



FOUNDATION

CASE STUDY

2008 AWARDS OF EXCELLENCE

AFFORDABLE HOUSING BUILT RESPONSIBLY

PROJECT AT A GLANCE

Location: Madison, Wisconsin
Project Type: New Construction
Ownership/Rental: Home Ownership
Project Completion Date: Sept. 2007

Size:

30 units
43,500 total sq. ft.
5 acres built upon; 6 units/acre

Affordability:

20 affordable units (66%); 14 units sold to households earning 51-80% of area median income (AMI); 4 units 31-50% AMI; 2 units ≤30% AMI; 10 market rate units

Project Team:

Developer: Madison Area Community Land Trust (MACLT)
Architect: Glueck Architects
Contractor: McGann Construction
Green Consultant: Focus on Energy
Land Steward: Community GroundWorks at Troy Gardens

Development Cost:

Land cost (housing site): \$155,835
Hard costs: \$4,440,467
Soft costs: \$883,788
Total: \$5,480,090

Cost/(Savings) of Greening:

Total Cost of Greening: \$163,435
Rebates and Grants: \$36,500
Net Cost of Greening: \$126,935

Standards Used:

Wisconsin Green Built Home & Energy Star

Key Green Features:

- Permanently preserved 26 acres of a 31 acre site; one of the last greenfield areas within Madison
- Clustered buildings; 3-4 units each
- Extensive stormwater management system with bioswales, rain gardens
- Advanced framing techniques with 24 inch on center stud walls, trusses, and engineered I-joists
- All units designed according to universal design principles, with accessible first floors
- Optional green upgrades include roof solar PV and thermal systems, tankless hot water heaters, dual-flush toilets, bamboo or cork floors

Troy Gardens

Madison Area Community Land Trust



Troy Gardens is a unique mixed-income homeownership project, organized as a condominium, using a cohousing model of community development. Developed by the Madison Area Community Land Trust (MACLT or the Trust), it includes 30 units, 20 of which were priced below market for low-to-moderate income households. Under the community land trust model, the income-restricted homes are affordable in perpetuity. With neighborhood residents the driving force behind the project, the homes are set on 31 acres, with 26 acres permanently protected green space for community gardens, an organic farm, a restored prairie, and nature trails. All homes were designed according to universal design principles, with fully accessible first floors, and basements to accommodate live-in attendants. Built for durability and energy efficiency to minimize operating costs and promote long-term affordability, the homes received Wisconsin Energy Star certification. To foster a sense of community, all homes are clustered around two central courtyards, with front doors and porches facing other homes.

Greening Goals

Both greening goals and community goals were important at Troy Gardens. MACLT's overall goal was to provide permanently affordable housing that is durable, livable, energy efficient, and set in a healthy environment with easy access to transportation and within walking distance to schools and shops. Its specific goals were to maximize community involvement, protect open spaces, minimize the impact of cars, maximize accessibility, and foster a sense of community. The community goals included providing mixed-income owner-occupied housing; ensuring access to all, regardless of age, income or physical disability; permanently protecting natural areas; managing community gardens and an organic CSA farm to provided healthy and affordable food to local residents; and teaching youth about conservation and sustainable agriculture.



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Green Features

Integrated Design Process

MACLT convened an impressive development team to plan and construct Troy Gardens. Employing an integrated design process from the outset, the team included not only the Trust, the architect, the general contractor, and the civil engineering/landscape design firm, but also a solar design and installation contractor and a sustainability consultant. This process minimized change orders, reduced cost overruns, and facilitated the permitting process, including a Planned Unit Development (PUD) approval. During the decade leading up to the project, there were at least a dozen charrettes for Troy Gardens, some focused on the site plan for greenspace areas, and others focused on the housing site. Participants included neighborhood residents, MACLT staff and board members, architects, community gardeners, members of Friends of Troy Gardens (now called Community GroundWorks at Troy Gardens), and landscape architects.

Site Design/Landscape Planning

After purchasing the 31 acre site from the State of Wisconsin in 2001, MACLT leased 26 acres to the Friends of Troy Gardens, the long-term steward of the natural areas. These acres are permanently protected through a conservation easement. All major decisions about the site plan were made by the neighbors and users of Troy Gardens, which resulted in decisions to: limit the density of the housing site to 30 units, permit specified uses in different sections of the protected lands (farm, prairie, community gardens, and interpretive trail system), and situate buildings and roads to reduce paved areas and keep cars on the periphery.

