Located on once-abandoned railway lands, this $250 million project revitalized this site on Toronto's waterfront. The first major office development south of the railway tracks in more than a decade, 25 York includes 30 stories with a five-level podium and three levels of parking. The building is located in the heart of the Toronto downtown core, just south of the financial district.

The AAA office building includes a gourmet kitchen for employees to prepare food, rooftop garden patios, ground floor retail, a fitness center, a prayer room, and massage rooms. Linking directly to the major attractions of the downtown core, the Toronto underground PATH walkway through 25 York provides direct indoor access to Union Station and in-building bicycle storage and showers. This building is steps from the waterfront, the Air Canada Centre (home to three Toronto professional sports teams), the entertainment district, and the financial core, plus many major restaurants and retail chains.

The building features large floor plates and a state-of-the-art building technology platform for the distribution of air, voice, data and power cabling. Building occupants enjoy personal control over their temperature and airflow volume through underfloor air distribution, an abundance of daylight with incorporated daylight sensors for indirect/direct lighting, and exterior views from 90% of the occupied spaces in the building.

The property management team received LEED for Existing Buildings: Operations & Maintenance Platinum certification in 2012. The team identified and implemented best practices that would continue the sustainable commitment to occupant comfort and environmental responsibility.

Tenant organizations are increasingly seeking green building space in the Toronto market and across North America (see For More Information on the Economic Benefits of Green Buildings). Whether it’s for keeping and attracting employees, reducing long-term operating costs, or part of a broader corporate sustainability initiative, tenants are putting sustainability on the “must-have list.”

On the opposite side, developers and property managers are seeing increased competition. By focusing on energy management, managers can reduce the impact of rising utility costs on their tenants.

Though a green certification might not increase rent, not having it for a new development is a bigger risk; this could lead to not being able to attract tenants to a space quickly. Sustainable building certification has progressed from “why” to “why not” certify.

Water and Site

Despite its location in the downtown core, 25 York Street incorporates green space in a variety of ways. The building’s green and white reflective roof helps minimize the urban heat island effect. Occupants enjoy a podium level rooftop green space that can be used at lunch or for entertainment events.

A combination of measures, including dual-flush toilets, low flow fixtures, dual-flush toilets, low flow fixtures, LEED for Existing Buildings: Operations & Maintenance, and energy management systems help make this a competitive, AAA office tower in the Toronto rental market. Conservation measures reduce long-term operating costs, while green certification helps attract tenants.

Benefits of Green Buildings

- Reduced energy costs on their tenants.
- Increased competition. By focusing on energy management, managers can reduce the impact of rising utility costs on their tenants.
- Though a green certification might not increase rent, not having it for a new development is a bigger risk; this could lead to not being able to attract tenants to a space quickly.
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Environmental benefits and long-term operations cost savings have traditionally been the main drivers of sustainable design. But building owners—including the owner of one of Toronto’s newest office towers—are also viewing high performing buildings as a competitive edge in leasing and managing office space. The strategy has worked for 25 York Street, which leased 90% of its space in the first year and 100% in the second year, outpacing the market’s average lease-out rate.
facets and rainwater reuse, reduce water use. Rainwater is collected from the roof, stored in an underground 29,000 gallon cistern and used to flush the toilets and urinals on floors three through five.

Limiting the reclaimed water use to three floors reduces the cost of dual plumbing and doesn’t hinder the water savings. This design also allows the fixtures to run off of city water pressure, eliminating any need for a connection to the tower booster pumps, saving energy and reducing costs.

Landscaping consists of native adaptive vegetation species, reducing watering demands. A highly efficient drip irrigation system is fed from the rainwater cistern. Based on actual metered data for 2012 and assuming 252 working days per year and 3,281 occupants in the building, the building’s water use is 37% lower than a typical office building. Landscaping on the rooftop patio and elsewhere consists of native adaptive vegetation, reducing watering demands. A highly efficient drip irrigation system is fed from the rainwater cistern.

Energy
Recognizing the environmental impacts associated with energy used by office buildings, the owner charged the design team with creating a high performance building. These systems help protect tenants from rising utility costs while providing occupants with a superior space.

The project team hired an independent commissioning agent to peer review the design, provide recommendations for new technologies, ensure installation of systems was correctly done and provides operational support during the first year of operations. This commissioning process included functional testing, confirming that all system components operated in an integrated manner resulting in expected energy efficiency and occupant comfort.

The property manager also hired an energy management consultant to monitor performance and identify opportunities to further push energy performance, which has resulted in an ENERGY STAR score of 88. Building energy conservation measures include an airtight, well-insulated envelope, high performance windows, automated solar tracking interior shades in addition to lighting and HVAC strategies.

Energy monitoring identified that the building was using 35% more electricity for lighting and power panels compared to the energy model prediction. This higher than expected energy use was due to approximately 48x416x689m".

FOR MORE INFORMATION ON THE ECONOMIC BENEFITS OF GREEN BUILDINGS

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50% of the total load being on during unoccupied hours, when it was expected that only 20% of the total load should have been operating.

