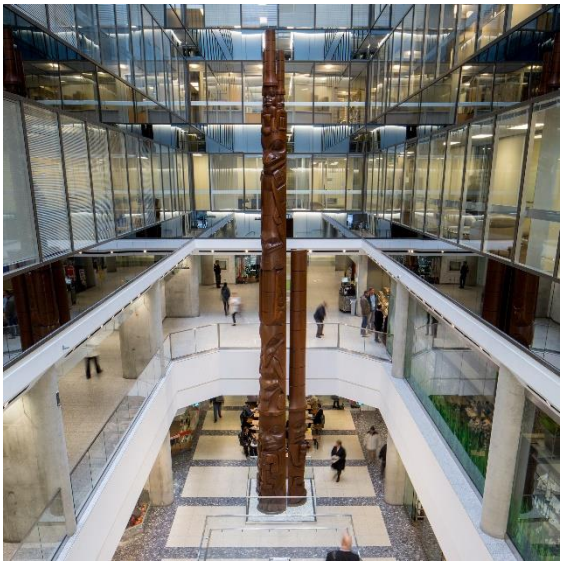
Sustainability Case Study



December 2018

CANDEREL

1. Introduction

777 Bay Street is a Class "A" 30 storey office tower with a two-level retail concourse strategically located at the corner of Bay & College Streets, midway between Toronto's financial core and the Bloor Street corridor. This is one of Toronto's most dynamic neighborhoods with significant recent growth in the commercial, residential and retail sectors. 777 Bay Street is directly connected to the remainder of the College Park complex and is one block from Queens Park, Toronto's hospital corridor and the city's MaRS Medical Research Development. There is a convenient indoor connection to the College subway station and abundant underground public parking is accessible 24 hours per day.

At 777 Bay Street, Canderel is committed to deliver the highest quality of service while minimizing the building's environmental footprint by implementing responsible and innovative property management practices.

The building achieved Gold certification in the Leadership in Energy and Environmental Design (LEED®) for Existing Buildings: Operations and Maintenance (EB:OM) program in 2014. LEED® EB:OM rewards buildings which have successfully implemented green building best practices with respect to environmental protection and human health.

2. Key Environmental Performance Metrics

Through the implementation of environmental initiatives and ongoing performance tracking, 777 Bay Street has significantly improved its environmental footprint, providing tenants with a healthy and efficient workplace. Below is a selection of 777 Bay Street's key performance metrics.

- Energy Star Score: 91 out of 100 (November 2017)
- Water use reduction: 36% relative to LEED baseline
- Water use intensity: 0.59 m^3/m^2/year
- Waste Diversion Rate: 50.7% (December 2017)
- Walkability Score: 99

3. LEED Credit Strategy & Building Environmental Policies

At the time of certification in 2014, a Gold level was achieved with a score of 64 out of a 100. A Gold level is pursued as part of the renewal, with a targeted score of 68 using LEED® EB:OM Version 2009.

The LEED® EB:OM rating system is comprised of five credit categories: Sustainable Sites (SS), Water Efficiency (WE), Energy and Atmosphere (EA), Materials and Resources (MR), and Indoor Environmental Quality (EQ). An additional credit category called Innovation on Operations (IO) addresses sustainable building expertise along with measures not covered by the other categories. Each category includes mandatory credits or "pre-requisite" and optional ones with different points associated with their completion. The allocation of points is based on the potential environmental impacts and human benefits of each credits. The credit strategy for this project was to build on the

previous certification in 2014 and identify new credits that could be pursued. A detailed description of the credits and associated measures that were undertaken are presented below.

3.1 Sustainable Sites

The Sustainable Sites (SS) category rewards environmentally sensitive building design and construction, enabling high-performance building operations to be achieved more easily. The SS category is broken down into eight credits, for a total of 26 points. There are no prerequisites for this category.