All homes are clustered in the southeast quadrant of the site and grouped into eight buildings, each with 3 or 4 attached units, around central courtyards with front doors and porches oriented toward the other homes. This creates large common greenspaces and promotes a sense of community. The greenspaces compliment a series of stormwater detention areas with rain gardens, to minimize stormwater flows. All buildings were oriented and designed for solar photovoltaic (PV) and thermal panels on the roof. Aside from the internal courtyards, the housing site is planted with a native prairie seed mix and, once established, will require little mowing or watering.

Location and Linkages

Troy Gardens is a strategic infill site, with direct access to existing utility infrastructure. It is ¼ mile from the local elementary school, and biking distance to a middle school. A public bus stop is located right in front of the development. Troy Gardens is less than a mile from Warner park, the largest public park in Madison, and just over a mile to a grocery store and a public library. It is also on the popular bike route around Lake Mendota, which connects to miles of other specially marked bike routes. The site itself contains several miles of nature trails.

Building Design Greening

Energy: Building envelopes at Troy Gardens include R-50 cellulose ceiling insulation; R-23 blown fiberglass wall insulation; low-E, argon filled insulated glass, Energy Star windows; and 2" of extruded polystyrene on foundation walls. All units have Energy Star appliances, furnaces, air conditioners and fluorescent light fixtures; energy recovery ventilators (ERVs); and low-flow water fixtures. Building orientation uses passive solar daylighting to minimize use of indoor lighting. Many units feature solar photovoltaic (PV) and/or solar hot water panels. Front porches and roof overhangs provide shading.

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GREEN HIGHLIGHTS

- Strategic urban infill site with access to existing roads and utility infrastructure and other amenities
- Integrated design process, with many community charrettes, minimized change orders and facilitated permitting
- Permanently protected 26 acres of the 31 acre site with conservation easement
- Clustered housing on corner of site with 3 to 4 units per building
- Buildings oriented and designed for PV and thermal panels on roof, plus maximum daylighting
- Natural native landscaping reduces need for irrigation and mowing
- Well insulated envelope and foundation; shading provided by porches and overhangs
- Energy Star windows, appliances, furnaces, air conditioners, lighting
- Low-flow water fixtures
- Followed waste minimization and reuse/recycling guidelines of WI Green Built Home program
- High efficiency energy recovery ventilators to ensure indoor air quality and control moisture
- Used fiber-cement board siding and OSB for sub-flooring and sheathing to reduce raw material use and for durability
- Green upgrade options included solar PV and thermal systems, tankless water heaters, dual-flush toilets, and bamboo or cork floors



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Green Features *cont.*

Indoor Air Quality: Energy recovery ventilators are installed in all homes to provide proper ventilation, manage interior moisture levels, and ensure healthy indoor air quality. All range hoods and bathroom fans vent directly to the outdoors. The location of Troy Gardens, adjacent to acres of protected land, results in excellent air quality immediately outside the homes.

Resource Conservation: Advanced framing techniques were used, including 24 inches on center stud walls, trusses, and engineered I-joists, and sizing of each header for its particular load and span. As part of its efforts to reduce raw material consumption, MACLT used fiber-cement board siding and oriented strand board (OSB) for sub-flooring and wall sheathing. Also, Troy Gardens utilized the waste minimization and construction waste reuse/recycling guidelines of the Wisconsin Green Built Home™ program. This included reusing all site topsoil as well as concrete rubble from temporary sidewalks, plus recycling wood scraps, wood pallets, metal, gypsum wall board, asphalt roofing, and cardboard.

Water Conservation: Low-flow aerators were installed on all faucets and shower heads. Dual-flush toilets were offered as a low-cost upgrade option and 90% of homeowners purchased them. In addition, tankless water heaters were another upgrade option and installed by three homeowners. Except for the interior courtyards, outdoor water use at the housing site was minimized by planting a native prairie seed mix.

Resident Education: Homeowners were trained on the operation of the energy recovery ventilator units, thermostats, as well as solar PV and thermal systems. In addition, the homeowner association received a comprehensive manual on the construction and operation of the homes. It included contact information for all subcontractors, installation guidelines, operating manuals, and warranty information. MACLT is in the process of developing an on-line resource for homeowners on its website.

