The Kendeda Building for Innovative Sustainable Design

Jimmy Mitchell
Sustainability Engineer, Skanska USA
www.linkedin.com/in/jimmymitchellskanska/

Whitney Ashley
Architectural Designer + Digital Fabricator, Lord Aeck Sargent
www.linkedin.com/in/whitney-Ashley-ba064a10
www.archinect.com/whitneyashley
Jimmy Mitchell

Sustainability Engineer

Jimmy started with Skanska in 2005 with a bachelor’s degree in civil engineering at Georgia Tech. Sustainability is a career passion, one of Georgia’s first LEED managers, created the Atlanta Mission urban garden, and a founding member of the construction material reuse nonprofit based in Atlanta, the Lifecycle Building Center. He recently completed The Kendeda Building for Innovative Sustainable Design with Skanska playing a leading role for all design and construction project phases.
Whitney Ashley is a multidisciplinary, project designer at Lord Aeck Sargent. Her experiences includes projects in the areas of education, sustainable design, commercial, housing and mixed-use. She has been working on the multi-award winning project The Kendeda Building for Innovative Sustainable Design from the project design phase to project completion and certification. Her expertise include digital design and fabrication with experience of an international award winning design-build project and multiple public art installations along the Atlanta Beltline. Her work pushes the boundaries between art and architecture with a combination of material research that are a catalyst for community involvement.

Whitney holds a Master of Science in Architecture with a concentration of Digital Design and Fabrication from the Georgia Institute of Technology and a Bachelor of Architecture with a minor in Business from Southern Polytechnic State University.
A CALL TO ACTION:

living.
building.
challenge.

www.livingbuildingchallenge.org
THE METAPHOR OF THE FLOWER
ROOTED IN PLACE AND YET:
Harvests all energy + water
Is adapted to climate and site
Operates pollution free
Is comprised of integrated systems
Is beautiful

LIVING BUILDING CHALLENGE
Integrated Holistic Planning & Design

20 Imperatives within a 7 Petal Structure

- **PLACE:** Restoring a Healthy Interrelationship with Nature
- **BEAUTY:** Uplifting the Human Spirit
- **WATER:** Net Positive Water Use
- **EQUITY:** Supporting a Just and Equitable World
- **ENERGY:** Net Positive Energy Use
- **MATERIALS:** Safe for all Species Through Time
- **HEALTH & HAPPINESS:** Optimize Well Being
The Kendeda Building For Innovative Sustainable Design at Georgia Tech
When we try to pick out anything by itself, we find it hitched to everything else in the universe.

John Muir
Design Development
Auditorium Rotation

Area 35ft away from window
Rain Water Collection

Green Roof

Solar Panels’ overhang used for water collection system
Mechanical System Options

- **Radiant Ceilings**
  - with Dedicated Outdoor Air System
  - Most expensive
  - Big architectural impact

- **Radiant Floors**
  - with Dedicated Outdoor Air System
  - Medium first cost
  - Low maintenance
  - Minimal architectural impact

- **Overhead Variable Air Volume**
  - Lowest first cost
  - Conventional
  - Requires superb envelope performance
  - High maintenance

- **AirFlow Panels**
  - with Fan Coil Units
  - Medium first cost
  - Unproven technology
  - Highly visible
  - Maintenance unknown

The ability to use either geo-thermal or the campus loop is available in both radiant options.
Mechanical Systems

Mechanical systems had two key design options through design development. The flexibility was needed to examine the value implications of campus CHW tie in vs. Geothermal.
Energy Use Intensity (EUI)
Net Positive Energy

EUI = 32
Kendeda Building is 72% More Efficient Than Similar Code Compliant Building

- High Performance building envelope
- Exterior shading
- Extensive Daylighting
- Reduced air infiltration
Redesign Queen Post Truss
**Structural Options**

**LUMBER**
Glu-lam Columns and Girders with glu-lam trusses as joists (queen posts).
Nail Laminated decking with 3” topping slab for radiant heating and cooling.

**STEEL**
Steel Columns and Beams with composite (concrete and steel decking) deck.
Requires additional 3” topping slab for radiant heating and cooling.

**CONCRETE**
Steel Columns and Beams with Hollow Core Plank decking and 3” topping slab (needed for radiant heating and cooling).

Porch Structure is Steel in all options.
Structural Systems AVG CO2

42,000 SF BUILDING IN ATLANTA

Concrete
413,168 KG/CO2e

Steel
164,645 KG/CO2e

Lumber
-1,718 KG/CO2e

SOURCES:
Lawrence Berkeley National Lab & PATH Tool
Revit for Solar Analysis

Fall Equinox
No need for upper exterior blinds with the PV canopy above.
BIM Coordination
BIM360 Glue – Clash of Open Atrium Space
BIM360 Glue – Clash of Open Atrium Space
BIM360 Glue – Clash at Innovation Learning Space
BIM360 Glue – Clash of Classlab of Level 1
1,034 products reviewed on Material Tracker