The credits pursued in this category are as followed:

- ***SSc4 Alternative Commuting Transportation***. Through this credit, the goal is to reduce dependency on single-occupancy cars and fuel inefficient vehicles. A building occupant survey was performed in April 2018 by Advitek to demonstrate the extent to which alternative transportation methods are used at 777 Bay Street. On April 17th, Advitek interviewed 381 people in the lobby and at the parking shuttle elevators, using handheld computers.

Alternative commuting mode @ 777 Bay St.	**89%**
Public transit	72%
Human-powered conveyance (eg. Walking or biking)	13%
Carpool	3%
Telecommute, compressed workweek	2%

- ***SSc7.1 Heat Island Reduction: Non-Roof.*** The intent of this credit is to reduce the heat island effects in urban centres. Option B was pursued in this case as 100% of 777 Bay Street's parking is located underground. The parking includes 902 spaces located over 3 levels on underground parking.

- ***SSc8 Light Pollution Reduction.*** This credit was not pursued for initial certification. Since then, exterior fixtures have been replaced and meet credit requirements.

3.2 Water Efficiency

The intent of the Water Efficiency category is to reduce both indoor and outdoor potable water consumption of a property through the promotion of conservation measures, dedicated policies, water efficient fixtures and responsible irrigation practices. This category has four credits and one prerequisite, for a total of 14 points.

The plumbing fixtures installed at 777 Bay Street's include toilets, urinals, lavatory faucets, and kitchen faucets. Toilets at the building are generally original to the building's construction. No major fixture replacements have occurred since initial certification.

777 Bay Street meets the requirements of the prerequisite *Water Metering and Minimum Indoor Plumbing Fixture and Fitting Efficiency* since a water meter (City of Toronto) is permanently installed to measure the total potable water use of the entire building and associated grounds. The meter is located in an underground mechanical room. Water consumption is recorded automatically each month by the City of Toronto and tracked on a monthly basis by Canderel through the Energy Star Portfolio Manager online platform.

The following credits were pursued under this category:

- ***WEc2 Additional Indoor Plumbing Fixture and Fitting Efficiency***. A water audit was performed in June 2018 to assess indoor fixture efficiency. 777 Bay Street's average water intensity is 0.59m^3/m^2/year, which exceeds REALpac's top 25% of commercial buildings (0.61m^3/m^2/year). The audit shows that 58.1% of the building's total potable water use comes from fixtures and fittings and 29.5% from retail tenants.

Water fixtures	Model & Performance
Washroom lavatory	Sloan & Toto faucets (American Standard)
AODA Washroom lavatory	Murro Wall Mounted Sink (American Standard Electronic Faucets)
Water closet	AFWALL Aquameter American Standard & AFWALL Millenium
AODA Water Closet	Afwall Wall Mounted with Sloan Automatic Flushometer 6 LPF (American Standard)
Urinal	Water-less Urinals WES-1000-STG

3.3 Energy & Atmosphere

The Energy and Atmosphere credit is one of the most important credits with a total of 35 points available. The intent of this credit is to reduce energy consumption in buildings, increase on-site and off-site renewable energy generation and reduce ozone layer depletion and global warming gas generation. The EA category is comprised of six credits and three pre-requisites.

Electricity at 777 Bay Street is supplied by Toronto Hydro and natural gas by Enbridge. Electricity is consumed by lighting, plug loads, data centres, domestic hot water and HVAC equipment. The natural gas consumed is for space heating and humidification.

To meet the requirements of the prerequisite *Energy Efficiency Best Management Practices*, an ASHRAE Level I audit was conducted on July 2018 as part of a retro-commissioning exercise and the property' sequence of operations was documented. 777 Bay Street meets the requirements of the prerequisite *Minimum Energy Efficiency Performance Option A* with an Energy Score of 91, far exceeding the required 69. Finally, 777 Bay Street is compliant with the pre-requisite *Refrigerant Management: Ozone Protection* as no CFC-based refrigerants are used in the HVAC systems.

