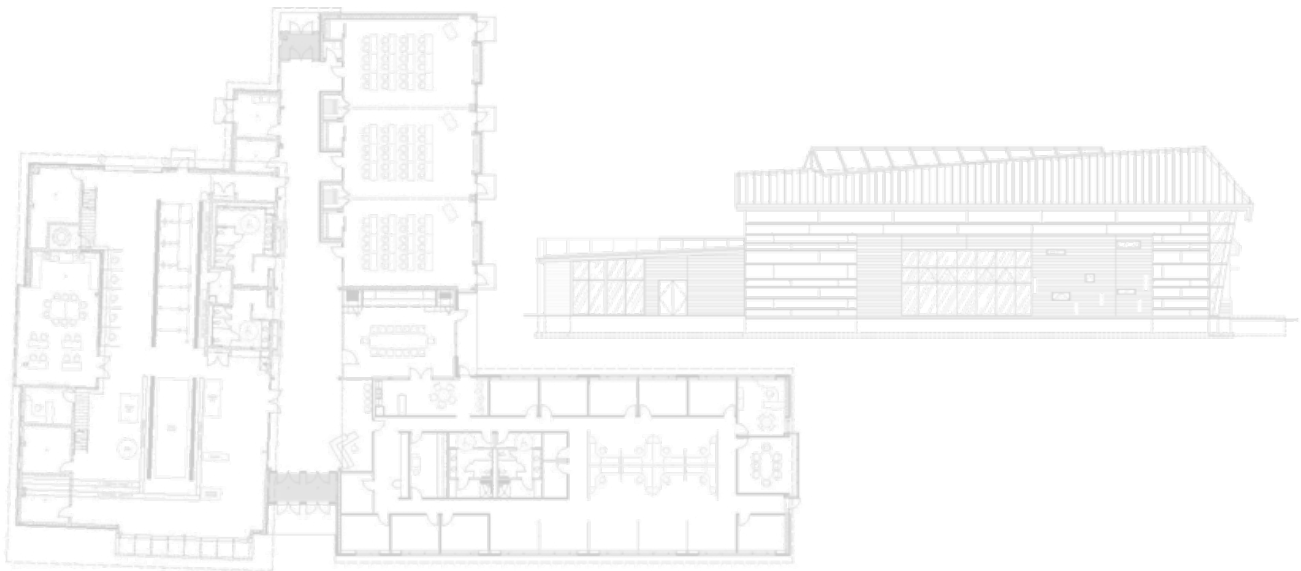


Walkerton Clean Water Centre



Walkerton Clean Water Centre

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Walkerton Clean Water Centre

Project Highlights

The Walkerton tainted water tragedy in May 2000 killed seven people and made 2,500 others ill. The subsequent public inquiry found that heavy rain had washed E.Coli-laden manure into a faulty municipal well run by poorly trained operators.

The inquiry's 121 recommendations focussed on preventing a recurrence of the public-health disaster and included mandatory training and certification for water-system operators. AECOM Canada Ltd. referred to as "AECOM" in this document was the prime consultant retained to provide engineering and architectural design services to build the Walkerton Clean Water Centre (the Centre). The facility is a 20,000 square foot institution for the training of clean water systems operators and for the demonstration of cutting edge technology in clean water systems.

The Walkerton Clean Water Centre (the Centre) was constructed by Ontario Realty Corporation and opened in June 2010. The Centre safeguards drinking water for the people of Ontario and is the leading centre for high quality training, applied research and technology demonstration.

AECOM was the prime consultant for this world-class administration and training facility for owners and operators of water facilities throughout Ontario. The Centre was designed to provide hands-on tools that demonstrate conventional and innovative water treatment and distribution systems. It offers over 20 specialised courses and workshops on drinking water treatment that it delivers to communities across the province.

The design incorporated several energy efficient technologies including geothermal heating and

cooling, solar panels, natural lighting, collection and reuse of rainwater, high R-value insulation and energy efficient windows, roofing material with high solar reflectance (white roof) and ultra-low flow toilets and showerheads and automatic controls.

