

# General Motors

*Delta Twp, Michigan*



*Case Study*

## GM OPENS FIRST GOLD LEED CERTIFIED AUTOMOTIVE MANUFACTURING PLANT

Founded in 1908, GM employs approximately 284,000 people globally. With global headquarters in Detroit, GM manufactures its cars and trucks in 33 countries. The Delta Township plant is 2.4 million square feet with approximately 3,000 team members when in full production. Unlike other GM plants, this building is the only automotive manufacturing plant in the world and the largest most complex manufacturing site to receive LEED certification. As a responsible corporate citizen, GM Delta Township plant is dedicated to protecting human health, reducing the use of our natural resources and eliminating negative impact on the local and global environment. The plant is committed to basing its environmental management programs upon the environmental impacts of its activities, products, and services. The goals are to reduce these impacts through the establishment of appropriate objectives and targets and implementation of controls.

General Motors' Delta Township Assembly Plant received gold certification from the U. S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) program. The LEED certification covers the Body Shop, General Assembly, Administration Buildings and the Arrival Center. Leadership in Energy and Environmental Design, or LEED, is a voluntary, third party certification program developed by the U.S. Green Building Council. LEED promotes a whole building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

### Site Development

The Delta Township facility is located on approximately 1,100 acres. Approximately 780 acres of the site was left undeveloped with 75 acres set aside to preserve existing plants and wildlife habitat, including a wood lot, prairie, and three wetland areas. All landscaping added to the site consists of either native species or specially adapted drought-resistant plants to eliminate the need for an irrigation system. Special plants were used in the ditches and culverts to help filter out solids and phosphorous before the water leaves the site. Goals included improving the general food, water, cover and habitat for wildlife species in wetland, wetland buffer and woodland areas. Boulder mounds, floating nest platforms, wood duck boxes, songbird houses and bat houses were placed around the wetland areas to begin the site enhancement. In addition, trees, shrubs, eastern bluebird nest boxes, a purple martin colony house, American kestrel nest boxes, raptor boxes and bee blocks were placed throughout

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the buffer site. A trail network was developed to provide safe access for visitors to experience the natural settings.



Stormwater at the site is managed through an innovative system that uses vegetative ditches, culverts and detention bioswales. These ditches and culverts allow much of the water to be naturally absorbed into the soil and groundwater in the area and filters out solids before water leaves the site. There is no need for a permanent irrigation system, which reduces the site's use of water. There is 1.5 million square feet of roof that is made of an ENERGY STAR highly reflective, white material to reduce heat, absorb ions and reduce the heat island effect. The exterior lighting on the site was shielded to eliminate light trespass that affects the viewing of our night skies and can negatively affect nocturnal animals.

### Materials and Resources

Of the construction materials used, on the project, more than 25 percent was composed of recycled content. Recycled content was used in items ranging from the structural steel, concrete, etc. used on the site. Office furniture salvaged from other GM facilities was reused at the plant. Office cubicle walls were salvaged and reconfigured onsite. More than 38 percent of the building products used for the project was made using raw materials extracted within 500 miles. More than 60 percent of all materials used in the construction of the building were sourced through manufacturers located within 500 miles, supporting the local economy and reducing transportation energy costs. This represents an investment in the local infrastructure of \$33.8 million.

Of the waste generated during construction, 77 percent was diverted from landfills. Concrete was crushed and used as gravel on site, as well as being sold by the recycler to other customers. Steel was sold to a smelter and recycled into steel products. Wood and cardboard also were recycled. A total of 3,963 tons of solid waste was reclaimed during construction as a result of an ambitious on-site waste segregating activity.

During construction, an extensive indoor air quality management plan was in place to assure good indoor air quality for construction workers and the future building occupants. Paints, adhesives, sealants, carpets, and composite woods used in construction were selected to limit the off-gassing of indoor chemical pollutants.

