WINTER QUARTER PRESENTATION

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A geographically distributed, multicultural, interdisciplinary, integrated, design team.
TEAM PROCESS

Be polite, there’s no need not to be. 😊

Brainstorming:

Communication process and tools:

Motivating each other:
The advantages of visual contact – using icons:

Helping each other in difficult situations.

Getting to know each other.

Health and exercise are important!
THE DESIGN CHALLENGE

Goals:

– Integrated Design Solution
– Design to meet local needs
– Healthy Building Challenge
– Innovation
– Sustainability Target Value
– Most Total Value for Client
“I want a building that allows me to be healthy”
- Maria Frank (Owner)
THE SITE

Puerto Rico

San Juan

University of Puerto Rico
Average Monthly Precipitation

Average Monthly Precipitation in inches across different months.

Average Monthly Rainfall = 4.7”

Average Monthly Cooling Degree Days

Average Monthly Cooling Degree Days across different months.

Zero Heating Degree Days

Annual Temperature (Max., Min., Mean)

Annual Temperature graph showing average temperatures across different months.

Consistently Warm Temperatures Year Around
SITE & CLIMATE DATA

Relative Humidity: 65% - 90%

Soil Conditions:
Medium to very stiff, clayey

Water Table: 17 Feet

Earthquake Risk Category: III

Wind dir. distribution San Juan Airport January
© windfinder.com
CONCEPT 1: THE NEURON

CONNECTIONS
INTERACTION
DYNAMIC
MIND
SOCIAL
PHYSICAL
The Neuron on Site

ARCH

Main Surrounding Buildings

Secondary Surrounding Buildings

Student Circulation

The Neuron

Creates a “hub” for University activity.
The Neuron:
Establishing connections that promote:
  Health
  Collaboration
  Value
SECTIONS

18'-0", 19'-0", 19'-0", 19'-0", 10'-0", 26'-0", 22'-0"

![Auditorium section diagram with labeled measurements and floor levels.]
9 DIFFERENT PANELS ALIGNED TO MAKE THE FAÇADE
• Big Idea
  – Organic Neuron Façade
  – Collaboration spaces
• Disciplines
  – Internal Exposed Structure
  – Pre-Fabricated Façade
  – Natural Ventilation

• Goals
  – Swinerton:
    • Ramp
    • Natural lighting
  – DPR:
    • Auditorium/Theatre
    • Café
    • Inovation
## BUILDING LOADS

### Concrete structure:

<table>
<thead>
<tr>
<th>Dead (main)</th>
<th>Dead (auditorium)</th>
<th>Dead (cantilever)</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>80</td>
<td>85</td>
</tr>
</tbody>
</table>

### Steel structure:

<table>
<thead>
<tr>
<th>Dead (main)</th>
<th>Dead (auditorium)</th>
<th>Dead (cantilever)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>90</td>
<td>95</td>
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</tbody>
</table>

### Live loads:

<table>
<thead>
<tr>
<th>Use</th>
<th>Uniform psf</th>
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<tbody>
<tr>
<td>Office</td>
<td>50</td>
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<tr>
<td>Classroom</td>
<td>40</td>
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<tr>
<td>Lounge</td>
<td>80</td>
</tr>
<tr>
<td>Auditorium</td>
<td>100</td>
</tr>
<tr>
<td>Lab</td>
<td>100</td>
</tr>
<tr>
<td>Assembly area</td>
<td>60-100</td>
</tr>
<tr>
<td>Corridor</td>
<td>80-100</td>
</tr>
<tr>
<td>Storage</td>
<td>150-250</td>
</tr>
<tr>
<td>Stairs</td>
<td>100</td>
</tr>
<tr>
<td>Roof</td>
<td>40</td>
</tr>
</tbody>
</table>
**Seismic loads:** Base Shear = 729 kips

**Risk Category III:**
- $S_s = 0.974$ g
- $S_1 = 0.378$ g

**Wind loads:**
- Hurricane season with high winds from NE.
- High season is from August till October.

**Soil profile:** Bearing capacity = 5000 psf

- Medium to Very Stiff Clayey Soil
- Excavation: 11 feet
- Water table: 17 feet
Reinforced Concrete

18’ cantilever on the entire side

Steel

60’ long span in the auditorium
Foundations are the same for both structural solutions.