The Centre was designed to provide hands-on tools that demonstrate conventional and innovative water treatment and distribution systems. It has three training rooms for up to 100 trainees that can convert to one large conference area, a technical demonstration facility with state-of-the-art pilot plant, advanced technologies and a distribution system, life-size water treatment equipment, a mini water tower, administration offices and a boardroom. The Centre offers over 20 specialised courses and workshops on drinking water treatment that it delivers to communities across the province. Housing all its operations and more classrooms in one building increases the Centre's capacity to train drinking water systems operators across Ontario, with a focus on smaller systems, including those serving First Nations. To date, over 23,000 operators have been trained.

The Walkerton Clean Water Centre was built to conform to Leadership in Energy and Environmental Design Green Building Rating System (LEED) Gold standard. **This facility will be, once certified, the first LEED Gold Certified provincially owned building in the province.**

Some of the measures taken to meet the LEED Gold standard included separating recyclable and reusable material during construction, which diverted 73 percent of the waste, and providing over 107,000 square feet of surrounding yard that will be protected from future development.

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New Application of Existing Techniques/ Originality/ Innovation

The Walkerton Clean Water Centre was built to conform to Leadership in Energy and Environmental Design Green Building Rating System (LEED) Gold standard.

LEED is an internationally recognized green design standard for developing buildings that are energy efficient. Energy use in buildings is responsible for 40 percent or more of greenhouse gas emissions in the developed world.

The new facility has surpassed the amount of points required for Gold certification by meeting or exceeding each credit's technical requirements. The application has been submitted for certification, and the Centre expects the new building will have LEED Gold certification by the end of the 2010-2011 fiscal year. The Green building features in the Centre's design include:

Sustainable Site

- Over 107,000 square feet surrounding the site were designed as open green space to protect the land from future development.

Water Efficiency

- Water conservation was a key aspect of the design for the Centre.
- The building achieved all water-related LEED credits, and is predicted to use 78 percent less indoor water than a conventional building.
- Rainwater collection and water re-use are important parts of the Centre's water conservation strategy. Rainwater is collected on the roof and directed to a concrete cistern below the building and is then used for toilet flushing. The reclaimed water is also connected to exterior hose bibs to be used for irrigation, as necessary. The rainwater collection cistern system is used for irrigation of exterior plantings only. There is a second separate cistern system that collects chlorinated process water from the training activities. This water is

not suitable for irrigation as it may contain detrimental levels of chlorine; however, it is suitable for use in toilet flushing.

Energy and Atmosphere

- The Centre features an energy-saving ground source heat pump and a solar hot water heater and is expected to use 59 percent less energy than a conventional building.
- Building is designed and situated to take advantage of natural day lighting.
- To cut down on lighting power wastage, occupancy sensors and daylight sensors are located throughout the facility to turn the lights on only in occupied areas or when there is insufficient daylight.
- Individual occupant environmental controls.
- Energy efficient, heating, cooling and appliances.
- Use of regional, recycled, and low emission materials.
- Roofing material with high solar reflectance (white roof).
- High R-value insulation and energy efficient windows.

Materials and Resources

- During construction, recyclable and reusable materials were separated from waste at the site. As a result, 73 percent of waste was diverted from the landfill.
- 25 percent of building materials were obtained from within an 800 km radius of the site, exceeding the 20 percent threshold for this LEED credit.
- Post construction, the Centre gained a LEED credit for following a green housekeeping program that uses only EcoLogo certified products.

Indoor Environment

- Indoor air quality was a priority at this building. The Centre achieved all the air quality credits available under LEED for such initiatives as using low-VOC (volatile organic compound) sealants, adhesives and paint. The Centre passed indoor air quality testing prior to occupancy.

Walkerton Clean Water Centre

Complexity

AECOM

AECOM coordinated detailed energy modeling for three unique functional areas (offices, training rooms and technical demonstration area). We also prepared a complex structural design for the roof of the technical demonstration area to provide a clear span while accommodating an innovative skylight feature designed to achieve the natural lighting target.

