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ONE YORK STREET
CASE STUDY

One York Street is an 800,000 square foot, 35-storey new office building developed and managed by Menkes Developments Ltd. (Menkes). Part of Menkes' larger mixed-use development encompassing approximately 2 million square feet of density on a two-acre site, the entire development is an urban re-generator that includes 1,313 condominium units and 200,000 sq.ft. of prime retail space, restaurant and public space, as well as a four level underground parking garage with nine electric vehicle charging stations and 12 car share spots.

Located in the newly evolved and thriving South Core business district, Menkes' newest development to open, One York Street is the ultimate location for a work, live, play lifestyle. The complex is PATH connected, within walking distance to the harbour front, and steps to Union Station. Occupying a full city block, this mixed-use development is situated at a prime location, south of the Gardiner Expressway at the foot of York Street. With superb area amenities such as world class restaurants, the Air Canada Centre, and incredible views, One York Street offers a fantastic work environment for its occupants.

The progressive design of the new office tower incorporates state-of-the-art technology in both building automation systems and tenant environments. One York Street aims to establish a new standard for environmentally sustainable development by pursuing LEED® Platinum certification under the internationally-accepted Leadership in Energy and Environmental Design program. The LEED® rating system recognizes excellence in the design, construction and operation of green buildings.

As a member of the Canada Green Building Council, Menkes is dedicated to building a green and sustainable future; striving to ensure that their projects are constructed to the highest standards to reduce energy consumption and their impact to the environment. Menkes builds office, industrial, and retail properties that combine attractive architecture with practical, effective technology to provide highly efficient workplaces that help keep employees happy, healthy and productive.

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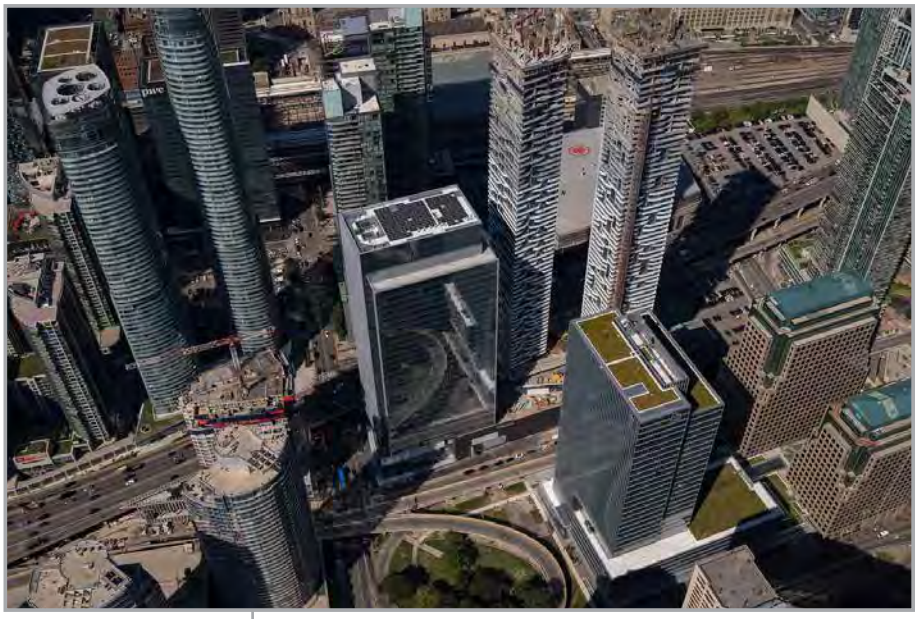
SITE