597 submittals to ensure Red List Compliance
Materials Red List: Reduced Materials Toxicity
<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
<th>Company</th>
<th>Location Path</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>002290</td>
<td>Edges look sharp. Can they be hemmed?</td>
<td>Roof Management, Inc.</td>
<td>SkinSouth</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002289</td>
<td>Shrubs along State St. look poor. Contractor to replace all plants that die within warranty period.</td>
<td>Ruppert Landscape</td>
<td>Site</td>
<td>Architect Punch List</td>
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<tr>
<td>002524</td>
<td>Complete the required adjustment of the Flexon CHW and CHCW flow meters to calibrate them. These two flow meters should match fi</td>
<td>Batchelor &amp; Kimball</td>
<td>Commissioning</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002110</td>
<td>Install splash block or walk pad. Typ. all downspouts.</td>
<td>Roof Management, Inc.</td>
<td>RoofHigh</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002468</td>
<td>Cut back head flashing. Typ. Condition immediately to the north looks good.</td>
<td>GCD &amp; Associates LLC</td>
<td>SkinWest</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>001905</td>
<td>N &amp; B item #5.09: Install GenSPEED 5350.17 Free cabling as approved during the submittal process. Cabling installed does not adhere to</td>
<td>Skanska USA</td>
<td>Interior</td>
<td>Engineer Punch List</td>
</tr>
<tr>
<td>002476</td>
<td>Cut back exposed upturn at head flashing. Typ at similar conditions.</td>
<td>GCD &amp; Associates LLC</td>
<td>SkinSouth</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>003145</td>
<td>Not a coves tongue as drawn. Edges look sharp.</td>
<td>Roof Management, Inc.</td>
<td>SkinWest</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>001509</td>
<td>Close metal panel where cable tray goes through to be acoustically sound.</td>
<td>Eckardt Electric</td>
<td>Interior</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002172</td>
<td>Detail needs to be resolved as Caleb mentioned. Coord with miller hull.</td>
<td>Miller Clapperton</td>
<td>Skin</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002064</td>
<td>Another round of cleaning is needed to remove mortar from brick faces. Typ</td>
<td>Cronos Contractors, LLC</td>
<td>SkinNorth</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002531</td>
<td>Confirm with if they want screens removed. Typ.</td>
<td>Skanska USA</td>
<td>SkinEast</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002622</td>
<td>Concrete floors are easily scratched. How do we prevent this from furthering happening?</td>
<td>Georgia Institute of Technology</td>
<td>SkinEast</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002210</td>
<td>Inconsistent finish on panels. Portions of lower end do not match rest of wall.</td>
<td>Miller Clapperton</td>
<td>SkinEast</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>001032</td>
<td>Clean / repair lens and flange at linear light.</td>
<td>Eckardt Electric</td>
<td>Interior</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002260</td>
<td>Clean mortar and dirt off concrete. Note damaged concrete in photo.</td>
<td>Cronos Contractors, LLC</td>
<td>SkinEast</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002498</td>
<td>Flashing extends too far below wood. See details on a 513. Typ.</td>
<td>GCD &amp; Associates LLC</td>
<td>SkinWest</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002227</td>
<td>Fix messy edges.</td>
<td>GCD &amp; Associates LLC</td>
<td>SkinSouth</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002169</td>
<td>Why are light fixtures short and not running up to the cabinets and to the end of the walls?</td>
<td>Eckardt Electric</td>
<td>InteriorSecondFl</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002159</td>
<td>Align as bims.</td>
<td>GCD &amp; Associates LLC</td>
<td>SkinNorth</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>00630</td>
<td>Clean perimenter of face of beam and 24&quot; at the pop up areas as much as possible to remove streak appearance.</td>
<td>Rosing Painting &amp; Wallcovering C Structure-Level 2</td>
<td>Architect Punch List</td>
<td></td>
</tr>
<tr>
<td>002710</td>
<td>Tree planted within the stone river area. Contractor to adjust same slightly east and be deeper per Long Engineering punch list report.</td>
<td>Ruppert Landscape</td>
<td>Site</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002149</td>
<td>Clean brick. Typ.</td>
<td>Cronos Contractors, LLC</td>
<td>Skin</td>
<td>Architect Punch List</td>
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<tr>
<td>001749</td>
<td>N &amp; B item #4.01: Install electrical receptacles at equipment, as shown on Sheet E303.</td>
<td>Eckardt Electric</td>
<td>Roof</td>
<td>Engineer Punch List</td>
</tr>
<tr>
<td>002608</td>
<td>Clean areas ofafflesorencence.</td>
<td>Eckardt Electric</td>
<td>SkinSouth</td>
<td>Architect Punch List</td>
</tr>
<tr>
<td>002819</td>
<td>Fix light.</td>
<td>Eckardt Electric</td>
<td>InteriorFirstFloorRemediation</td>
<td>Remediation</td>
</tr>
<tr>
<td>002701</td>
<td>Fix drywall from water damage. Paint too.</td>
<td>Rosing Painting &amp; Wallcovering C Structure-Level 2</td>
<td>Remediation</td>
<td></td>
</tr>
<tr>
<td>002787</td>
<td>Fix door latch. Class lab 230. Left door on hallway side.</td>
<td>Cream Corr</td>
<td>InteriorSecondFl</td>
<td>Remediation</td>
</tr>
</tbody>
</table>
Net Positive Waste
Net Positive Waste

A salvaged material for every 500 m²

Photo credit: The Miller Hull Partnership
Recycled materials weighed more than landfill materials

48,560lb went to landfill – only 0.5 percent of total material!