The following credits were pursued:

- ***EAc1 Optimize Energy Performance***. This credit was rewarded with 16 points as the building's Energy Star Score is 91. The building implements a range of energy efficient strategies:

High-efficiency boilers
Motion sensors in stairwells, elevator lobbies and core washrooms
Water balancing valves on Deep Lake Cooling System
Conversion to LED exit lights
Lighting upgrade in retail areas, parking ramps and portion of mechanical rooms
Variable Frequency Drives on rooftop Air Handling Units
Optimization of HVAC and fan schedules

- ***EAc2.1 Existing Building Commissioning*: Investigation and Analysis**. To achieve this credit, a retro-commissioning study was launched in March 2018 to document the breakdown of energy use in the building and identify operational and capital energy saving measures. The Retro-Commissioning report was issued in July 2018.

- ***EAc2.2 Existing Building Commissioning: Implementation***. A selection of no- or low-cost operational improvements were implemented at 777 Bay Street including revising chilled water pump control and relocating 3rd floor FCU chilled water piping. Other measures have also been incorporated into the building's capital plan including recalibrating or replacing Carbon Monoxide (CO) Sensors, installing a VSD on Glycol Pump P-17, installing VSDs on Main Hot Water Circulating Pumps (P-10 and P-44) and replacing existing T12 & T8 fluorescent lighting with LED.

- ***EAc2.3 Existing Building Commissioning*: Ongoing Commissioning.** Based on the retro-commissioning study an ongoing commissioning program has been implemented. It includes elements of planning, documentation, system testing, performance verification and ongoing measurement to proactively address operating problems. The program will be updated regularly to reflect any changes of the building operating systems and procedures.

- ***EAc5 Enhanced Refrigerant Management:*** The building uses deep lake cooling technology, which meets credit requirements.

  EAc6 Emissions Reduction Reporting. A greenhouse gas emissions report was created to document emissions reductions delivered by energy efficiency, renewable energy and other building emissions reduction. The building will also participate in a voluntary GHG registry with a third-party certification.

3.4 Materials & Resources

The goal of the Materials and Resources credit category is to encourage sustainable purchasing practices and comprehensive waste management programs for existing buildings and promote recycled content and rapidly renewable materials. This category includes two prerequisites and 4 credits, for a total of 10 points.

777 Bay Street adopted a *Sustainable Purchasing Policy* and *Solid Waste Management Policy* to meet the requirements of the two pre-requisites. Canderel's goals at 777 Bay Street include:

- Divert from landfill or recycle at least 50% of the ongoing consumables waste stream
- Collect and recycle at least 80% of batteries used
- Collect and recycle all discarded fluorescent light bulbs
- Divert or recycle at least 75% of the durable goods waste stream

The following credits were pursued as part of the Materials and Resources category. These credits aim at reducing the environmental and air quality impacts of the materials and food acquired for use in the operations and maintenance of the building.

- ***MRc4 Sustainable Purchasing*: *Reduced Mercury in Lamps.*** The purpose of this credit is to reduce the amount of mercury brought in the building through purchases of lamps. To meet credit requirements, 777

Bay Street established a purchasing plan which requires that at least 90% of purchased lamps comply with the overall average mercury content target of 90 picograms per lumen-hour or less.

- ***MRc5 Sustainable Purchasing: Food***. As part of this credit, Canderel ensured that at least 25%of the total combined food and beverage purchases at 777 Bay Street is purchased within a 160 km radius of the building.

- ***MRc6 Solid Waste Management****: Waste Stream Audit.* A comprehensive waste audit was conducted in December 2017 to identify the types of waste and their respective volumes. The audit identified a diversion rate of 50.7%, a capture rate of 62%. Several opportunities for improved waste management practices at the building were identified, including the following:

    - Ensure recycling signage is available to all tenant spaces.
    - Continue to provide regular education and training to the office tenants, food service tenants and building staff.