Occupant Satisfaction

“We are very proud that our homes were built green as one of the core values of this community is sustainability, which we try to incorporate in most of our lifestyle decisions.... MACLT’s vision of incorporating an affordable housing community alongside this precious place not only gave the opportunity to first time homeowners to buy homes in this beautiful place, but it preserved the community gardens for generations of families to come.”

— Troy Gardens Resident

Project Financing

Financing for Troy Gardens came from the Federal Home Loan Bank, the Wisconsin Department of Commerce, HUD subsidy funds, an equity investment from MACLT, plus grants from private foundations and businesses. The Trust raised almost \$1 million in public and private funds to purchase the land and subsidize the cost of the affordable units. Also, proceeds from market-rate units subsidized affordable units. Several mortgage lenders made Fannie Mae Energy Efficient Mortgage products available to finance optional green features, though no homeowners took advantage of this option.

Cost of Greening Project

The Troy Gardens project team used a truly integrated design process with energy efficiency and indoor environmental quality in mind. This makes identifying and costing “green aspects” of the project difficult. Nonetheless, MACLT identified the incremental costs of several green materials (e.g., fiber-cement board siding; Energy Star appliances, lighting, furnace and AC; energy recovery ventilators; making the buildings solar ready) at over \$163,000 or 4% of construction costs. This was partially offset by state and utility grants.

Life-Cycle Cost Analysis (LCA)

No formal LCA was performed, but the project’s experienced team considered durability and energy efficiency in material and equipment selection.

MEASURABLE BENEFITS

- **Energy Use:** Building orientation, tight envelope design, Energy-Star equipment and on-site PV and solar hot water will significantly reduce energy consumption. Reductions in electricity and natural gas usage will be measured as part of a long-term energy study beginning in 2009 with the local utility, Madison Gas & Electric, and Wisconsin Focus on Energy.
- **Green Open Space:** 26 of the site’s 31 acres (84%) were permanently preserved for residents through a conservation easement as community gardens, an organic farm, a restored prairie, and nature trails.



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“Troy Gardens represents an extraordinary community-driven project that simultaneously meets a wide range of goals. Not only does it preserve great community open space assets with the community gardens and farm, it provides affordable and attractive green homes for low-income disabled or elderly people in a mixed-income community. This is a wonderful application of the land trust model. MACLT’s creativity and thoroughness in balancing the various needs is commendable.”

- Member, Awards Advisory Committee

Contacts

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Looking Ahead

Challenges

MACLT successfully overcame numerous challenges, including negotiating a complex Planned Unit Development (PUD) agreement with the City of Madison to allow for the unusual diversity of land uses, and fulfilling MACLT’s commitment to building a consensus among a large and diverse group of stakeholders. In addition, the Trust needed to raise almost \$1 million in public and private funds to purchase the land and subsidize the cost of the below-market units. MACLT also faced the common obstacle of substantially greening the units while keeping them affordable, and selling homes in a real estate market that was declining rapidly.

Partnerships

Troy Gardens was driven by community residents as evidenced by more than a dozen charrettes that took place in the years leading up to the project. The partnership between MACLT, its project team, and local residents, was of paramount importance. MACLT also formed key partnerships with Community GroundWorks at Troy Gardens, who lease and manage the 26 acres of greenspace; the Center for Resilient Cities (formerly the Urban Open Space Foundation), which holds the conservation easement for this land; Madison Gas and Electric, the local utility that provided funds to offset the cost of Energy Star appliances, light fixtures and mechanical systems; plus a number of local lenders who allowed homebuyers to roll in the cost of green upgrades into their mortgages.

Policy/Practice Implications

Troy Gardens represents several impressive innovations with implications for other green affordable housing developers. It is the first conservation-based affordable housing project in an urban setting. This led the Lincoln Institute for Land Policy to select Troy Gardens as its first case study of a community land trust development project and provide MACLT with funds to develop an extensive on-line case study for the project (see www.troygardens.net). The land trust model is an effective means for maintaining affordability in perpetuity. Also noteworthy are MACLT’s conscious efforts to build a close knit community through building orientation and design features, emphasis on walkability, active engagement with and training of the homeowners condo association, and the planned community center. The Land Trust’s close workings with local lenders that resulted in homebuyers’ access to Fannie Mae Energy Efficient Mortgage products is also a useful model.

