

Leonardo Academy is upgrading a 100-year-old building in Madison, Wisconsin into a sustainable home. This ongoing demonstration project will illustrate both the process for upgrading to a sustainable building and the process of ongoing sustainable building management.

The building was built in 1905 as a single-family residence and since has been used as a single family residence, a rooming house, and a rental property. The sustainable house is intended to be a working demonstration of a realistic application of sustainable building upgrade and operating practices in existing buildings. The upgrading and ongoing sustainable building management is planned to be carried out as a gradual process that any building owner could replicate.

Once the housing has been fully upgraded, it will be used as sustainable housing and offices for Leonardo Academy interns and research fellows. Projects that have already been implemented include rain garden installation, plaster repair, electrical work, plumbing, wiring for communications, and painting.

Leonardo Academy will document the upgrade process through a series of papers, reports, presentations, and web-based materials in order to demonstrate use of sustainable products, services, and practices. The project has registered for certification under the U.S. Green Building Council's LEED® for Existing Buildings program.

Completed Building Upgrade Actions

1. New electrical wiring installed throughout the building
2. New communications wiring installed
3. Plaster repaired throughout most of the residence
4. Installation of two [rain gardens](#) and a [prairie planting](#) in the yard
5. Installation of a high-efficiency central air conditioning system
6. Conducted a waste stream audit to determine the building recycling rate and opportunities to improve

Green Building Maintenance Strategies Used

1. All paints used in the house contain no toxic compounds and are low-VOC or VOC-free
2. All cleaning supplies routinely used in the house are nontoxic and biodegradable
3. All paper products used in the house contain recycled materials
4. No pesticides are used in the house or on site
5. Composting of organic food scraps and yard waste
6. Energy efficient compact fluorescent lamps are used in lieu of standard incandescent bulbs

Future Actions and Upgrades

1. Replace current plumbing fixtures with high efficiency fixtures
2. Install low flow aerators on lavatory faucets and showers
3. Install energy efficient windows
4. Replace exterior siding while improving insulation in outer walls
5. Replace aging water heater with ENERGYSTAR® qualified unit
6. Continue yard landscaping with native and/or adapted vegetation
7. At the end of its useful life, replace roofing materials with sustainable, cool-roof materials
8. Upgrade parking area using porous paving that prevents runoff while keeping snow removal practical
9. Install a bicycle rack and sheltered bicycle storage to promote alternative transportation
10. When it is necessary to replace any other major appliances, install energy and water efficient products
11. Implement low mercury policy for all mercury containing bulbs to minimize toxic substances in the building and on site.

Contributions and Donations

Leonardo Academy is seeking financial and in-kind donations of products, equipment and services to support this sustainability demonstration building and the associated intern and research fellows programs. Leonardo Academy is a charitable 501(c)3 nonprofit, and all donations to this project are tax deductible to the fullest extent allowed by United States tax law.

Parties interested in making a contribution to this valuable project should [contact us](#)

Project Sponsors

- Johnson Controls, Inc.
- Iconica (previously Planning Design Build)
- The Graham Martin Prairie Foundation

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Demonstration of Green Landscaping Practices: Rain Gardens

In 2005, two rain gardens (110 and 81 square feet) were installed in the back and front yards of the Sustainable House Demonstration Project. Both gardens were planted with a mixture of native grasses and wildflowers. The goals of this project were to minimize water and fertilizer inputs, mitigate stormwater runoff from nearby impervious surfaces, and to demonstrate sustainable alternatives to turf grass landscaping. The project site is located in the downtown isthmus area of Madison, where close proximity to lakes makes protecting water quality through runoff prevention and the elimination of fertilizers a priority. As a demonstration project, the landscaping and other features of the house will be used as tools for generating awareness about sustainability. The rain garden installation was funded by a \$500 grant from the Graham-Martin Prairie Foundation's Plant Dane! 2005 Native Plant and Seed Grant Program.

[More on Leonardo Academy's Rain Gardens](#)

Rain gardens are landscaped plantings of native wildflowers and grasses that soak up rain water runoff from impervious surfaces such as roofs and driveways. A rain garden allows 30 percent more water to soak into the ground than a patch of conventional lawn. This collection of runoff can reduce the amount of water and pollutants that enters local storm drains that eventually lead into nearby streams and lakes. Rain gardens may benefit insects and wildlife and are aesthetically pleasing.

Native Plantings

In 2006, a 160 square foot planting of prairie grasses and wildflowers was installed in the front yard with the goal of increasing the amount of native vegetative cover and decreasing the amount of turf grass. The prairie plugs were purchased from the Friends of the Arboretum.