- ***MRc8 Solid Waste Management: Durable Goods***. Canderel employs a third party to collect durable goods from 777 Bay Street. Tenants are made aware of the durable goods recycling program and if any of the specified items are not being used anymore and require disposal, the tenant clearly marks the item as durable goods waste and the contracted cleaning staff collect the obsolete electronic waste from the tenants and deposit the material into the designated area located in the loading dock for pick up.

3.5 Indoor Environmental Quality

Through the Indoor Environmental Quality (IAQ) category, property management teams can improve tenant comfort by providing a healthier work environment through effective ventilation, reduced exposure to harmful pollutants and regular occupant surveys. This category is comprised of three main credits and three prerequisite, for a total of 15 points.

The following measures were undertaken to comply with the pre-requisites:

- Prohibition of smoking within 7.5 meters from entries, outdoor air intakes and operable windows
- Establishment of minimum indoor air quality performance
- Implementation of a green cleaning policy

In addition to meeting the pre-requisites, the following credits were pursued under this category:

- ***EQc1.1 IAQ Best Management Practices: IAQ Management Program***. A dedicated indoor air quality management program was created at 777 Bay Street to optimize practices preventing the development of air quality problems. IAQ inspections are incorporated into the building's preventative maintenance program. Periodically, mechanical equipment including supply and exhaust fans as well as humidification equipment are maintained to check that equipment is operating in a way that does not negatively impact indoor air quality. In addition, the property manager engages a third-party firm on an annual basis to assess the indoor air quality at 777 Bay Street. The property uses an automated preventative maintenance system, Angus Anywhere, to receive and respond to IAQ complaints from building occupants. Tenants can submit IAQ complaints online or by calling the building service centre. An indoor air quality audit was performed in June 2018 by Resource Environmental Associates Ltd., following the EPA's I-Beam model. Only a few minor issues were identified. The following recommendations were implemented in the building:
    - Replacement of missing pre-filters and filters

- Cleaning of fan rooms
- Greasing bearing for noise issues with fans in AHUs 10, 21, 28.

Additionally, a low VOC paints and shipping and receiving protocols have been implemented and incorporated into tenant manuals.

- ***EQc1.4 IAQ Best Management Practices: Reduce Particulates in Air Distribution***. 777 Bay Street has a building-specific preventative maintenance management program called Angus Anywhere. This program schedules and creates work orders for all preventative maintenance within the building, including HVAC maintenance and filter replacement. It will generate work orders for fan maintenance on a quarterly basis at which point filters will be inspected. MERV 13 filters were installed to reduce exposure of building occupants to potentially hazardous particulate contaminants.

- ***Green Cleaning.*** 777 Bay Street implemented a comprehensive green cleaning strategy allowing the property to meet the requirements of most of the green cleaning credits in this category, including staff training, and use of certified cleaning products.

- ***EQc3.1. Green Cleaning: High-Performance Cleaning Program.*** To meet credit requirements, 777 Bay Street established a high-performance cleaning program supported by a green cleaning policy. The intent is to reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants.

- ***EQc3.3. Green Cleaning: Purchase of Sustainable Cleaning Products and Materials***: At 777 Bay Street, over 90% of cleaning products used are sustainable.

Products	Sustainability Criterion
Trash bag products	U.S. EPA CPG for Janitorial Paper and Plastic Trash Can liner
Janitorial paper	U.S. EPA CPG for Janitorial Paper and Plastic Trash Can liner
Carpet stain remover Avmor EP62	Environmental Choice CCD-148
Biomor Heavy Carpet Cleaner	Environmental Choice CCD-148
Biomor Heavy Duty Drain Maintainer	Environmental Choice CCD-148
Floor Finish Avmour EP81	Environmental Choice CCD-146
Stainless Steel Cleaner Polish Avmor EP60	UL 2792
Multi-Use Cleaner Avmor EP64	UL 2792
Multi-Purpose Cleaner Enivormore	UL 2792
Ecopure Cream Cleanser Avmor EP76	UL 2792
Ecopure Heavy Duty Washroom Cleaner Avmor EP77	Environmental Choice CCD-146
Cleaner Disinfectant Avmor EP 50	Environmental Choice CCD-146
Bathroom cleaner Avmor EP74	Environmental Choice CCD-146
Safeblend Hand and Body Soap	Environmental Choice CCD-104