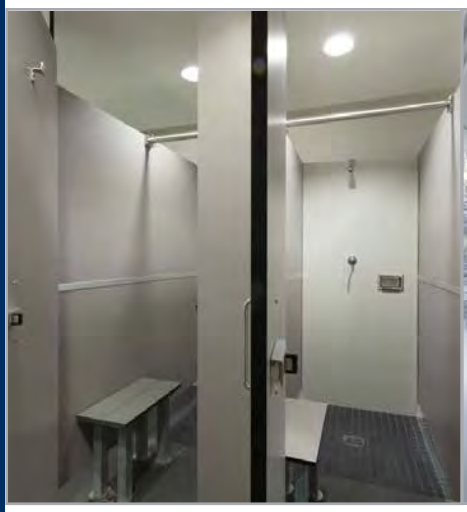
Construction projects can be an environmental disturbance to neighboring properties, rainwater systems, and the site itself. To reduce pollution from construction activities by controlling soil erosion, waterway sedimentation, and airborne dust, an Erosion and Sedimentation Control plan was implemented on the site and maintained throughout the construction phase. Measures included a silt fence, filter fabric protection on all storm sewer inlets, mud-tracking controls and regular street sweeping.



TRANSPORTATION

The building is located within a five minute walk to Union Station, Canada's busiest multi-modal passenger transportation hub with access to TTC, GO Transit including train and bus services, VIA Rail, and UP Express, an airport rail link to Pearson Airport. It is connected to the PATH system, downtown Toronto's primary underground walkway which facilitates pedestrian linkages to various amenities and public transit, accommodating more than 200,000 business-day commuters.

More and more companies are encouraging employees to lead healthy lifestyles and minimize their impact on the environment. Employees who participate in regular exercise are more productive than those who don't exercise and less likely to suffer depression and work burnout. One of the simplest methods for employers to promote healthy lifestyles is to make it easier for employees to ride their bicycles or walk to work and exercise during breaks. One York supports alternative commuting by providing over 300 bike racks located on parking levels P1 to P4. Change room and showering facilities are also provided with a total of 18 showers located on parking level P1. Driving can't always be avoided for those who commute from outlying communities, so One York has provided preferred parking of 12 car share spots, as well as nine electrical vehicle charging stations.



WATER EFFICIENCY

Two large rainwater collection cisterns are installed at One York; the collected rainwater supplies water for toilets and urinals, as well as the drip irrigation system serving the water-efficient landscaping located on the ground and podium levels. The cistern system contributes to an annual savings of over five million litres of potable water, and is a major component of the development's stormwater management.

keeping water that falls on One York on site, runoff is reduced to minimal levels while easing the strain on Toronto's sewer system.

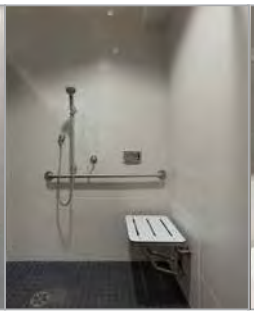
The base building washrooms feature low-flush toilets, low flow urinals, low-flow showers, and low-flow sensor lavatory faucets with automatic shut-off.

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the land surface. Paved surfaces, hardscapes, rooftops and other surfaces that prevent water from soaking into the ground to our landscape greatly increases the runoff volume created during storms. Stormwater runoff also picks up and carries with it many different pollutants that are found on paved surfaces such as sediment, nitrogen, phosphorus, bacteria, oil and grease, trash, pesticides and metals. This contributes to stormwater runoff as the number one cause of natural water source impairment in urban areas. Runoff is swiftly carried to local streams, lakes, wetlands and rivers and can cause flooding and erosion, and wash away wetland creatures' habitats. Here in the city of Toronto, an aging sewer system that was built between 50 and 80 years ago no longer supports the growing population, nor the more frequent and heavy rainfall as a result of climate change. By diverting rainwater for use in the building and

WATER SAVINGS

Fixtures	One York	Conventional
Toilets	**4.8 LPF**	6 LPF
Urinals	**0.5 LPF**	3.8 LPF
Lavatory Faucets	**1.9 LPM**	8.3 LPM
Showers	**5.7 LPM**	9.5 LPM

LPF - Litres per flush, LPM – Litres per minute



ENERGY EFFICIENCY

Energy and power production create staggering amounts of pollution, including carbon dioxide, sulphur dioxide and mercury. Canada is among the highest per-capita energy users in the world. Minimizing energy use reduces the demand on local production facilities, which in turn decelerates the growth rate of expensive and destructive power generating infrastructure. As energy prices continue to rise, providing energy efficient buildings will become necessary to prevent rolling brownouts and energy shortages.

