Why Did I Commission
Gretchen & Mark Biedron

- Owners - Co-Founders
- General Contractor
- Parents
The Willow School
Develop Future Leaders
PREMISE

“Man is part of the natural cycle, we are not here to control nature.”
An Environmental Ethic in Design, Construction, and Curriculum

The Willow School
For the Kids
What is “Green” Design?
LEED defines it as:

Design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants in five broad areas:

- Sustainable site planning
- Safeguarding water and water efficiency
- Energy efficiency and renewable energy
- Conservation of materials and resources
- Indoor environmental quality
Energy & Atmosphere

- Passive Solar Heating/Cooling
- Optimal Volume
- R19 Walls, R-30 Roof
- SHC .37 at Windows
- Renewable Energy

- Operable Windows
- Ceiling Fans
- Natural Ventilation
- Hybrid Economizer Mode
- Commissioned Systems
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Open up the comfort zone

When outside temperature is between 65 F and 80 F, the heating and cooling systems shut down.

- Air handler delivers only fresh outside air
- Green light in the classroom tells the children to open the windows

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Recycled Materials

- Recycled Glass & Terrazzo Tile
- Recycled Structural Steel
- Recycled Cotton Insulation
- Recycled Metal Roofing
- Recycled Fly Ash in Concrete
- Recycled Bathroom Partitions
Recycled Materials

Ultra Touch Natural Fiber Insulation
Made from recycled cotton and other natural fibers
No warning labels, no respiratory equipment
No harmful airborne particles
100% recyclable
Minimal use of energy in manufacturing
Provides maximum R-value performance
No settling after installation

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Commissioning

- LEED
- Go for the GOLD
Commissioning Agent Required

- LEED said so!
- No LEED Certification Without
- Cost a big issue, a lot more than a bicycle rack
- Saw zero benefit
- Did it because I had to
How I got one

- Got a list of them
- Interviewed
- Used my team to help pick out the most experienced.
- Negotiated to get it in budget
The process from my perspective

- Design Intent
- Design Review
- Bid Documents
- Awards
- Construction
- Start/up
- Occupancy
Design Intent & Basis of Design

• General Function
• Sustainable & Compatible
• Indoor Environmental Quality
• Landscaping
• HVAC
• Power
Design Review

- General Review
- Load Confirmations
- Heat Balances
- Alternative Solutions
  - 2 vs 4 pipe
  - Chiller Configurations
  - Pumping & Piping Schemes
  - Glycol Use
  - Replace electric with wet heat
Construction

- Getting Contractors on board with Commissioning in mind – Pre-Bid, Post Bid
- The installation
- Systems brought on-line piecemeal
- Integration of Controls
- Commissioning
- Acceptance
Problems / Resolutions

- Not Many
- Resolved before they stopped progress
Paperwork

- Lots of it
- Signing off on everything
- But I haven’t figured out how to get it right without it!
After the Dust Settled

- Still on Board
- Checking Seasonal
- Lights on at 2AM
- End of Warranty
- New Phase coming
Pat Miller

- Engineered Energy Systems - 24 Years
- Mechanical Engineer – PE
- Background in HVAC
- Controls & Systems Expert
Radiant Heat

- 60 Zones
- Storage Effect
- Setpoints
Installation

Glycol %
Maintain concrete coverage
Air Handling Unit

Fan Discharge
Wrong Arrangement
Acceptance Phase

- Point by Point
- Details are definitely the Devil
Cx Issues

- Heat-Cool Changeover
- Radiant Heat Sequence of Operation
- Tagging
- Control Issues - last state?
- Excessive flow on Fin Tube
- Noise on Fan Coils
Lessons Learned

• Start Early
• Owner must understand Cost & Benefits
• Keep it Non-adversarial & Professional
• Commitment from the Team for Cx
• Persistence Pays
• The Devil is in the Details
Sequence of Operation

- When should it operate?
- Economizer might be a conflict

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Post-Acceptance Phase

- Lighting
  - Motion Detector
  - Lights Moving
Post Occupancy Activities

- Seasonal testing
- Near warranty end review
- Remaining Cx issues
- Energy usage monitoring & analysis
- Training, Maintenance, Documentation
For the Birds
For Us to Learn & Replicate
Q & A
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