Typical depth of the mat to offer enough support on Stiff Clayey Soil.

Foundation above the water table: no need for drainage!

Small retaining walls instead of columns where needed.

Thickened flat plate under the columns to avoid puncturing the mat.
CONCRETE - FIRST FLOOR

- 24” x 12” column
- 20” x 10” column
- 18” x 18” column
- Shear walls
- 16” inverted T beam
- 16” x 10” beam
CONCRETE - SECOND FLOOR

- 24" x 12" beam
- 24" x 12" column
- 20" x 10" column
- 18" x 18" column
- shear walls
- 16" inverted T beam
- 16" x 10" beam
CONCRETE - THIRD FLOOR

- 24" x 12" beam
- 24" x 12" column
- 20" x 10" column
- 18" x 18" column
- 16" inverted T beam
- 16" x 10" beam
- 32" x 16" posttensioned beam
- shear walls

Dimensions:
- 30' x 30'
- 25'
- 21'
- 12'
- 7'
- 19'
- 18'
- 21'
- 11'

Architectural features:
- Lecture auditorium
- Corridors
- Restrooms
CONCRETE - ROOF

- 24" x 12" column
- 20" x 10" column
- 18" x 18" column
- Shear walls
- 16" inverted T beam
- 16" x 10" beam

- 24" x 12" beam
- 32" x 16" posttensioned beam
VERTICAL LOAD PATHS

Double tee prefabs:

- **loads**
- **tension**
- **compression**
LATERAL LOAD PATHS

- loads
- tension
- compression
- ground reaction
STEEL - FIRST FLOOR

W 14 x 53 column
W 12 x 45 column
2’ x 2’ truss column
shear walls
W 14 x 68 beam
W 12 x 58 beam
STEEL - SECOND FLOOR

- 3’ deep truss beam
- W 14 x 53 column
- W 12 x 45 column
- 2’ x 2’ truss column
- shear walls
- W 14 x 68 beam
- W 12 x 58 beam
STEEL - THIRD FLOOR

- W 14 x 53 column
- W 12 x 45 column
- 2’ x 2’ truss column
- Shear walls
- W 14 x 68 beam
- W 12 x 58 beam

Legend:
- 3’ deep truss beam
- 5’ deep truss beam
STEEL - ROOF

3’ deep truss beam

5’ deep truss beam

W 14 x 53 column

W 12 x 45 column

2’ x 2’ truss column

shear walls

W 14 x 68 beam

W 12 x 58 beam
Slim deck composite slab:

- **loads**
- **tension**
- **compression**

14”
LATERAL LOAD PATHS

loads

tension

compression

ground reaction
**Big Idea:** Everything is light and dynamic (open collaborative spaces) and connected.

**A:** Static elements hidden behind dynamic facade.

**CM:** Easy construction.

**MEP:** Simple maintenance.

**Goals:** Cheaper and with less concrete/steel = healthier.
MEP CONSIDERATIONS

SHADE STUDY

Summer Solstice – 21 June

Winter Solstice – 21 December
South Façade Radiance Simulation
(Summer Solstice)

North Façade Radiance Simulation
(Summer Solstice)

South Façade Radiance Simulation
(Winter Solstice)

North Façade Radiance Simulation
(Winter Solstice)
Outdoor Air Conditions:
• Hottest Month = August
• 2% Dry Bulb Temperature = 89.24°F
• 2% Wet Bulb Temperature = 77.72°F
• 2% Humidity Ratio = 0.026 lb/lb

(2005 ASHRAE Handbook Fundamentals)

Indoor Air Conditions:
• Lowest Winter Temperature = 68.5°F
• Highest Winter Temperature = 75.7°F
• Highest Summer Temperature = 80.1°F
• Maximum Relative Humidity = 84.6%
• Indoor Design Conditions = 75°F, 84% Rh

Based on 90% People Satisfied (PPD=100)
OPTION 1: Dual Path Air Handler, W/DX Coils, & Variable Speed Fan

Paired with Steel Structural System
Approx. 13,000 cfm
35-45 Tons
OPTION 2: Desiccant Dehumidification System, W/DX Coils, & Variable Speed Fan