### Water Management

Over the first ten years of operation, the facility is expected to save over 40 million gallons of water. Non-manufacturing water use has been reduced by 45 percent, for a savings of over 4.1 million gallons of water annually.

Rainwater is collected from the roof of the General Assembly Building by a cutting-edge roof drain system. Rainwater is then stored in large 3,000 gallon cisterns above restrooms and is used instead of potable water to flush toilets. Low-flow plumbing fixtures are used throughout the facility. Waterless urinals that use a filter-based technology save over 1 million gallons of water annually. Municipal water used for sewage conveyance decreased by about 69 percent. Native and drought-resistant plantings on site eliminate the need for a permanent irrigation system and associated water usage.



## Energy

Over the first ten years of operation, the facility is expected to save over 30 million kwh of electricity. Energy efficiency was designed into most systems, resulting in energy costs that are 45 percent lower than industry standard, with a projected savings of \$1 million per year.



Lighting in the plant consists of bright task lighting where needed and lower overhead lighting levels in areas such as aisles, reducing the lighting energy used by about 20 percent compared to a typical auto assembly plant. This equates to a savings of three million kwh annually. Areas of the factory where robots do all the work have no lights at all beyond what is needed for maintenance. Lighting in work areas is turned off when workers are not around. The 1.5 million square foot heat reflecting roof previously mentioned, helps reduce costs to cool the building in the summer.

No ozone-depleting substances (CFCs, HCFCs or halons) are used in any of the building's HVAC, refrigerant, or fire suppression equipment.

## Society

General Motors Corporation demonstrates its commitment to environmental stewardship and increasing native biodiversity by achieving Habitat and Corporate Lands for Learning SM certification at Delta Township. The Wildlife Habitat Council and the Michigan Department of Environmental Quality's Neighborhood Environmental Partners Program have recognized the GM Delta Township Assembly

Center for creating an exemplary new wildlife habitat program and for their outstanding commitment to environmental community outreach.

GM shows that employing exemplary practices and approaches helps protect our natural resources and the environment while continuing to promote significant economic benefits. General Motors Delta Township plant partnered with Woldumar Nature Center to develop a habitat education program for junior high students. GM developed a Habitat Curriculum Student Activities Handbook to provide activities intended to enhance the habitat education experience, provide additional hands on learning and reinforce the learning objectives related to the habitat curriculum.

The plant supports the following local programs: Wood Duck program, Bat Team, Pheasants Forever, Frog and Toad Training, Owl Prowl, Wetland Wonders Program, Songbird Nest Team, Reptile & Amphibian Team, Kirkland Warbler Team, and the Michigan Audubon Society.

## Sustainability

EARTH is the acronym for key points in General Motors' Environmental Policy and stands for: Environmental laws, Avoid pollution, Reduce, reuse, recycle, Teamwork for continual improvement and Healthy environmental Community. EARTH system requirements and the site's objectives and targets are reviewed periodically to assess progress toward continual improvement. Therefore, the earliest plans for the assembly plant included a goal to design and build the world's most environmentally advanced auto manufacturing plant. One of the objectives of the plant was the continued execution of their Environmental Management System which includes practicing effective pollution prevention in accordance with a hierarchy giving top priority to waste and emission or discharge prevention at the source, elimination or reduction of wasteful practices, and recycling.

"General Motors has a global commitment to reduce the impact of its operations on the environment," says Elizabeth Lowery, GM vice president, Environment and Energy. "In our older, established facilities, we are constantly making changes as we renovate buildings to keep them current with state-of-the-art

environmental practices. At Lansing Delta Township it was a great experience to be able to start from scratch to design and build the world's most environmentally advanced auto manufacturing plant.”

“GM's Lansing Delta Township Plant is a very good and large example of how it's possible to incorporate sustainable practices into large scale manufacturing facilities,” S. Richard Fedrizzi, the U.S. Green Building Council President, said. “Today, not only is it possible, it is cost and energy efficient, and provides a healthy environment for employees. We expect GM's plant will change the way manufacturing buildings are built in the future.”

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