

Green Building Tour

Welcome to the Mercy Family Center. We are delighted to show you our new, green facility. We hope we'll inspire you to look at the built environment differently and think about new ways you can make the world a greener place.

So just what is "green"? We all hear that word bandied about but we'd like to focus on what it means here at the Mercy Family Center. We understand "green" to be "sustainable" and that means that we approach our building and the things that we do here keeping this in mind:

Take Less From the Earth, and Give More to People

By taking less, we are good stewards of the earth and our natural resources. We are also better stewards of our financial resources, so we can devote as much as possible to the people of Tioga, whom this building was created to serve.

As we tour the Mercy Family Center, I will point out some of the features that make this a green building. Please feel free to ask questions as we go along.

Before we begin, let me explain that "green" is not just the specific features you'll see in the building, but the entire approach to the project.

This project was designed to meet the US Green Building Council's criteria for LEED certification. LEED stands for Leadership in Energy and Environmental Design. As you will learn, there are many ways to "go green" and reap the rewards of sustainable building ideas. While higher cost, high technology approaches like solar panels may be a part, it's possible to "green" your building using readily available materials and on a modest budget.

You start by gathering as many of the people who will be affected by your building as possible. That includes the people who will work here, live here, attend programs here, and be the project's neighbors. It includes the financial and political supporters. And it includes the architects and engineers who draw the plans and the contractors who build it. We did this in November 2005 when 80 people gathered over 4 days in our neighborhood to discuss, debate and dream about the future Mercy Family Center. In this process, called a charrette, we talked about our goals, our needs, and what seemed like far-off possibilities, and the ultimate designs produced by our teams and discussed by the group as a whole led to the final building design you see here.

Okay, let's take a walk.

You may have noticed that we are in what still looks a lot like a warehouse or factory. That's because, from 1937 to 2006, that's what this building was. It is actually 5 buildings, added to one another over 50 years and adding up to about 32,000 square feet.

One of the key factors making this a green building project is that we adapted and re-used this existing building. Instead of tearing it down, we were creative enough to see that it could be modified to suit our needs, and that it provided a wonderful resource. We could not have afforded to build a solid masonry building like this that will last another hundred years or more. And we did not want to spend the effort and energy that it would have taken to tear it down and send tons and tons of usable materials to a landfill. Imagine all the gas to drive all those trucks! And imagine all the energy expended years ago to manufacture and transport and put in place the materials already in this building. That's called embodied energy, and once spent it can never be retrieved. Better to honor that investment and continue to use the very durable materials of which this building was built.

Of course, building anything produces a lot of waste. Construction is a very waste-intensive industry, and it is estimated that as much as 40% of waste in landfills is tied to the construction of buildings. But green building advocates have focused on ways to reduce that waste, and to recycle the waste that is produced. We are extremely proud that our construction manager achieved a 95% rate of recycling on this project, keeping 716 tons of construction waste out of landfills and diverting them back into a new manufacturing cycle.

Another way to reduce waste is to reduce what you build. You may have noticed that many of our brick warehouse walls are still brick – they haven't been covered over in drywall. That saved us money and a lot of material that didn't have to be transported to the site, material that we didn't have to expend energy on to install, and that didn't produce a lot of waste.

You probably also noticed that most of our interior walls are short – they are actually 10 feet tall, but they don't go up to our 18 to 20 foot roof. That's certainly building less, and the classrooms inside these walls don't have ceilings either. We not only built less this way, but we capitalized on a very important green concept – daylight. Our building has 5 large skylight openings in the roof, which were used to reduce artificial lighting needs when this was a warehouse. They still serve that function, but more efficiently. Instead of flat glass panels in these openings, which allows for considerable heat gain from the sun and heat loss at night, we built roof monitors that let cool, even northern light into the building without adding heat. This light is visible widely since we don't have ceilings, and it reduces our need for electric lighting during the day. Daylighting has also been shown to improve student outcomes and worker productivity – it certainly provides a noticeably nicer working environment than conventional, sometimes harsh fluorescent lighting does. And using daylight in lieu of artificial lighting brings home the idea that we make green decisions every day. Our behavior makes a big impact on our energy use and we can choose to leave lights off more often than we may realize.