Paired with Concrete Structural System
Approx. 13,000 cfm
35-45 Tons
Conflicts: (1) Introducing 3rd MEP Riser, (2) Deeper support girder in auditorium, (3) Clashes between branch ductwork and structural columns, (4) Punching through shear walls.
FLOOR SANDWICHES

Section with Concrete Solution:

Diagram showing a section with concrete solution, including details such as drop ceiling, return duct, girder (10" x 16"), t-beam (4" x 10"), flexible space, and pressurized floor.
Section with Steel Solution:

- **11 ft Slab-to-Slab**
- **Girder (12" x 13")**
- **Structural Beam**
- **Office**
- **Swirl Diffuser**
- **Pressurized Floor**
- **Return Duct (10" x 28")**
- **Hallway**
- **Exposed Ceiling**
- **Flexible Space**
- **Supply Duct (10" x 28")**
Red Light Green Light Window Signaling System

Demand Controlled Ventilation
(≤60% energy savings)

Intelligent MEP system that works as a brain

Systems that Communicate

Daylighting Controls
(≤75-80% reduction, lighting loads)
Dual Path Air Handler

**Big Idea:** Systems that communicate with each other

**Disciplines:**
- Relocation of risers
- Long duct runs avoided
- Coordination issues with beam depth

**Goals:**
- Reduced energy needs
- Innovative technology
- Dedicated outdoor air component
- Improved occupant comfort

Desiccant Dehumidification

**Big Idea:** Systems that communicate with each other

**Disciplines:**
- Relocation of risers
- Long duct runs avoided
- Desiccant system paired with concrete solution

**Goals:**
- Decontamination of air and prevention of pollution
- Further reduced energy needs
- Up-and-coming technology
CONCEPT 1: THE PUZZLE

PIECES FITTING TOGETHER

COOPERATION

CAMPUS AS A PUZZLE

CHALLENGE

DISCOVERY
Circulation:

Two structural cores that provide vertical circulation. On the first floor we integrate a ramp and stairs that cross thru the entire building.

All other floors concentrate their circulation around the open atrium and make use of the exterior views.
SECOND FLOOR

- Faculty Offices
- Department Chair’s Office
- Senior Administrative Assistants
- Administrative Assistants
- Faculty Lounge
- Student Offices
- Auditorium
- Large Classrooms
- Small Classrooms
- Seminar Rooms
- Instructional Labs
- Technical Support
- Storage Space
- Cafe
- Bicycle Showers
Collaboration Spaces
Multy-functional Spaces
Reinforced Concrete

Steel

18’ cantilever on both sides

39’ long span in the auditorium
CONCRETE - FIRST FLOOR

- 20" x 20" column
- 16" x 16" column
- 24" x 12" beam
- 18" x 12" beam

Shear walls:

Dimensions:
- 19.5' x 19.5'
- 18.5' x 18.5'
- 21.5' x 21.5'
- 31' x 31'
- 10' x 10'
- 36' x 36'
- 20' x 20'
- 11.5' x 11.5'
CONCRETE - SECOND FLOOR

- 20" x 20" column
- 16" x 16" column
- Shear walls
- 24" x 12" beam
- 18" x 12" beam
- Cantilever beam with changing depth (from 36" to 12")
CONCRETE - THIRD FLOOR

- 20" x 20" column
- 16" x 16" column
- 24" x 12" beam
- 18" x 12" beam
- Cantilever beam with changing depth (from 36" to 12""
- Shear walls
CONCRETE - ROOF

20" x 20" column
16" x 16" column
Shear walls
24" x 12" beam
18" x 12" beam
cantilever beam with changing depth (from 36" to 12"

Diagram with various measurements and structural elements.
VERTICAL LOAD PATHS

Bubble Deck:

- Loads
- Tension
- Compression
LATERAL LOAD PATHS

- Loads
- Tension
- Compression
- Ground reaction
STEEL – MAIN IDEA

- W 14 x 61 column
- Shear walls
- W 18 x 46 beam
STEEL - SECOND FLOOR

- W 14 x 61 column
- W 18 x 46 beam
- W 24 x 76 beam

shear walls
STEEL - THIRD FLOOR

- W 14 x 61 column
- Shear walls
- W 18 x 46 beam
- W 24 x 76 beam
VERTICAL LOAD PATHS

Steel composite deck:

loads

tension

compression
LATERAL LOAD PATHS

- loads
- tension
- compression
- ground reaction
**Big Idea:** Cores and different cantilever solutions correspond to the Puzzle theme.

