CASE STUDY #3
A sustainable site & design- ADAM LEWIS CENTER
ANDREW HENDRICKSON, FRANCISCO VARGAS & NICK BUCKLEY

Adam Lewis Center

- The Adam Lewis Center
- LOCATION: Oberlin, Ohio
- Building Use: Classrooms, offices, atrium, & auditorium
- Total Square Footage: 13,600 sqft
- Completed January 2001
Sustainability Features

Water

Living Machine
- Filters all grey water generated within building, and reuses it in urinals and toilets.
- Uses a combination of microbes, plants, and insects to treat water.
- Is used as an education tool for students.
- Provides tranquil garden environment for students.

Onsite Pond
- Captures onsite rain water runoff, and irrigation runoff.
- Provides proper ecology to safely filter runoff before it seeps into the soil.

Environmentally Green Building
Sustainability Features

Energy

Solar energy
- 4,000 sq. ft of PV panels
- Supply 45 kilowatts
- Interconnected to the grid

Lighting
- Compact fluorescent bulbs
- Expansive south facing windows
- Motion sensors
- Light sensors

Heating
- Closed loops ground water heat pump
- Radiant floor heating
- Elongated east west axis
- High natural ventilation

Site

- Small orchard of 50 pear and apple trees
- Terraced berm on the north side
- Extensive cistern and drain system to collect storm water.
- Paths, Benches, and rock garden make social gathering space.
Malcolm Well's Checklist

**Air / +50**
- **The amount of green vegetation on site helps keep the air clean.**

**Water / +75**
- **There's a retention pond on site that cleans all the water on site.**

**Rainwater / +75**
- **The same pond is used to retain the fresh rainwater.**

**Food / +50**
- **There's on-site food grown on site.**

---

### Malcolm Well's Checklist - Site

<table>
<thead>
<tr>
<th>Item</th>
<th>Degeneration</th>
<th>Sustainability</th>
<th>Regeneration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollutes air</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Pollutes water</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Wastes rainwater</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Consumes food</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Destroys rich soil</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Destroys wildlife habitat</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Imports energy</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Requires fuel-powered transportation</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Intensifies local weather</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Excludes daylight</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Uses mechanical heating</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Uses mechanical cooling</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Needs cleaning and repair</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Produces human discomfort</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Uses fuel-powered circulation</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Pollutes indoor air</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Is built of virgin materials</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Cannot be recycled</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Serves as an icon for the apocalypse</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Is a bad neighbor</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
<tr>
<td>Is ugly</td>
<td>-100 Always</td>
<td>-75 Usually</td>
<td>0 Always</td>
</tr>
</tbody>
</table>

**Final Score:** 725
### Malcolm Well’s Checklist - Site

- **Waste / +25**
  - There is a small amount of waste added to the local vegetation.

- **Wildlife / +75**
  - The green space was used to recreate wildlife habitat.

- **Energy / +25**
  - The PV’s on the roof are only used to power the main building.

- **Transportation / -50**
  - The main transportation for the school is busses for transportation.

- **Weather / +0**
  - The green space combined with the pollution doesn’t effect anything.

---

### Malcolm Well’s Checklist - Building

- **Waste / +25**
  - There is a small amount of waste added to the local vegetation.

- **Wildlife / +75**
  - The green space was used to recreate wildlife habitat.

- **Energy / +25**
  - The PV’s on the roof are only used to power the main building.

- **Transportation / -50**
  - The main transportation for the school is busses for transportation.

- **Weather / +0**
  - The green space combined with the pollution doesn’t effect anything.
Malcolm Well’s Checklist - Building

- **Air / +50**: There is vegetation on the inside of the building cleaning the air.
- **Materials / +50**: A large amount of the materials were used of recycled materials.
- **Recycled / +50**: The current building materials can be somewhat recycled.
- **Regeneration / +25**: The building is innovative and can be a good example for others.
- **Neighbor / +50**: The building is nice for the people around it and is green.
- **Beautiful / +50**: The building is modern and unique.

