# Monroe Community College
# PAC Center LEED® Registered

## Building Highlights

**Design**
Energy use: 31.6% energy cost reduction from ASHRAE Standard 90.1, 2004
Water use: 30% reduction from Energy Policy Act of 1992 Fixture Performance Requirements

**Construction**
50% diversion of construction waste away from landfills
30% recycled content of all materials in the building
Indoor Air Quality during Construction and before Occupancy

**Program:**
Monroe Community College (MCC) constructed its first athletic facility, Building 9, in 1968. A swimming pool and health and fitness center were added to the Samuel J. Stabins Health & Physical Education Complex in the 1970s and 1980s, respectively. Currently, the gymnasium is the only indoor facility that MCC's 14 intercollegiate athletic teams can use for practices, which results in scheduling conflicts and maintenance issues. The gymnasium must also accommodate intramural programs and physical education/health curricular activities. The demand is further compounded by the college's enrollment growth, from approximately 8,000 students in 1968-69 to over 36,000 today.

MCC's 2003-2008 Facilities Master Plan included investigating the expansion of its athletic facilities. In July 2004, MCC retained Clough Harbour & Associates LLP (CHA) to study the need for, and requirements of, improvements to the athletic facilities, including a potential field house. The study included the recommendation for a field house sited adjacent to the swimming pool on the south side of campus.

The single story, 56,000 Square foot building includes the following features:
- A Field House with a 136 foot by 220 foot turf field with lighting controls, (2) retractable batting cages (10 x 12 x 60), and perimeter and ceiling netting as well as a center divider curtain
- The turf field is surrounded by a (2) lane walking/jogging track
- Interactive lobby
- 3,500 sf Fitness Center with cardio & strength training
- 1,800 sf Training Room including hot/cold hydro pools and whirlpools
- (4) Men's/Women's Team Locker Rooms

- Multipurpose Room
- Cleat lobby with public restrooms can be used for outdoor turf field
- Coaches offices
- Equipment storage areas

The new building is being constructed on land previously used as a practice field.

The project is using the LEED V2.2 for New Construction rating system as a guideline to design and certify green elements. Documentation for certification is being compiled and will be submitted to the United States Green Building Council in first quarter of 2009.

**Location:**
The PAC is located at the south side of campus adjacent to the Building 10 Natatorium

**Project Team:**
The project team set out to capture every opportunity to integrate function, architecture and engineering through a collaborative team effort. The design and construction team members were:
Architect: Clough Harbour Sports
Site/Civil: Clough Harbour & Associates
Structural Engineer: Clough Harbour & Associates
MEP Engineer: M/E Engineering, PC
Sustainability Consultant: Sustainable Performance Consulting, Inc.
Construction Manager: DiMarco Constructors
General Contractor: Christa Construction
Mechanical Contractor: JW Danforth
Electrical Contractor: East Coast Electric
Plumbing Contractor: Thurston Brothers

The MCC staff and facilities managers were heavily engaged throughout the process, including in the selection and reviews of materials, building systems, and equipment.

## Sustainable Site:

***Construction Pollution Activity Protection:*** MCC created and implemented an Erosion and Sedimentation Control Plan for all construction activities associated with the project. Erosion on existing sites typically results from foot traffic killing the vegetation, creating steep slopes where stormwater flow exceeds the vegetation holding power. Sedimentation contributes to the degradation of water bodies. The build-up of sedimentation n stream channels can lessen flow capacity, potentially leading to increased flooding. It also effects aquatic habitat by increasing turbidity levels. Turbidity reduces sunlight penetration into the water and leads to reduced photosynthesis in aquatic vegetation, causing lower oxygen levels that cannot support aquatic life.

Preventive measures that were implemented on this project were silt fences, temporary seeding, and filter fabric that were put into place during construction to prevent runoff.


***Alternative Transportation –*** The environmental effects of automobile use include vehicle emissions that contribute to smog and air pollution as well as environmental impacts from oil extraction and petroleum refining. Increased public transportation can improve air quality. Reduction in private vehicle use reduces fuel consumption and air and water pollutants in vehicle exhaust. On the basis of passenger miles traveled, public transportation is approximately twice as fuel efficient as private vehicles. Another benefit is he associated reduction in the need for infrastructure used by vehicles. MCC has convenient access to existing transportation networks to minimize the need for new transportation lines. The PAC is Located within 1/4 mile of one or more stops for two or more public or campus bus lines usable by building occupants. In addition, MCC added no new parking to support this new facility. Parking facilities for automobiles also have negative impacts on the environment, since asphalt surfaces increase storm water runoff and contribute t urban heat island effect. By not adding additional parking lots, MCC benefits from reduced parking requirements and healthier green space.