**A:** Cores moved, changed to allow more space for the auditorium.

**CM:** Easier construction with Bubble deck and steel composite deck.

**MEP:** Allignment for the third shaft.

**Goals:** Less concrete used because of Bubble Deck and composite steel deck = healthier.
MEP CONSIDERATIONS

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35-45 Tons
OPTION 2: Desiccant Dehumidification System, W/DX Coils, & Variable Speed Fan

Paired with Concrete Structural System
Approx. 23,000 cfm
35-45 Tons
Conflicts: (1) Avoiding long duct runs, (2) Avoiding repetitive design, (3) Critical floor sandwich dimensions, (4) Punching through shear walls, (5) Clashes with structural beams in hard-to-reach spaces
FLOOR SANDWICHES

Section with Concrete Solution:
Section with Steel Solution:
MEP INNOVATIONS

Each piece fills in one part of the entire puzzle.

Natural Refrigerants – CO₂
(Reduction in ODP)

Phase Changing Materials
(20-30% Energy Savings)

Green roof
(50% of rooftop runoff)

Flat Plate Solar Water Heater
(Natural gas only as a back-up)
**Dual Path Air Handler**

**Big Idea:** Systems that link in an interactive way.

**Disciplines:**
- Punching through shear walls
- Clashes with structural beams
- Extremely constrained floor sandwich

**Goals:**
- Reduced energy needs
- Innovative technology
- Dedicated outdoor air component
- Improved occupant comfort

**Desiccant Dehumidification**

**Big Idea:** Systems that communicate with each other

**Disciplines:**
- Punching through sheer walls
- Clashes with structural beams
- Extremely constrained floor sandwich
- Desiccant system paired with concrete solution

**Goals:**
- Decontamination of air and prevention of pollution
- Further reduced energy needs
- Up-and-coming technology
Two alternative entrance ways to the construction site from the freeway.

Our construction site.
Site Logistics Neuron

- Site office
- Laydown area
- Building footprint
- Recycling and material area
- Drive-thru site entrance with connected loading off zone
SITE LOGISTICS PUZZLE

- Site office
- Laydown area
- Building footprint
- Recycling and material area
- Drive-thru site entrance with connected loading off zone
**GROVE TMS700E**
Loading capacity 60 tones.

Rental from Forteza Equipo, Bayamón a 20 minute drive from the site.

**VOLVO EC140 Excavator**

Rental from BlueLine Rental, Toa Baja a 25 minute drive from the site.
Construction period: 8 ½ months.

Scheduled Weather buffer: 1 ½ month

Start: End of September 2019.

• Target Cost is $10,300,000.

• Based on cost data from RS Means, a reference project, material supplier data and mentor feedback.
COST ESTIMATION

L. Concrete
- D 27%
- C 11%
- B 56%

L. Steel
- D 27%
- C 31%
- B 56%

Square Concrete
- D 33%
- C 12%
- B 49%

Square Steel
- D 32%
- C 12%
- B 51%

TARGETS DISTRIBUTION
- A Substructure 7%
- B Shell 28%
- C Interiors 9%
- D Services 40%
- E Equipment and Furnishings 0%
- F Specialty Construction 8%
- G Building Sitework 7%
- H General Conditions 7%

- F Special Construction 5%

- G Building Sitework 4%
- H General Conditions 7%
- A Substructure 7%
- B Shell 28%
- C Interiors 9%
- D Services 40%
- E Equipment & Furnishings 0%
## Pros and Cons

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Constructability</th>
<th>Labour</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RC</strong></td>
<td>Prefab double tee slabs, insitu shear walls, cables</td>
<td>More local</td>
<td>Highest</td>
</tr>
<tr>
<td><strong>STEEL</strong></td>
<td>Prefab elements, no formwork (slimdeck)</td>
<td>Less local</td>
<td>Higher</td>
</tr>
<tr>
<td><strong>RC</strong></td>
<td>Semi prefab Bubble deck, insitu shear walls</td>
<td>More local</td>
<td>Lowest</td>
</tr>
<tr>
<td><strong>STEEL</strong></td>
<td>Fast construction, problematic connections</td>
<td>Less local</td>
<td>Lower</td>
</tr>
</tbody>
</table>
Alternative 1: Neuron+Steel+Dual Path