---

**LEED Checklist**

LEED V4 for BD+C: Schools

Project Name: [Name]
Data: [Date]

**Location and Transportation**

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7.4</td>
<td>16</td>
<td>Location and Transportation</td>
<td>10</td>
</tr>
<tr>
<td>9.7.5</td>
<td>2</td>
<td>High Priority Site</td>
<td>2</td>
</tr>
<tr>
<td>9.7.6</td>
<td>5</td>
<td>Access to Quality Transit</td>
<td>5</td>
</tr>
<tr>
<td>9.7.7</td>
<td>4</td>
<td>Energy Audit</td>
<td>4</td>
</tr>
<tr>
<td>9.7.8</td>
<td>2</td>
<td>Energy Audit</td>
<td>2</td>
</tr>
</tbody>
</table>

**Sustainable Sites**

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.3</td>
<td>12</td>
<td>Sustainable Sites</td>
<td>12</td>
</tr>
<tr>
<td>9.3.1</td>
<td>1</td>
<td>Construction Activity Pollution Prevention</td>
<td>1</td>
</tr>
<tr>
<td>9.3.2</td>
<td>2</td>
<td>Environmental Site Stewardship</td>
<td>2</td>
</tr>
</tbody>
</table>

**Water Efficiency**

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1.1</td>
<td>12</td>
<td>Water Efficiency</td>
<td>12</td>
</tr>
<tr>
<td>5.1.2</td>
<td>2</td>
<td>Indoor Water Use Reduction</td>
<td>2</td>
</tr>
<tr>
<td>5.1.3</td>
<td>2</td>
<td>Outdoor Water Use Reduction</td>
<td>2</td>
</tr>
</tbody>
</table>

**Energy Use and Atmosphere**

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1.1</td>
<td>35</td>
<td>Energy Use and Atmosphere</td>
<td>35</td>
</tr>
<tr>
<td>10.1.2</td>
<td>2</td>
<td>Energy Use and Atmosphere</td>
<td>2</td>
</tr>
</tbody>
</table>

**LEED Gold Certification**

60/110

Improvements need to be made.
Redesign Ideas

Reduce Vehicular Traffic
- Provide sculptural bike racks
- Improve bike paths to building

Wind Turbines
- Vertical turbines could be used as a learning aid.
- Vertical turbines would not create noise pollution.
- Could provide alternative supply of sustainable energy.

Improved Natural Ventilation
- By adding lower operable windows, people could add ventilation to adjust for their comfort.
- Increased ventilation would improve indoor air quality.

Redesign Proposal

-Issue - The site is already efficient with water using, gray water toilets, cisterns, storm water collection, and the living machine. However, that is all onsite what about the surrounding area?

-Proposal - Bioswale to collect and filter water from sidewalks and road.

Bioswale will divert 987,000 gallons of runoff annually

\[
\text{Bioswale capacity} = 4400 \text{ sqft} \times \frac{36 \text{" of rain annually}}{12 \text{" per ft}} = 132000 \times 7.82\text{ gallons per cubic ft}
\]
Redesign Proposal
-Issue – The living machine already has cisterns to capture rainwater but the amount of water collected can be improved.
-Proposal – Green roof to collect water not captured by cistern.

Green roof will capture an additional 18,700 gallons of storm water
(roof surface 40' x 20') = 800 sqft x (36" of rain annually / 12" per ft) = 2400 x 7.82 gallons per cubic ft

Redesign Proposal
-Issue – The average US city gets 26 inches of snow per year. Oberlin, OH gets 44 inches. Snow and ice can cause complications for pedestrians. When snow melts water collection can be an issue.
-Proposal – Use solar roads to keep walkways clear of snow and ice. They can also be used to store water and create energy.

250ft of solar road can produce 3,000Kwh in 6 months, that's enough to power a home for a year.
Malcolm well’s checklist - REVISED

- The improvements made were both on the site and the building.
- The numbers went from 725 to 1,675.
- This is a 950 point increase from the original design.

LEED checklist revised

We improved the building and went from:

LEED Gold Certification 60/110
-TO-
LEED Platinum certification 91/110
IMPROVEMENT OF 31 POINTS
CONCLUSION

- The Adam Lewis Center was a good building in its day but was in need of improvements.

- Redesign Proposals:
  - Reduce Vehicular traffic
  - Wind Turbines
  - Improve natural ventilation
  - Bioswale
  - Green roof
  - Solar roads

- The Malcom Well’s Checklist numbers went from 725 to 1,675.
  - This is a 950 point increase from the original design.

- The LEED certification went from LEED Gold 60/110 to LEED Platinum certification 91/110.
  - This is an improvement of 31 points.

- If we implement these sustainable measures we can take an already green building to the next level.