Intricate coordination was required between the geothermal heating system design, structural engineering design and civil engineering design to ensure that increased depth of frost created by geothermal system removing heat from the ground did not negatively impact the building foundations or services.

AECOM completed site grading and servicing design coordination with LEED targets for collection of on-site rainwater using reverse-slope parking areas, perimeter infiltration galleries and a storm water management pond to minimize surface water runoff from the property.

The architectural design of the building addressed the competing demands of maximizing natural day lighting while minimizing heat gain from direct sunlight; obtaining appropriate visual exposure of the building while protecting it from natural forces. In particular, the roof geometric design included complex overhang and skylight details designed specifically to allow substantial natural lighting of occupied areas while blocking the direct sunlight. This design results in more efficient mechanical systems that reduce the overall energy demand of the building. The site location and orientation of the building was selected after careful study and consideration of issues such as convenient user path of travel, resistance to the impact of the prevailing wind direction, collection of site surface water runoff and positioning of the building geothermal heating system. Accommodating the various

performance requirements of these systems required an iterative approach to the design to test the effect of various proposed locations/orientations.

Vanderwesten Rutherford Mantecon

Vanderwesten Rutherford Mantecon was commissioned to design the mechanical and electrical systems for the project which had a goal of achieving LEED Gold Certification. As with any LEED project, an integrated design process and compliance with strict construction procedures are essential demands. A LEED Gold Certification simply intensifies these demands. Through collaboration and coordination with the design and construction team, the following mechanical and electrical features were designed and installed into this project:

- **Mechanical:** Geothermal heat exchange, energy efficient equipment and appliances, dedicated outside air unit, heat recovery, solar domestic water heating, storm water collection / recycling, water conservation and wireless building management / automation (BMS/BAS) systems.
- **Electrical:** High efficiency lighting inside and out.

Enermodal

Enermodal worked closely with the Walkerton Clean Water Centre project team, contributing some of its core services to the project, including LEED consulting and certification services, energy modelling, fundamental commissioning and a Green Education plan. Their integrated team approach allowed them to work with all parties throughout the project to maximize the sustainable features and long-term energy efficiency of the building. These features helped the project to realize indoor water savings of 78 percent and a 59 percent reduction in energy consumption, key components of the LEED Gold target.

Throughout development and construction, their commissioning team worked with the contractors and building owner to verify that the building's mechanical

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and electrical equipment was properly installed and functioning as designed. The value of the project was further increased through the Green Education component, which – along with sustainable features like minimizing urban light pollution and a water efficient landscape design – facilitates awareness and interaction with the surrounding community to reinforce sustainable features and operations.

MHBC Planning Urban Design and Landscape Architecture

The landscape design for the Centre was created to have a variety of landscape features and amenities that would complement the architecture and highlight the qualities of the site.

The building, by its location within the topography, is a landmark and the landscape design has been planned so there is a formal landscape treatment immediately around the building and as the visitor moves further from the building into the outer areas of the site, it becomes more naturalized.

One of the main features of the design is an ornamental water feature at the main entrance which provides the sight and sound of refreshing water throughout the summer months.

Because the site is located on the edge of the community it is important that there are onsite amenities for visitors and staff. The large outdoor amenity area on the north side of the building is available for use at lunch time and meeting breaks. There is also an extensive walkway system that leads around the naturalized area of the site that contains the stormwater management features.

The landscape was developed using a combination of native materials, in the tree collection as well as the shrub perennial and turf grass meadow mix. Another feature of the site is infiltration beds that are part of the stormwater management plan. They provide heat island relief in the parking areas as well as collecting rain water in the vegetated swales. The tree collection has been planned to mitigate the winter wind effect, increasing shelter at entrances and outdoor amenity areas on the site.

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Environmental Impact and Social and Economic Benefits

Laurel Broten, Minister of the Environment (2005 – 2007) stated:

“The Centre contributes directly to the safety of drinking water in Ontario by ensuring operators across the province get the classroom training they need both at the entry level and for emerging issues. And now, they will be able to gain hands-on experience operating state-of-the-art equipment.