Bicycling & Showers – secured bicycle racks have been provided within 200 yards of a building entrance AND showers and changing facilities are also provided within the building. Building occupants can realize health benefits through bicycle and walking commuting strategies. Bicycling and walking also expose people to the community, encouraging interaction and allowing for enjoyment of the area in ways unavailable to automobile passengers. Bicycle commuting also relieves traffic congestion, reduces noise pollution, and requires far less infrastructure for roadways and parking lots. Roadways and parking lots produce stormwater runoff, contribute to the urban heat island effect and encroach on green space. Bicycles are more likely to b e used for relatively short commuting trips. Displacing vehicle miles with bicycling even for short trips, carries a large environmental benefit, since a large portion of vehicle emissions occur in the first few minutes of driving following a cold start, as emissions control equipment is less effective at cool operating temperatures


Heat island effect – (thermal gradient differences between developed and undeveloped areas) . Heat Island Effects occur when warmer temperatures are experienced in urban landscapes compared to adjacent rural areas as a result of solar energy retention on constructed surfaces. Principal surfaces that contribute to the heat island effect include streets, sidewalks, parking lots and buildings. As a result of heat island effects, ambient temperatures in urban areas can be artificially elevated by more than 10ºF when compared with surrounding undeveloped areas. This results in increased cooling loads in the summer, requiring larger HVAC equipment and electrical demand resulting in more greenhouse gas and pollution generation, and increased greenhouse gas and pollution generation and increased energy consumption. MCC worked to mitigate heat island effects by installing a highly reflective roof, utilizing higher reflectance pavements on fifty percent of the project site hardscape.

## Water Efficiency:

In the United States, approximately 340 billons gallons of fresh water are withdrawn per day from rivers, streams and reservoirs to support residential, commercial, industrial, agricultural and recreational activities. This accounts for about on-quarter of the nation's total supply of renewable fresh water.

Outdoor uses, primarily landscaping, account for 30% of water consumed daily. Improved landscaping practices can dramatically reduce and even eliminate irrigation needs. MCC included native and adaptive vegetation on the project site, which fosters a self-sustaining landscape that requires no supplemental water and provides other environmental benefits such as aiding in the conservation of local and regional potable water resources. No irrigation system was installed on the grounds.

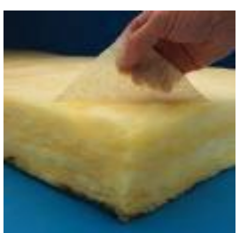
Water conserving fixtures that use less water than requirement in the Energy Policy Act of 1992 can result in a significant, long-term financial and environmental savings. Conversely, using large volumes of water increases lifecycle costs for building operations and increases consumer costs for additional municipal supply and treatment facilities. Facilities that use water efficiently reduce costs through lower water use fees and lower sewage volumes. At the PAC Center, occupant water use was reduced by 30% compared to Energy Policy Act of 1992 – compliant plumbing fixtures**.** Water reduction was achieved by using low flow showerheads, toilets and urinals, and low-flow sinks.

**Energy & Atmosphere:**

Commercial and residential buildings consume approximately 2/3 of the electricity and 1/3 of all energy in the United States. Energy efficiency in buildings limits the harmful environmental side effects of energy generation, distribution and consumption while reducing operating costs. The project set out to meet the high standard of environmental stewardship and energy efficiency. The result is energy cost savings of 31.6% more efficient than a building built to the ASHRAE 90.1, 2004 standard which is the reference document for the New York Energy Construction Conservation Code. An energy model was developed for the PAC and used to optimize the building systems. The performance data shows that the building's total energy use is predicted to be 5,008 MBtu/$ft^2$.equating to a predicted cost of $139,128 annually (based on 2008 energy cost). The

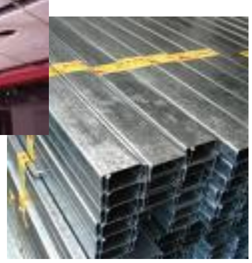
field house was constructed using pre-engineered metal panels with steel beam support framing, and utilized a highly-reflective roofing surface to reduce solar gain.  High-performance low E glazing was incorporated for all building fenestrations.