Alternative 2: Neuron+Concrete+Desiccant

Alternative 3: Puzzle+Steel+Dual Path

Alternative 4: Puzzle+Concrete+Desiccant
## RISK MANAGEMENT

### IDENTIFICATION

<table>
<thead>
<tr>
<th>Major risks</th>
<th>Description</th>
<th>Project phase</th>
<th>Consequences</th>
</tr>
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<tbody>
<tr>
<td>Hurricanes</td>
<td>Damages to building and users</td>
<td>Construction &amp; operation</td>
<td>Delays, reduced availability, repair and replacement costs</td>
</tr>
<tr>
<td>Earthquakes</td>
<td>Damages to building and users</td>
<td>Construction &amp; operation</td>
<td>Delays, reduced availability, repair and replacement costs</td>
</tr>
<tr>
<td>Vandalism &amp; sabotage</td>
<td>Theft or damages</td>
<td>Construction &amp; operation</td>
<td>Repair, replacement &amp; cleaning costs</td>
</tr>
<tr>
<td>Material &amp; resources input</td>
<td>Availability deviate from forecast</td>
<td>Construction &amp; operation</td>
<td>Delays, reduced availability of building, additional costs</td>
</tr>
</tbody>
</table>
RISK MANAGEMENT

HURRICANES

Neuron

+ Iconic design
  Prefabrication
  Fast repair

- No closable windows
  Worse hurricane protection
  Higher initial costs
  Higher O&M costs
  Additional energy costs

Puzzle

+ Closable shell/windows
  Better hurricane protection
  Prefabrication
  Fast repair

- Lower initial costs
  Lower O&M costs
  No additional energy costs
- No iconic design
**HURRICANES**

<table>
<thead>
<tr>
<th></th>
<th>Neuron</th>
<th>Puzzle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Costs</td>
<td>3.494.000,00</td>
<td>$810.000,00</td>
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<tr>
<td>Maintenance</td>
<td>349.000,00</td>
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<td>Cleaning</td>
<td>419.000,00</td>
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<td>Smaller Repairs</td>
<td>2.012.000,00</td>
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<td>Major Repairs</td>
<td>1.509.000,00</td>
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<tr>
<td>O&amp;M Costs</td>
<td>4.289.000,00</td>
<td>$993.000,00</td>
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<tr>
<td><strong>Total Costs</strong></td>
<td><strong>7.783.000,00</strong></td>
<td><strong>1.803.000,00</strong></td>
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*Preferable Facade*
LIFE CYCLE COSTS

**Puzzle in concrete most beneficial!**

<table>
<thead>
<tr>
<th></th>
<th>Neuron - Steel</th>
<th>Neuron - Concrete</th>
<th>Puzzle - Steel</th>
<th>Puzzle - Concrete</th>
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<tbody>
<tr>
<td><strong>Construction Costs</strong></td>
<td>$ 9,768,000.00</td>
<td>$ 9,642,000.00</td>
<td>$ 7,582,000.00</td>
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<td><strong>O&amp;M Costs</strong></td>
<td>$ 18,559,000.00</td>
<td>$ 18,320,000.00</td>
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<td><strong>Total Costs</strong></td>
<td>$ 28,327,000.00</td>
<td>$ 27,962,000.00</td>
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<td>Neuron - Steel</td>
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<td>LEED Criterias</td>
<td>Puzzle - Steel</td>
<td>Puzzle - Concrete</td>
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<td><strong>Sustainable Sites</strong></td>
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<td><strong>Water Efficiency</strong></td>
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<td><strong>Materials and Resources</strong></td>
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<td><strong>Indoor Environmental Quality</strong></td>
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<td><strong>Innovation</strong></td>
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<td><strong>70</strong></td>
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<td><strong>Total</strong></td>
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<td><strong>74</strong></td>
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### Criterias