This work is vitally important as it helps ensure that people in every part of the province have access to safe, clean water. It's critical to our health and prosperity.”

The Centre's goals and outcomes demonstrate how the facility contributes to the economic, social and environmental quality of life.

Goal 1: Develop a permanent facility in Walkerton to demonstrate leading-edge drinking water technology.

The Outcome: The facility provides a practical training tool for drinking water treatment facility operators and other water suppliers. It helps operators, stakeholders and the public become aware of the variety of treatment and delivery systems and technologies available. The Technology Demonstration Facility is also used by colleges and universities for developing programs in water quality and treatment.

Goal 2: Train Operators, Operating Authorities and Owners of Drinking Water Systems.

The Outcome: Offering comprehensive training programs is the core purpose of the Walkerton Clean Water Facility. The Centre identifies emerging training needs and topics related to drinking water

and oversees the development and delivery of related courses. The Centre placed particular emphasis on addressing three critical gaps in drinking water system operator training as identified by the Walkerton Inquiry, namely:

- Accessible training for operators in small or remote communities
- Readily available required training
- Training for First Nations operators.

In two typical months (February and March 2010), the Centre offered 12 different courses in a wide variety of Ontario locations: Walkerton, Baden, Barrie, Elliot Lake, Etobicoke, Hamilton, Kingston, Kitchener, London, Markham, Ottawa, Pembroke, Red Lake, Sudbury, Thunder Bay, Timmins, and Vaughan.

Goal 3: Provide information and advice for operators of small, remote or older drinking systems.

The Outcome: The Centre's staff developed a comprehensive outreach strategy called the Small Systems Program, which centres on the use of three mobile training units (MTUs). The MTUs reduce travel costs for system owners and municipalities and enable staff of small operations to stay in their community while they train. In 2009-10, the MTU's goal was to train 40 participants. That goal was exceeded: 58 participants were trained using the MTUs. The Centre organized several training sessions specifically for communities in Ontario's Far North.

Goal 4: Conduct and sponsor research.

The Outcome: The Centre has three research-related initiatives:

- Sponsoring and participating in research projects
- Publishing the results of research projects
- Providing three scholarships per year for graduate students.

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Goal 5: Education and outreach.

The Outcome: Through its research and training activities, the Walkerton Clean Water Centre has become a hub of information about safe drinking water. To share this information as broadly as possible, an in-house library was developed to address water system operators' specific needs and challenges. The Centre provides career information in secondary schools to aspiring drinking water operators through school tours and career fairs.

Walkerton Clean Water Centre

Meeting and Exceeding Owner's/Client's Needs

Quote from Richard Slater, Portfolio
Performance Manager, ORC
Southwest Region

"AECOM's services were provided within the approved timeframe and budget and to our complete satisfaction. This facility is the first LEED Gold Certified provincially owned building in the province and it was a privilege to have AECOM as the prime consultant to design a structure that the entire community would be proud of."



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March 21, 2011

Jim Flanigan, P.Eng., MBA
Manager, PDD, Central West
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Dear Jim:

**Regarding: Walkerton Clean Water Centre Award Submission for
Consulting Engineers of Ontario**

This letter confirms permission for AECOM Canada Ltd. and AECOM Architects Canada Ltd. "AECOM" to enter the Walkerton Clean Water Centre project into the Consulting Engineers of Ontario awards competition. AECOM were the prime consultants retained to provide engineering and architectural design services to build the Walkerton Clean Water Centre, a 21,040 square foot facility for the training of clean water systems operators and for the demonstration of cutting edge technology in clean water systems.

AECOM's services were provided within the approved timeframe and budget and to our complete satisfaction. This facility is the first LEED Gold Certified provincially owned building in the province and it was a privilege to have AECOM as the prime consultant to design a structure that the entire community would be proud of.