Natural daylight is also present at the Mercy Family Center through the very large, industrial sized window openings we have preserved throughout the building and filled with new, energy efficient windows. Following a priority set up in our initial charrette, we've located three of our children's classrooms on the building's south side, creating a sunny learning environment. One of these has windows where the original loading dock doors were.

All of the windows at the Mercy Family Center can open, which may not sound remarkable but is not standard operating procedure in many new buildings. This will allow us to provide fresh air and to reduce our use of our heating and cooling systems, especially in the spring and fall when beautiful weather creates comfortable conditions.

Another note on our lighting: Of course we have used energy efficient light fixtures and light bulbs. And we have fewer fixtures because we calculated our needs carefully instead of using the old industry standards. We also have occupancy sensor switches, so that the lights turn on automatically when someone enters a room, and turn off automatically when the activity in the room ends. These small investments add up to a lot of energy savings, and that keeps money in our budget for our people and programs.

Our heating and cooling system was also designed with energy savings in mind. It includes features like a heat recovery device so that the energy in heated or cooled stale air is recovered before it is vented to the outdoors. And we do vent stale air to the outdoors to keep this a healthy, comfortable building. We have a computerized energy conservation system that is similar to a programmable thermostat used to save energy in homes. It is set to reduce the heat or cooling in each area when it is empty, but bring it back to the preferred temperature before the occupants arrive. This is very important in a building like ours where classrooms may be empty for several hours each day. The system also allows us to customize the heat or cooling in a given area without affecting the building as a whole. This is also important to us since our seniors have different needs than our children.

Do you see the big fabric tubes that run everywhere overhead? These are our ducts called duct sox and they distribute the heat and cooling very evenly through little holes along the sides. This eliminates most of the hard metal ducts and registers and produces more even temperatures in a space which makes people more comfortable. The ducts inflate when air is flowing through them and deflate when it is not. This helps eliminate dust which may be trapped on hard ducts.

While we are looking up, let me mention our new roof. We are very grateful for our new roof, which replaces a very leaky old roof that caused huge puddles in our building before we started renovations. But our new roof does more than keep us dry. It is a white roof – literally white – and that's something that's more and more common and more important, especially in cities. It's also especially important for a huge roof like ours, nearly 30,000 square feet in area. White roofs reflect the sun's heat, unlike the far more common black roofs that soak it in. This helps keep our building cool in summer and reduce our air conditioning costs. It also helps reduce the heat island effect that is a key factor in cities. Ever notice that the local weather report generally lists a higher temperature in Philadelphia than in the surrounding towns, often by several degrees? This is largely the result of the heat island effect. With all the black roofs, black asphalt and masonry buildings that fill cities, significant heat is absorbed from the sun. And there are fewer trees, open space and more limited breezes to dissipate this heat. Cumulatively, these factors measurably heat up the city and add to everyone's air conditioning burden. By installing a white roof, we help ourselves and our neighbors.

Besides electricity for lighting and cooling, and gas for heating, buildings are big users of another valuable resource: water. We have incorporated a lot of water savings into our green building. And when we consume less water, we send less of it down the drain as storm water or sewage, which is equally important to our environment.

When you think of water in buildings, you have to consider the bathrooms. So please, go inside here and tell me what you see.

Did you notice the green handles on our toilets? As the sign tells you, these are special toilets which allow you to use more or less flushing water, depending on your needs. Where old fashioned toilets use 3 to 5 gallons per flush, these use as little as .9 gallons to do the job. You can imagine that this adds up to a huge difference in potable water use and sewage capacity. Toilets similar to these are available for your houses and we encourage you to consider them.