One York Street was designed to consume considerably less energy than a similar non-LEED® building. In addition to utilizing the EnWave district heating and cooling system, other energy saving features incorporated into the base building design include: premium efficiency HVAC equipment, state-of the-art building automation controls, and a high-performance curtain-wall system. The building design and energy efficient systems at One York translate to 46% energy consumption savings when compared to a typical office building.

The building envelope, the boundary between the interior and exterior of a building, performs a number of tasks including exterior protection from the elements and preservation of internal space

requirements such as thermal, light, and acoustic comfort and humidity. The energy efficient building envelope at One York reduces both the thermal energy lost to the building's surroundings and the amount of energy needed to heat and cool the building.

As part of base building tenant space, One York Street Inc. has provided occupancy sensors, daylight sensors and an optimized fixture layout. All of these systems have been carefully engineered to reduce lighting electricity consumption. Additional energy savings are achieved with the use of LEDs in all exterior lighting.

ONE YORK'S BUILDING ENVELOPE:

- **Glass selected with good shading co-efficient but also with good visible light transmittance**
- **Low U value, argon filled**
- **Thermally broken curtainwall mullions**
- **Insulated spandrel**
- **Unitized system so manufactured units arrived pre-assembled on site with the glazing in frame which allowed for better quality control**
- **Maximized area of glazing panels to minimize amount of aluminum**

To further improve the energy performance of the building, an extensive photovoltaic solar panel array is located on the roof of the building which produces approximately 86,000 kWh of energy annually. The building is also connected to the EnWave system which provides district cooling within the downtown core of Toronto, using deep lake cooling technology.

Enwave is the largest provider of district cooling from a renewable source in North America. Over 30 buildings are connected to the system including the Air Canada Centre and the Metro Toronto Convention Centre. Deep Lake Water Cooling (DLWC) keeps buildings cool year-round while enhancing the potable water supply, decreasing electrical consumption and greenhouse gas emissions, and improving indoor air quality.

How Does DLWC Work? Three intake pipes which reach 5km into Lake Ontario supply cold water (4°C) to the City of Toronto's water filtration plant. The lakewater is transferred through 18 pairs of stainless steel heat exchangers to Enwave's closed-loop chilled water supply distribution network. Returning water from the distribution system, which is not more than 13°C, is cooled using the deep chilled water from the lake and then by centrifugal polishing chillers to around 3°C. Once it has passed through the heat exchanger, the lake water (13°C) enters the City's potable water supply system.

ADVANTAGES OF DLWC:

- Reduces electricity usage by 90% compared to a conventional cooling system.
- Frees up more than 61,000 kWh of electricity for Ontario and Toronto's electrical grids.
- Removes 79,000 tonnes of carbon dioxide from the air annually (based on the displacement of coal and at full system build out) – equivalent of taking 15,800 cars off the road.
- Reduces the need for cooling towers saving approximately 714 million litres of fresh potable drinking water.
- Provides an opportunity for buildings to decommission the use of older electricity driven refrigeration systems that contain CFCs and HCFCs.

DID YOU KNOW?

Enwave's Deep Lake Water Cooling system uses 85 million kilowatt-hours per year less than conventional cooling systems or roughly the amount of power required to supply 6800 homes a year.

As well as fundamental commissioning of the building's systems, an enhanced commissioning program was implemented. This means an independent third party reviewed the design and tested the systems post-construction to ensure the building was operating as designed when the project was turned over to Menkes. A properly executed commissioning process improves planning and coordination, reduces energy consumption during building operation, and overall lowers operating costs. Another potential benefit of commissioning is occupants' health and comfort because of better temperature and ventilation control.

