462
- Equipment and Furnishings: $-
- Services: $2,365,385
- Interior: $1,153,846
- Shell: $1,038,462
- Substructure: $923,077

Current Estimate

- Sitework: $288,462
- Equipment and Furnishings: 0
- Services: $2,365,385
- Interior: $951,923
- Shell: $2,467,267
- Substructure: $503,180

Budgeted Cost: $7.5 Million
Excel Estimate Books

- Cost estimate on left
- Cost assemblies on right
Schedule

Duration: 365 days

Critical Task

Milestone
Milestones

Milestone 1: Excavation Complete
June 5, 2015

Milestone 2: Water tight
Nov 5, 2015

Milestone 3: Building Complete
May 19, 2016
4D Perspective

- Have next to Milestones and Gantt chart slides
4D Section

- Have next to Milestones and Gantt chart slides
Project Equipment - Heavy

**Heavy material handling**
- Volvo L220F Hybrid

**Concrete pump**
- SANY 5253THB

**Excavation**
- Kamatsu PC200-8 Hybrid

**Crane**
- Grove TM500E-2 45ton Truck Mounted-Hydraulic Crane
Crane - Greatest Load

Beam Weight: 5,080lbs  
Crane Capacity Used: 64%  
Lift Radius: 55 ft  
Boom Angle @ 55ft: 44°
Model Integration

- Properties
- Visual Description

- Unit Costs
- Production Rates

- Performance Analysis

- Duration
- Logic
Task List → Track & Manage Design Work

Benefits of the Task List

- Transparency
- Tracking & Statusing
- Planning & Re-planning
- Interdisciplinary Understanding
- Goal-Oriented Team Work
Task List → Weekly Production Plan

<table>
<thead>
<tr>
<th>SAT 04/24</th>
<th>SUN 04/25</th>
<th>MON 04/26</th>
<th>TUE 04/27</th>
<th>WED 04/28</th>
<th>THU 04/29</th>
<th>FRI 04/30</th>
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<tbody>
<tr>
<td>Finish Revit Model</td>
<td>Columns Above Auditorium</td>
<td>Equest Model Discussion</td>
<td>Equest Model Refinement</td>
<td>Sketchup of Facades</td>
<td>Structural Stair Modeling</td>
<td>Slide Plan for Presentation</td>
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<tr>
<td>Meeting with Afaan</td>
<td>Finish Assemblies</td>
<td>Wall Sections</td>
<td>ETABS Analysis and Simulations</td>
<td>Retaining Wall Modeling</td>
<td>Create a 4D Model</td>
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<tr>
<td>Clash Detection</td>
<td>C-Channel Issue Resolution</td>
<td>Sketches of curtain wall connections</td>
<td>Load of Curtain Wall</td>
<td>Structural Catwalk Modeling</td>
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</tbody>
</table>

Legend:
A
EJ
EP
C
Design Work Flow in SPS
Meeting Dynamics - Winter

START
- Logging-On 10 min
- Agenda Discussion 10 min
- Presentation 1 30 min
- Presentation 2 30 min
- Presentation 3 30 min
- Presentation 4 30 min
- Assign Work 10 min

END

0:00:00 0:10:00 0:20:00 0:50:00 1:20:00 1:50:00 2:20:00 2:30:00
START
- A
- EJ
- EP
- C

END
- A
- EJ
- EP
- C
Meeting Dynamics - Spring

### Agenda

- **Standup**
  - 10 min

- **Agenda Discussion**
  - 10 min

- **Group Problem Solving**
  - 30 min

- **Subgroup Session 1**
  - 30 min

- **Subgroup Session 2**
  - 30 min

- **Subgroup Session 3**
  - 30 min

- **Recap Commitments**
  - 10 min

### Timeline

- **0:00:00**
- **0:10:00**
- **0:20:00**
- **0:50:00**
- **1:20:00**
- **1:50:00**
- **2:20:00**
- **2:30:00**

### Commitments

- **0:00:00**
- **0:10:00**
- **0:20:00**
- **0:50:00**
- **1:20:00**
- **1:50:00**
- **2:20:00**
- **2:30:00**
Work Week Dynamics - Winter
Work Week Dynamics - Spring
Interaction in Teleplace

- Task List / Agenda
- Whiteboard Sketching
- Sharing Revit
- Brainstorming with Post-It Notes
- Sharing Navisworks
- Documents from Past Meetings
Experiencing R2B in Teleplace

Beyond Conventional Visualization

Exploring Typical Spaces
Enacting End-User Scenarios
Performing Visual Inspections
Experiencing R2B in Teleplace

Involving the Owners in the Design

Select a view to experience
Explore building context
Perform circulation review
Birthdays in Teleplace
THANK YOU!

Renate Fruchter
Bahrath Sridharan
Ron Teitelbaum
Forest Peterson
Hossein Nasseri
Humberto Cavallin
Afaan Naqvi
Adhmina Rodriguez
Prof. Helmut Krawinkler
Prof. Eduardo Miranda
Greg Luth
Glenn Katz
David Bendet
Prof. Bob Tatum
Balazs
“Coordination is a negotiated agreement, Integration is an effort made together.”

- Henning Roedel

“No cantilever is too big”

- Plamen Ivanov

“Integration is more than charts and lists. It is about being successful in putting yourself in the other’s position and understanding what they need”

- Gabriela Perez

“Communication *truly* is a skill”

- Jaclyn Lee