Building management worked with tenants to identify the source of the excess energy use and determined strategies to ensure equipment and lighting only operate when required. Reductions in airflow rates through the compartmental units also reduced the cooling load and energy consumption by eliminating unnecessary artificial lighting.

Efficient T8 lamps are used in the washrooms, storage/service areas, parking garage and stairwells. T5HO lamps and task lights with a LPD of 0.1 W/ft² are used in office areas. Exterior lighting includes low level flood lights and recessed high-intensity discharge lamps, while LED exit signs provide additional lighting savings. The effective LPD (0.17 W/ft²) was estimated at 41% lower than ASHRAE/IESNA Standard 90.1-1999 for office buildings (25% and 15% lower than Standard 90.1-2007 and Standard 90.1-2010 respectively).

**HVAC**

The heating and cooling systems are served by the local district energy system (DES) piped through heat exchangers and circulating pumps. The DES generates and distributes thermal energy at the community level, rather than generating it on site at buildings. This system avoids the use of on-site infrastructure and boilers, while also eliminating costly maintenance and operating concerns.

Heating for office spaces is provided via perimeter hydronic finned elements, which are recessed into the raised floor plenum. The building entrance and the high glazed areas are heated via fan coil units located below the glazed surface or over the revolving door.

The perimeter hydronic finned elements have underfloor air diffusers that stratify heat effectively and increase occupant comfort. The fan coils have finned tube coils and fans, which are compact in design to provide heating at the entrance and high glazed areas where individual zone control is required.

District cooling from the DES also eliminates the on-site chiller plant, cooling tower and concern for maintenance and operation of this plant. The DES uses deep lake cooling to provide cooling energy that already has a very high coefficient of performance (COP), which is not possible for an on-site chiller and cooling tower plant. This cooling technology significantly reduces the need for electricity use.

Cooling is primarily provided via down discharge VAV compartmental units on each floor. Chilled water is available to meet process equipment cooling requirements in local area network (LAN) rooms, elevators, machine rooms and telephone rooms via dedicated terminal units to limit space temperatures.

Ventilation air is provided to the office areas (floors 4–30) via a common system (DES) piped through heat exchangers and circulating pumps. The DES generates and distributes thermal energy at the community level, rather than generating it on site at buildings. This system avoids the use of on-site infrastructure and boilers, while also eliminating costly maintenance and operating concerns.

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DEEP LAKE WATER COOLING SYSTEM

A deep lake water cooling system operated by Enwave Energy Corporation takes advantage of Lake Ontario’s icy waters to provide cooling to 64 Toronto buildings, including 25 York Street. During winter, the surface of Lake Ontario cools to about 39°F. This cold water sinks to the lake’s bottom during the summer, and remains very cold despite the summer heat. Three high-density polyethylene pipes draw water from a depth of 272 ft, transporting it to a filtration plant. At the next stage, heat exchangers facilitate an energy transfer between the cold lake water and the 7.5 mile closed chilled water supply loop. Once the energy transfer process is complete, the lake water continues on mechanical energy consumption on each floor in addition to the other energy end uses included in Figure 1. The electrical meter data are integrated to the building automation system for automated data trending and archiving. The steam meter and chilled water energy meter provide the heating and cooling energy consumption.

The design stage energy simulation predicted an annual energy reduction of 25.4% relative to Canada’s 1997 Model National Energy Code for Buildings (MNECB) baseline. Based on measured data the actual energy savings were 21% below the calibrated reference building based on the MNECB 1997.

The building has been in operation for more than three years, and 2012 monthly energy consumption is shown in Figure 2. The 2012 annual energy consumption was 70 kBTU/ft²·yr, with an energy cost index of CAN$1.25/ft²·yr. Actual annual energy consumption is 1% higher than predicted due to minor operational issues associated with optimizing control sequences of various mechanical equipment. The building uses 70.1 kBTU/ft²·yr, 34% less than the typical Canadian commercial office building average of 105.6 kBTU/ft²·yr. The typical office building energy data is derived from the Natural Resources Canada’s Survey of Commercial and Institutional Energy Use—Building SCI/EU-2009, published in December 2012. The HVAC system uses non-CFC refrigerant, R-410A, which meets LEED requirements. The annual energy consumption has been reduced by 16 million kBTU as compared to MNECB reference building, reducing equivalent CO2 emissions by 726 tons based on Ontario electricity generation and greenhouse gas (GHG) emission factor.