COMMISSIONING ACTIVITIES INCLUDED:

- **Reviews of drawings at two different stages of design**
- **Testing of installed devices and systems to verify settings for optimal performance**
- **Training of building personnel to ensure performance of the systems will be maintained as the building moves into the operations phase.**

Some refrigerants used in HVAC&R systems cause significant damage to Earth's protective ozone layer if they are released into the atmosphere. Others contribute to greenhouse gas emissions, causing global climate change.

Greenhouse gases (GHGs) warm the Earth by absorbing energy and slowing the rate at which the energy escapes to space; they act like a blanket insulating the Earth. Different GHGs can have different effects on the Earth's warming. Two key ways in which these gases differ from each other are their ability to absorb energy (their "radiative efficiency"), and how long they stay in the atmosphere (also known as their "lifetime").

The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO^2). The larger the GWP, the more that a given gas warms the Earth compared to CO^2 over that time period. The time period usually used for GWPs is 100 years. GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases (i.e. to compile a national GHG inventory), and allows policymakers to compare emissions reduction opportunities across sectors and gases. Ozone Depletion Potential refers to the amount of ozone depletion caused by a substance.

Chlorofluorocarbons (CFCs) cause significant damage to the ozone layer, as the reaction between CFC and ozone molecules in the stratosphere destroys the ozone and reduces the stratosphere's ability to absorb a portion of the sun's ultraviolet radiation. To avoid damage to the ozone layer, a more environmentally friendly hydrofluorocarbon refrigerant HFC-410A was implemented with ~0 ODP and a GWP of 1,890.

MATERIALS AND RESOURCES

CONSTRUCTION WASTE

Recycling construction materials diverts solid waste from entering landfills and incinerators, improving the sustainability of waste management. This directly contributes to sustainable development by preventing toxins from entering the environment, maximizing the use of raw materials, reducing the footprint of landfill areas and conserving the energy used in the harvest of virgin raw materials for additional construction products.

Construction waste from the project such as metals, concrete, drywall, and wood was sorted and sent to various recycling facilities such as Triple M Metal LP, Strada Aggregates, New West Gypsum, and Kirkland Lake Power for use as Bio-mass fuel.

The hydro generated from the turbine generators is transferred into the Ontario Hydro grid system. Over 88% of construction waste was returned to the manufacturing cycle to make new products rather than being sent to landfill. Metals are sorted and sent to several mills across Ontario to be melted down and made into new products. Clean wood is recycled into coloured mulch, livestock bedding, and wood flour. Concrete is crushed and used as roadway base, in parking lots, and in driveways. Recycled gypsum is sent to drywall manufacturers, where it is blended with virgin or synthetic gypsum to make new wallboard.

RECYCLED CONTENT

The purchase of recycled products sends a message to industry that recycled products are in demand and helps close the waste circle, ensuring that recyclable materials will continue to be recycled and not wasted. When recyclable materials become the raw materials of industry, they reduce the need for mineral and petroleum extraction and timber harvesting. Less water and energy are typically required to make products from recovered materials than from virgin materials. Purchasing recycled products saves vital natural resources and helps stimulate economic growth through environmentally preferable technologies.

New construction materials including steel, concrete, drywall, and finishes were chosen to maximize recycled content with a contribution of over 15% of the total materials cost.

MYTH: RECYCLED PRODUCTS AREN'T AS GOOD AS "VIRGIN" PRODUCTS.

Recycled products have the same quality, reliability, and dependability. Recycled-content products undergo the same stringent testing and exacting performance documentation that virgin products are subjected to.