The interior lighting systems incorporate high efficient light fixtures and occupancy sensor controls, in addition to lighting scenes for the field house.  A variable air volume HVAC system was designed to condition the offices spaces, locker rooms and training spaces. The system utilizes campus chilled and hot water. All HVAC and Fire Suppression equipment is free of CFC based refrigerants.  Carbon dioxide based demand controlled ventilation sensors are included to reduce ventilation rates during periods of low occupancy.  Heat recovery is utilized for the locker room areas to save energy due to the large amount of exhaust required in these spaces.  The field house itself is conditioned using a single heating and ventilating unit. A Whole Building Design Analysis, which involved a holistic approach to building simulation in which the interactions between all of the different building systems and features were modeled.    Building systems commissioning (the process of verifying and documenting that facility and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the Owner's Project Requirements) ensured that systems were designed and installed for optimal performance. Other measures include:   Demand control ventilation: Two carbon dioxide monitors and a DDC system use the variable frequency drive to modulate the amount of outside air, based on demand.



## Materials & Resources:

Building materials choices are important in sustainable buildings because of the extensive network of extraction, processing and transportation steps required to process them.  Activities to create building materials may pollute the air and water, destroy natural habitats and deplete natural resources.  Materials selected for the field house project contained recycled-content which reuse waste products that would otherwise be deposited in landfills. Building products with recycled content are beneficial to the environment because they reduce virgin material use and solid waste volumes.



Materials supplied locally, within a five hundred mile radius of the jobsite, supported the local economy and reduced pollution associated with transportation.

Construction and demolition waste constitutes about 40% of the total solid waste stream in the United States. The PAC Center project recycled 52% of the total waste on the project site. During the construction of the PAC Center, occupancy was maintained in the existing buildings surrounding the project. Care was taken during construction to reduce the associated environmental impact of producing and delivering all new materials to the project site.


MCC developed a comprehensive storage and collection of recyclable materials within the PAC Center. Containers designated for Cardboard, Glass, Metal, Plastic and Cardboard are located throughout the facility to provide easy access for maintenance staff as well as the building occupants to dispose of such materials. By creating convenient recycling opportunities for building occupants, and instituting a comprehensive plan to dispose of these items, a significant portion of the solid waste stream can be diverted from landfills. Recycling of paper, metals, cardboard and plastics reduces the need to extract virgin natural resources.

## Indoor Environmental Quality:

On average, Americans spend 90% of their time indoors where the US Environmental Protection Agency reports that levels of pollutants may run two to five times higher than outdoor levels. Many of these pollutants can cause health reactions in the estimated 17 million Americans who suffer from asthma and 40 million who have allergies. The PAC Center project strived to attain high Indoor Environmental Quality and incorporated construction practices that were aimed at preventing many IEQ problems from arising. Some steps taken were in the specification of materials that release fewer and less harmful chemical compounds. Specification and installation of adhesives, sealants, paints, carpets with low levels of potentially irritating off-gassing compound were aimed at reducing occupant exposure. Scheduling of deliveries and sequencing construction activities to reduce material exposure to moisture and absorption of off-gassed contaminants was also incorporated.


The air handling systems in the building were protected during construction and a building flush-out prior to occupancy was performed to further reduce potential for problems arising during the operational life of the building. The joint efforts of the College, building design team, contractors, subcontractors and suppliers were integral to providing a quality indoor environment.

Good indoor air quality in buildings may yield improved occupant comfort, well-being and productivity. A key component of maintaining indoor air quality in a green building is providing adequate ventilation. The ventilation system was design to meet the minimum outdoor air ventilation rates of the ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) Standard 62.1. This implementation reduces potential liability regarding indoor air quality issues.


The relationship between smoking and various health risks, including lung disease, cancer and heart disease, has been well documented. A strong link between Environmental Tobacco Smoke (ETS) or "second-hand smoke" and health risks has also been demonstrated. MCC has developed a Smoking Policy for the campus called "Smoke Free Inside and Out" which delineates a smoke-free perimeter that is more than twenty-five feet away from all entrances to buildings, outdoor air intakes and any operable windows opening to common areas. MCC has also made over-the-counter nicotine replacement products, such as gum and lozenges, conveniently available for purchase at the College Bookstore.

## The Process, Integrated Design and LEED Accredited Professionals

To support and encourage the design integration required by a green building project, several design team members were LEED Accredited Professionals (AP). LEED APs have the expertise required to design a building to LEED standards and to coordinate the documentation process that is necessary for LEED certification. The LEED AP professional understands the importance of integrated design and the need to consider interactions between the prerequisites and credits and their respective criteria.