Material Choices

During the design process, the project team sought sustainable materials, which were sourced from local manufacturers, made from recycled materials, or came from certified forests (over 75% of the wood used is Forest Stewardship Council certified). Ninety-three percent of construction waste was salvaged or recycled and diverted from the landfill. To ensure good indoor air quality, all

**Table: Building Envelope**

<table>
<thead>
<tr>
<th>Type</th>
<th>Overall R-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roof</strong></td>
<td><strong>R.20</strong></td>
</tr>
<tr>
<td><strong>Walls</strong></td>
<td><strong>R.4.5</strong></td>
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<tr>
<td><strong>Windows</strong></td>
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<tr>
<td><strong>Solar Heat Gain Coefficient (SHGC)</strong></td>
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</tr>
<tr>
<td><strong>Visual Transmittance</strong></td>
<td><strong>0.36</strong></td>
</tr>
</tbody>
</table>

**Location**

Latitude: 43.64 N
Longitude: 79.4 W
Orientation: True north is at 160 47' 30" of west

**Source:** Enwave Energy Corporation

**Note:** Energy data is shown in Figure 1 and Figure 2.
Sealants, adhesives, paints, coatings, laminates, composites, and carpet are low off-gassing varieties.

**Sustainable Operations**

The facility has implemented policies for housekeeping, site management and pest management to reduce the environmental impacts of maintenance and upkeep. For facilities in a northern climate, snow maintenance, which can involve the overuse of salt, can have a significant environmental impact. However, the implementation of best practices, such as removing accumulated snow before applying deicer, ensuring deicing application devices are calibrated to the width of the path, and applying deicer before the ice has bonded to the surface can dramatically reduce the use of salt. These practices have resulted in reducing the quantity of deicer used, which means less chemical residue making its way into the water system.

A building waste management program has resulted in a diversion rate of more than 85%. The building team is targeting the ultimate goal of eliminating waste sent to the landfill.

The building features multiple collection bins for various types of waste to ensure materials like paper aren’t compromised from liquid left over in glass bottle or cans. Less frequent waste items like electronics and furniture are donated for reuse or sent to recycling facilities. Building management seeks to engage occupants by making them aware of programs like the waste diversion efforts and broader sustainability issues.

The building team provides green tenant guidelines to new tenants (who may not be pursuing LEED certification) to address sustainability in their fit-out and coordinate with the base building efforts.

These guidelines also can provide guidance on sustainable construction practices for smaller alterations in the building. Following these guidelines is voluntary; however, they have been well received by tenants, and widely used in the building.

**Conclusion**

As one of Toronto’s premier new office towers, 23 York Street demonstrates the benefits of energy efficiency and sustainability. The AAA office tower meets tenant expectations for a modern office, while still achieving multiple LEED certifications. When combined with sustainable operations and tenant involvement, green building design can positively impact occupants and the owner’s bottom line.

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**LESSONS LEARNED**

**Education.** The building management team worked with tenant groups after the occupant comfort survey identified areas of occupant dissatisfaction or confusion regarding how to use building systems. Main areas of concern were acoustic quality, office layout and general operations.

One response by the building team involved explaining to occupants the reasoning behind some of the changes, such as the automatic blinds that track the sun to reduce glare and heat load. Tenants expressed concerns about the blinds moving throughout the day and questioned the reasoning for their automation. The team alleviated concerns by explaining that the blinds are designed to keep occupants comfortable and increase energy efficiency.

The building team also informed tenants that the building audio system could be used to provide white noise to the open office areas to address acoustic concerns from the occupants. The minimal mechanical equipment results in little background sound.

**Water Submeters.** Water submetering can be an important tool to provide water information for performance and diagnostic purposes. In the LEED for New Construction rating system, points are only awarded for the installation of energy meters, and often water submetering is cut to save costs. However, it is next to impossible to determine why water use is high or how much water a rain harvesting system is saving without these meters. Installing water meters in a live system postconstruction can quadruple the cost. Installing these meters during construction saves money in the long run and can provide valuable information to the property team during operations.

**Motivated Team.** A motivated site team is key to pursuing and obtaining LEED EB: O&M. It is important that the site team is not only committed to the effort, but also is excited to work on the project. Everyone on the property team already has a full-time job and has a full plate of tasks to be completed, so adding a LEED certification can be overwhelming. Keys to motivating a team include a high commitment level from the property management company, tenant willingness to participate, and an explanation of how the process will improve building operations. A team that is motivated and passionate about sustainability is more likely to develop innovative strategies, streamline documentation efforts and maintain new programs.

**Tenant Education.** While implementing green operation programs as part of LEED EB: O&M certification, the property manager discovered that tenant education was a critical element. Informing occupants in advance of the program’s implementation and explaining its rationale greatly improved the program’s success. These programs included the zero waste target and energy conservation. Explaining objectives and how the programs would benefit occupants helped make the implementation process go smoothly and allowed for tenant input.

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**BUILDING TEAM**

**Building Owner/Representative** Menkes Property Management Services Ltd.

**Architect** Adamson Associates Architects

**General Contractor** Menkes Construction Ltd.

**Mechanical Engineer, Commissioning Agent** TMP Consulting Engineers

**Technical Engineer, Lighting Design** Mulvey & Banani

**Energy Consultant, Sustainability/LEED Consultant** Enermodal Engineering

**Structural Engineer** Stephenson

**Civil Engineer** MMM

**Environmental Consultant** Theakston

**Landscape Architect** MBTW

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**ABOUT THE AUTHORS**

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