<table>
<thead>
<tr>
<th>Criterias</th>
<th>Weight Team</th>
<th>Weight Owner</th>
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<tbody>
<tr>
<td>Integration of the big idea</td>
<td>13,14%</td>
<td>13,05%</td>
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<td>Integration of both challenges</td>
<td>13,29%</td>
<td>11,76%</td>
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<tr>
<td>Integration in the site</td>
<td>8,57%</td>
<td>8,86%</td>
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<tr>
<td>Construction</td>
<td>5,57%</td>
<td>4,52%</td>
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<td>Performance regarding natural hazards</td>
<td>12,00%</td>
<td>11,67%</td>
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<tr>
<td>Design aspects</td>
<td>9,00%</td>
<td>9,67%</td>
</tr>
<tr>
<td>Flexibility and functionality</td>
<td>6,43%</td>
<td>7,48%</td>
</tr>
<tr>
<td>Energy efficiency</td>
<td>6,71%</td>
<td>7,24%</td>
</tr>
<tr>
<td>Water efficiency</td>
<td>5,00%</td>
<td>5,00%</td>
</tr>
<tr>
<td>GWP</td>
<td>5,86%</td>
<td>6,29%</td>
</tr>
<tr>
<td>User comfort (air quality, lighting, thermal comfort)</td>
<td>9,00%</td>
<td>8,33%</td>
</tr>
<tr>
<td>Operation and maintenance</td>
<td>5,43%</td>
<td>6,14%</td>
</tr>
</tbody>
</table>

Performes citeria...  
- poor: 1 Point  
- reasonable: 2 Points  
- good: 3 Points  
- excellent: 4 Points
## DECISION MATRIX

<table>
<thead>
<tr>
<th>TEAM</th>
<th>Neuron Steel</th>
<th>Neuron Concrete</th>
<th>Puzzle Steel</th>
<th>Puzzle Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achieved points out of 48</td>
<td>33</td>
<td>32,5</td>
<td>30</td>
<td>30,5</td>
</tr>
<tr>
<td>Maximum achievable points</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Ratio to maximum points</td>
<td><strong>69%</strong></td>
<td><strong>68%</strong></td>
<td><strong>63%</strong></td>
<td><strong>64%</strong></td>
</tr>
<tr>
<td>Weighted points</td>
<td>2,765</td>
<td>2,786</td>
<td>2,674</td>
<td>2,776</td>
</tr>
<tr>
<td>Maximum achievable points</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Ratio to maximum points</td>
<td><strong>69,1%</strong></td>
<td><strong>69,7%</strong></td>
<td><strong>66,8%</strong></td>
<td><strong>69,4%</strong></td>
</tr>
<tr>
<td>Construction Costs</td>
<td>$ 9.768.000,00</td>
<td>$ 9.642.000,00</td>
<td>$ 7.582.000,00</td>
<td>$ 7.377.000,00</td>
</tr>
<tr>
<td>Costs per point</td>
<td>$ 296.000,00</td>
<td>$ 296.676,92</td>
<td>$ 252.733,33</td>
<td>$ 241.868,85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OWNER</th>
<th>Neuron Steel</th>
<th>Neuron Concrete</th>
<th>Puzzle Steel</th>
<th>Puzzle Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achieved points out of 48</td>
<td>25,7</td>
<td>25,7</td>
<td>33,7</td>
<td>38,7</td>
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<tr>
<td>Maximum achievable points</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Ratio to maximum points</td>
<td><strong>53,5%</strong></td>
<td><strong>53,5%</strong></td>
<td><strong>70,1%</strong></td>
<td><strong>80,6%</strong></td>
</tr>
<tr>
<td>Weighted points</td>
<td>2,151</td>
<td>2,174</td>
<td>2,691</td>
<td>3,117</td>
</tr>
<tr>
<td>Maximum achievable points</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Ratio to maximum points</td>
<td><strong>53,8%</strong></td>
<td><strong>54,4%</strong></td>
<td><strong>67,3%</strong></td>
<td><strong>77,9%</strong></td>
</tr>
<tr>
<td>Construction Costs</td>
<td>$ 9.768.000,00</td>
<td>$ 9.642.000,00</td>
<td>$ 7.582.000,00</td>
<td>$ 7.377.000,00</td>
</tr>
<tr>
<td>Costs per point</td>
<td>$ 380.571,43</td>
<td>$ 375.662,34</td>
<td>$ 225.207,92</td>
<td>$ 190.784,48</td>
</tr>
</tbody>
</table>
THANK YOU!