Our bathrooms also include automatic sink faucets. The water flows when you put your hands under the faucet, but turns off when you remove them. This too reduces water use greatly.

We have a small shower room here, to be used occasionally by our seniors but also available to anyone who bicycles to work or walks a long way. These showers, like those in our residence upstairs, have low flow shower heads.

The appliances in our residence and in our staff rooms are Energy Star rated, which means that they use at least 10% less energy to operate than standard appliances. If you need to purchase a refrigerator or television or other appliance, we encourage you to check out the very extensive list of Energy Star appliances on the energystar.gov website.

We mentioned fresh air when we looked at our operable windows, and I would like to note that we have taken air quality into consideration throughout our building. All of the paints and adhesives used in construction of the building meet low VOC standards. VOCs are volatile organic compounds and they are unhealthy to breathe. New standards for indoor air quality call for reduction or elimination of these ingredients in building products, which can persist for years, off-gassing and creating indoor air pollution. We insisted on making a healthy environment at the Mercy Family Center and so materials were selected which have low or no VOCs. These paints are readily available at home stores and are usually no additional cost, so make sure to ask for them for use in your home or office.

While speaking of healthy buildings, I'd like to mention an easy, low cost way to drastically reduce contaminants in any building, which may become part of the indoor air we breathe and the surfaces we touch, and that is to install walk off mats. The greatest percentage of contaminants in a building enters on our feet, and that is true in urban, suburban and rural environments. Home gardeners are one of the highest users of pesticides and herbicides, and these chemicals, many now deemed health hazards, can persist in the soil for decades. Wipe your feet, and keep walk off mats clean to keep all kinds of unhealthy substances outside your buildings. We have mats 6 feet or longer at every entrance to the Mercy Family Center.

Another way that we have improved our indoor air quality, and reduced our overall consumption of materials, is by purchasing some used furniture. The purple leather lounge chairs you saw in our lobby, the blue webbed chairs in our senior activity room, our 7 office work stations, all of our file cabinets and our teacher storage cabinets were purchased used. Much of the classroom furniture and all of the residence furniture was already owned and moved here. This strategy saved a lot of money, but also keeps furniture out of landfills and reduces the off-gassing of chemicals in new fabrics and other furniture components. In addition, the fabric

that covers our work stations is made of 100% recycled materials and carries an extended warranty so it won't need replacing anytime soon.

Now we've reached our auditorium which occupies the oldest part of our building. Notice the original wood roof trusses that make this an interesting space. I should really call this a multi-purpose room. It holds 150 chairs and a large stage for our special events, but the seats are stackable and the stage is modular. Both can be stored so we can use this room for line dancing on Monday nights and for an indoor play area when it's raining or too cold outside. That's a green concept too, to maximize the usefulness of the spaces you build by making them adaptable.

Here is our outdoor play area. Do you see the steel bar joists? That's a clue that this was once an indoor space. In fact, we literally took the roof off of half of one of our five interconnected buildings to create a safe enclosed outdoor play area for our children. The play surface you see provides a safe cushion for active - very active - children. It is also permeable, allowing rain water to soak into the soil below instead of being funneled off into our storm water system. This is an important concept in green building, to keep stormwater where it originates and recharge the soil and ground water, rather than flowing away in torrents to overload the storm water systems and potentially cause flooding. This is especially important in Philadelphia where the storm water is mixed with sewage water and piped to the sewage treatment plant, working at over capacity. Water which slowly penetrates the ground is also cleaned of pollutants as it flows through subsurface layers before reaching aquifers that may be a source of drinking water.

Before we built the Mercy Family Center, this site was 100% impervious, meaning that all surfaces were hard – either building or paved parking lot - and all rainwater flowed into the sewers. In addition to our play yard, we have also opened up 2900 square feet of pervious surface out front in our new native plant garden.

The front of our building, where 80 children and our teaching staff enter every day, was for many years an asphalt and concrete parking lot. No more! We have a new, green front door.