REGIONAL MATERIALS

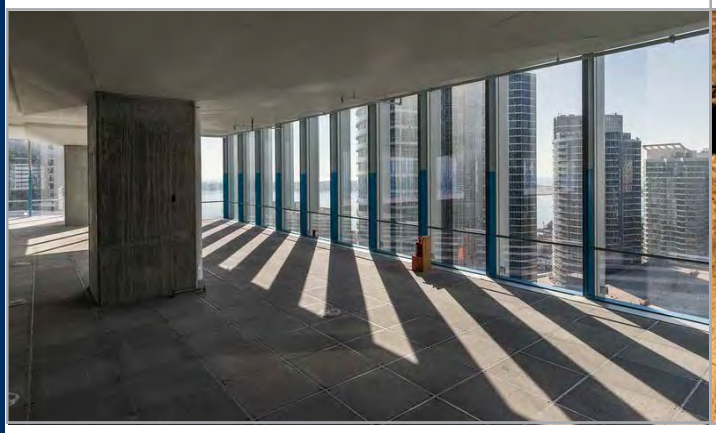
Reducing the amount of project materials and products that travel long distances helps to reduce the building's ecological footprint. Less transportation also means less traffic congestion, which has the potential to reduce the amount of fuel emission that contributes to air pollution. Locally sourced materials and products have many environmental benefits. They produce less waste by eliminating unnecessary transportation and delivery, therefore reducing the amount of packaging being used. Less packaging means less waste and less demand on landfill sites. Buying local helps reduce pollution, improve air quality and improve health.

Over 35% of construction materials were manufactured in or near Southern Ontario from local manufacturers, reducing the environmental impact of shipping long distances. Aluminum and insulation for the curtain wall was manufactured in Brampton and Milton, Ontario, respectively. Concrete was sourced here in Toronto with raw materials extracted nearby in Southern Ontario, and a portion of the concrete reinforcement came from Whitby, and Cambridge, Ontario.

CERTIFIED WOOD

100% of the wood used on the project was certified by the Forest Stewardship Council as being harvested from sustainably managed forests. The Forest Stewardship Council awards certification to companies who adopt environmentally and socially responsible forest management practices.

The Forest Stewardship Council (FSC) promotes environmentally appropriate forest management, ensuring that the harvest of timber and non-timber products maintains the forest's biodiversity, productivity, and ecological processes. The purchase of FSC certified wood not only contributes to the protection of harvesting process, but is also beneficial to the protection of rare and endangered wildlife. FSC is also the only forest certification system that requires consultation with local Aboriginal Peoples with the intention of protecting their rights on both public and private lands. With respect to the rights of communities and workers, the FSC standard not only requires forest managers to consult with these social groups, but to provide fair compensation; protect their health, safety and livelihoods; and allows them to organize under international labour conventions.



INDOOR ENVIRONMENTAL QUALITY

VOCs (Volatile Organic Compounds) are chemicals contained in many construction materials. They can cause negative health effects by off-gassing into the indoor air. Low VOC products were chosen for the project to reduce initial exposure of construction workers as well as long-term exposure of building occupants. Some of the products used on site with zero or low VOC content include paints, primers, concrete and masonry sealers, duct sealants, silicone sealants and adhesives, drywall compound, and firestop sealants.

LOW OR NO VOC PRODUCTS

- **Hilti CF810 Crack & Joint Foam - 1.9 g/L**
- **Dow Corning 995 Silicone Structural Glazing Sealant - 34 g/L**
- **LaFarge Rapid Coat Pro Joint Compound - 2 g/L**
- **Weicon Flex 310M Adheshive & Sealant - 0 g/L**
- **Ectoflex 646 Concrete Waterproof Coating - 0 g/L**
- **Dulux Lifemaster Interior Acrylic Paint - 1g/L**
- **Benjamin Moore Ultra Spec 500 Interior Latex Primer - 0 g/L**

Urea formaldehyde is another chemical that causes negative health effects. Urea formaldehyde binders and resins are commonly used during the manufacturing process of composite wood products such as plywood and MDF. The construction team used only products and materials that use alternate binders rather than urea formaldehyde.