The Walkerton Clean Water Centre facility was occupied on March 31, 2010 and provides various specialized courses and workshops on drinking water treatment for Municipal Employees across the province.

Sincerely,



Richard Slater
Portfolio Performance Manager
ORC Southwest Region

Walkerton Clean Water Centre



Walkerton Clean Water Centre

Cutting edge technology in clean water systems

Objectives/Solutions

The Walkerton Clean Water Centre is an institution for the training of clean water systems operators and for the demonstration of cutting edge technology in clean water systems. This prestigious Centre's goal is to become renowned for its knowledge-based and innovative approach to training. The design of the Centre incorporates several energy efficient technologies including geothermal heating and cooling, solar panels, collection and reuse of rainwater, and natural lighting. The Centre contains an office administration area for twenty staff, state of the art training rooms for up to 100 trainees and a technical demonstration facility housing hands-on demonstration drinking water treatment and distribution systems. The Centre is approximately 20,000 square foot in gross floor area with a construction budget of \$7.6 million. Construction was completed in 2010.

Building a Sustainable, Healthier Workplace

Contribution to economic, social and / or environmental quality of life.

The Centre was established in response to the recommendations of the Walkerton Inquiry and focuses on training for drinking water professionals across Ontario. Its technology demonstration facility is a hands-on training tool and a resource for owners and operators of water facilities. Housing all its operations and more classrooms in one building increases the Centre's capacity to train drinking water systems operators.

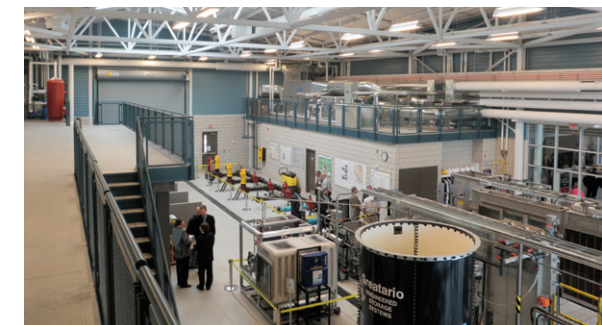
The Leadership in Energy and Environmental Design Green Building Rating System (LEED) is an internationally recognized green design standard for developing buildings that are energy efficient. Energy use in buildings is responsible for 40 per cent or more of greenhouse gas emissions in the developed world.

The Walkerton Clean Water Centre is a LEED registered building for a gold certification. LEED promotes a whole-building approach that looks at reducing impacts to both the natural and indoor environment. Best practices in designing, constructing and maintaining the new facility will conserve electricity and water and promote a healthier working environment.

Technical Excellence

Green building features in the Centre's design include:

- Building designed and situated to take advantage of natural day lighting and protection from the elements
- Geothermal heating and cooling
- Collecting storm water to flush toilets and irrigate
- Ultra-low flow toilets and showerheads and automatic controls
- Individual occupant environmental controls
- Energy efficient lighting, heating, cooling and appliances
- Use of regional, recycled, and low emission materials
- Roofing material with high solar reflectance (white roof)
- High R-value insulation & energy efficient windows
- Native, non-invasive, drought resistant plants



Level of complexity

- Performed detailed energy modeling for three unique functional areas (offices, training rooms and technical demonstration area)
- Performed complex structural design for roof of technical demonstration area to provide a clear span while accommodating an innovative skylight feature designed to achieve natural lighting target.

Quick Facts

The Centre offers over 20 specialized courses and workshops on drinking water treatment that it delivers to communities across the province. It has trained 23,000 operators responsible for drinking water systems, mostly in more remote or rural areas.

Main areas:

- 3 training rooms that can convert into one large conference area
- Technical demonstration facility with a state of the art pilot plant, advanced technologies and a distribution system
- Administration office
- Boardroom

Architects: AECOM Canada Architects Ltd.

Subconsultants: VRM, Enermodal, MHBC

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All photos are courtesy of Walkerton Clean Water Centre. The Canadian Consulting Engineer Association can use the photos for marketing purposes.



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