As construction neared completion in November 2008, our Construction Manager removed the asphalt and underlying gravel from most of the parking lot, and replaced it with 4 to 5 inches of top soil. Two fresh concrete entrance sidewalks were poured. The concrete-paved loading dock area was left in place to park the 12 person van and one staff vehicle, our only on-site parking. Most of our daily visitors arrive on foot or by public transportation, which is a very green idea.

The planting project was led by Paul Donnelly, a former Mercy Family Center reading volunteer who installed the garden as his Eagle Scout project for BSA Troop 144 in Havertown, PA. Paul organized 20 scouts and their families who dug and planted 5 trees and 52 shrubs in a single Saturday. They also laid a flagstone walkway, using materials salvaged from a neighbor, and distributed 3 yards of mulch.

Plant materials were selected for our Native Plant Garden with these priorities in mind:

- Native to the eastern U.S.
- Sun tolerant and drought tolerant for this south-facing site
- Urban tolerant
- Providing bird habitat with shelter, food sources, nesting materials
- Low maintenance requirements
- Colorful in flower, leaf, fruit, bark

- Multi-season interest with exfoliating bark, varied and persistent leaves and fruits, and interesting branching patterns
- Moderate size to allow sunlight to reach the building

Limiting our garden to native plants will allow us to avoid pesticides and herbicides, since these plants are hardy growers used to difficult growing conditions and not accustomed to human intervention. Many non-toxic approaches, such as biodegradable insecticidal soaps, are also very effective with native plants, and we will use them if any help is needed.

Using native plants is a widely recognized strategy to reduce water consumption. Just as importantly, the native plants we used were selected on the basis of their suitability for the garden's specific site conditions, which include full sun and poor soil. Also, the garden consists primarily of trees and shrubs, which, once established, will require watering only under true drought conditions. They will increasingly shade their own roots, adding to their drought resistance. Where perennials are used to supplement the design, they are meadow plants such as *echinacea purpurea* which thrive in sunny, dry conditions, live long with little or no maintenance, and spread readily to densely cover exposed soil areas, helping to reduce rainwater runoff and keep the soil cool.

The Mercy Family Center garden will not include any turf nor any annuals, both of which are high water demand plantings. In fact, once the spreading native perennials are planted this spring, no new plants will need to be introduced. New plantings have high water demands. All of the trees and shrubs were purchased and planted in the late fall and, luckily, have been well watered by a high precipitation winter. Spring and summer plantings are much more water intensive, when hot weather stresses can't be effectively countered by disturbed root systems. Our plantings will be much more tolerant of warm weather when it arrives since they have had six months to become established.

Notice that our garden is mulched with a natural root bark mulch which will be renewed annually. Mulch is a critical water saving measure. It protects the soil from drying out and holds rain water to reduce runoff, allowing slow water penetration and encouraging the growth of deep root systems which are more drought resistant than the shallow roots which prosper under artificial watering methods. Natural mulches also keep roots cool and break down to supply nutrients to the soil, promoting healthy plant growth. Since the Mercy Family Center garden is "for eyes only," bordered by and visible from two of the center's main entrances, the mulch will not be disturbed by many feet, and the soil will not be compacted, a stressing factor which inhibits healthy plant growth.

No irrigation system will be installed in the garden. Instead, regular watering will take place by hand during the first year per good practice landscaping standards to allow the plants to become established. The watering will be done by volunteers and the convent residents based on observed need. We anticipate that no regular watering will be required after the first year since the native plants were selected to be suited to the specific site conditions, including drought tolerance. No lawn grasses or other water-craving plants will be introduced.

The new native plant garden at the Mercy Family Center will be registered as an Audubon Society Bird Habitat and will be utilized as an educational resource for the adults and children who participate in the center's programs. We hope this green urban sanctuary will be enjoyed by hundreds of people for years to come, and inspire you, our Tioga neighbors and future visitors to green their communities.

Thank you for coming to visit the Mercy Family Center today.