TORONTO
Facilities & Real Estate
Energy & Waste Management

New Building Design Case Study

#43 Police Division – Integrated Design Process

Facility Profile

On Monday, January 16th, 2006, the newly constructed 43Police Division, 4556 Lawrence Ave E., opened its doors to the public. This unique building, which houses both 43Police Division and Emergency Medical Services, has a floor area of 4838 m^2.
An Integrated Design Process was used during the design and planning stage to develop an extremely energy efficient design that will provide comfortable, high-quality working conditions for Toronto's law enforcement and emergency response personnel.

Project Summary	
Project commencement	Dec 2003
Total project cost:	$10,654,000
Estimated CO_2 emission reduction:	250 tonnes/yr
Project Funding: City of Toronto, NRCan, Enbridge	

Integrated Design Process Implementation

The Integrated Design Process employs a whole-building team approach in matching the various building components to attain efficiency and sustainability goals. This results in an efficient building that balances the initial capital investment with long term sustainability goals:

- The two-story structure has abundant patio and balcony space and utilizes the surrounding trees to provide shading to the facility, cutting down on the amount of summer cooling, while blending into the residential neighbourhood.
- The crescent shape was created to capture the prevailing west winds and enhance the cross-ventilation through the linear building. With the building orientated along a north south axis, fresh air and sun penetrates into every office space.
- Rainwater from the building's main roof is collected in raised cisterns and reused for watering plants, particularly a series of vertical vines. This 'Vertical Garden' in front of the west side windows reduces air-conditioning needs in the summer, and heating costs in the winter months.
- Overflow water is captured in a series of eight cascading retention ponds, thus avoiding the use of the city's over-extended storm sewer system.

Building Energy Performance Index (BEPI)

The BEPI is a benchmark that compares the total energy usage per square-meter of floor area of similar police stations in the City's EnergyCAP energy information system. The total energy consumption per square-meter of floor area for the 43 Division is charted against similar police stations. The BEPI for the 43 Division is about20 % less than of the average (195 vs. 240 ekWh per m^2).

Benefits ofIntegrated Design Process

This building is a first prototype model station incorporating Community Based Policing concept with an optimal complement of 300 police staff. It enjoys the benefits of natural surroundings, as well as the efficient architectural design by Nelson Wong Architect Inc.
The building's systems use these energy-saving technologies:

- Occupancy sensors for fresh air
- Heat recovery on exhaust
- Efficient lighting systems
- High efficient condensing boilers for both heat and domestic hot water
- Variable Speed Drives on supply and return fans
- Motorized Variable Air Volume supply boxes and continuous control of fresh air

These technologies have been married to a centralized building control system, which maintains and monitors space conditions. The result is a building that will use 28.8 percent less energy than a typical police station built to building standards mandated by the Model National Energy Code.