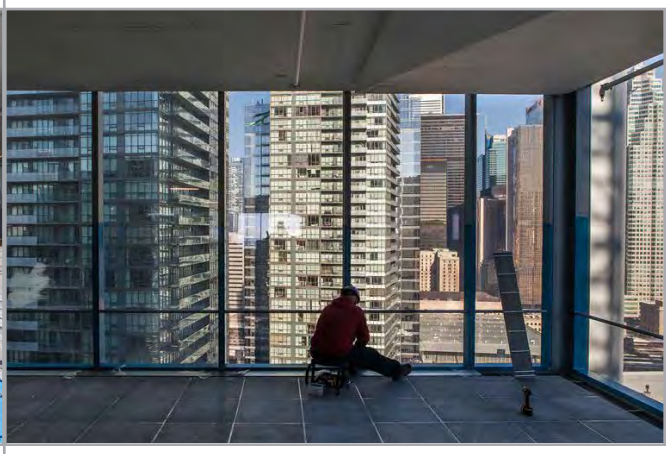
The construction management team developed and implemented an indoor air quality management program for the construction phase to reduce contamination risks of dust, chemicals and moisture. Measures established by the Sheet Metal & Air Conditioning Contractor's National Association (SMACNA) in the "SMACNA Indoor Air Quality Guidelines for Occupied Buildings Under Construction, 1995" document were implemented as part of the indoor air quality management plan. The SMACNA Guidelines provide project management guidance in maintaining good indoor air quality of occupied buildings undergoing renovation or construction. The Guideline covers how to manage the source of air pollutants, control measures, quality control and documentation, communication with occupants and/or site workers. Construction measures implemented included sealing all open duct ends, dedicated work areas including a tent for cutting materials such as the access floor tiles and sequencing material and finish installation so that absorbent materials were not installed until the building was 100% enclosed.

OCCUPANT COMFORT

One York Street provides a comfortable and healthy work environment with an underfloor air distribution system which contributes to heating/cooling efficiency and fresh air delivery effectiveness.

By combining a building's heating, ventilating, and air-conditioning (HVAC) system with all major power, voice, and data cabling into one easily accessible service plenum under the raised floor, significant improvements can be realized in terms of increased flexibility and reduced costs associated with reconfiguring building services.

The effectiveness of the HVAC system is further improved with an integrated CO^2 monitoring system. Outdoor air is provided to the constant volume boxes from four central dedicated 100% outdoor air handling units. The constant volume boxes on each floor are connected to and draw ventilation air from this shaft. The ventilation air is supplied to a



Conditioned air is ducted into the underfloor plenum where it flows freely to the floor diffusers into the space. Air is returned from the room at ceiling level, which produces an overall floor-to-ceiling air flow pattern that takes advantage of the natural buoyancy produced by heat sources in the office and more efficiently removes heat loads and contaminants from the space

Thermal comfort improvement is also a major benefit of underfloor air distribution systems as it allows individual occupants to have some amount of control over their local thermal environment, allowing for accommodation of individual comfort preferences. Each floor is equipped with approximately 200 floor diffusers for occupant controllability and comfort.

compartment unit on each floor which distributes the ventilation air to the office space via the underfloor air distribution system. The constant volume boxes are set to a specific air flow quantity, and the Building Automation System (BAS) monitors the CO^2 levels at each of the six sensors located on each office floor.

Floor to ceiling glass allows for maximum natural light penetration and both direct and indirect lighting as well as spectacular views. Daylight levels are one of several inputs to the state-of-the-art automated lighting control system that is programmed to maintain comfortable lighting levels.

ONE YORK PROJECT TEAM

- Developer – Menkes Development Ltd.
- Construction Manager - EllisDon
- Architect – Sweeny & Co Architects Inc.
- Structural – Stephenson Engineering
- Mechanical – The Mitchell Partnership
- Electrical – Mulvey & Banani International Inc.
- Landscape – NAK Design Group
- Surveyor – R. Avis Surveying Inc.
- Elevator Consultant – Soberman Engineering
- Site Services – MMM Group
- Shoring – Isherwood
- Code Consultant – Leber Rubes Inc.
- LEED® Consultant – Green Reason Inc.