- ***EQc3.5. Green Cleaning: Indoor Chemical & Pollutant Source Control***: Exterior walkways are kept clean by daily sweeping (manual shoveling as required in winter) and vacuuming of entryway walk off mats. Entryway floors, grates and mats are cleaned daily or more frequently, if required, by the contracted cleaning staff. These areas are kept clean by sweeping grates, mopping floors and vacuuming mats.

3.6 Innovation in Operations

- ***IOc1.4. Green Building Education Program***
  To educate occupants, visitors and the general public about the environmental and human health benefits of green building practices, and the specific measures that have been incorporated into the operation and maintenance of 777 Bay Street, and how building occupants can help maintain and improve the performance of the building and reduce the environmental impact of their own personal activities. An actively instructional green building education programs have been implemented at 777 Bay Street. This initiative is implemented by the Canderel operations and management team, as part of its "On the Green Path" program:
  - A quarterly newsletter distributed to all tenants at 777 Bay Street, includes both information regarding the building's performance, highlights key sustainability initiatives that the building is involved with, and provides tips on how they can implement at work and at home to be more "green".
  - This case study will be made available to all tenants at 777 Bay Street.

- 777 Bay Street pursued several exemplary Performance credits including "Heat island reduction: non-roof" for the covered parking, "Additional Indoor Plumbing Fixture & Fitting Efficiency" with at least 35% less potable water used for plumbing fixtures than the LEED baseline and "Green Cleaning: Purchase of Sustainable Cleaning Products and Materials" with more than 90% of purchased cleaning products meeting credit requirements. As well, "Documenting Building Cost Impact" is being pursued, by providing 5 years of operating costs.

4. LEED Project Timelines

During the LEED Performance Period, the building management team in partnership with the LEED consultant coordinated the collection of data from building service providers and contractors. Data was gathered monthly in order to verify that the project remained on track for its certification target.

Quarterly “status report” meetings were held with the project team to review action items and check-in on project progress.

Milestones	2018												2019			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	...
LEED Recertification																
Recertification Kick-off																
Recertification Documentation Period and Ongoing Credit Tracking*																
Energy Star Performance Period (Dec. 2016-Nov 2017) - CaGBC Grandfathering Allowance																
Performance Period for Newly Pursued Credits (3 months)																
WSP Documentation Reviews and Status Reports																
LEED-EB Application Preparation																
CaGBC Review and Team Response*																
Additional Services for LEED-EB																
Transportation Survey (existing survey expires June 2018)																
Water Audit (existing audit expires October 2018) - parallel with retro-commissioning																
Outdoor Air Calculations and Measurement (existing assessment expires Oct 2018)																
Waste Audit (existing audit expires April 2018, performed Dec 2017)																
Emissions Reduction Reporting																
IBEAM Indoor Air Quality Audit (existing audit expired June 2018)																
Task Lighting Survey																
Green Education Program																
Retro-commissioning and OpSaver Incentive																
Information Gathering and Update Building Operating Documents																
Investigation and Opportunity Analysis (existing audit expires October 2018)																
Develop Ongoing Commissioning Plan																
Measurement and Verification Support for OpSaver Incentive																
Apply for OpSaver Milestone Incentive																
Implement Low- and No-cost Energy Conservation Measures																

Estimated Certification: Q3 2019

*Recertification Performance Period: October 2014 to December 2018. Documentation period (last 25%): December 2017 to December 2018.

5. LEED Project Team

Project Management Team	Canderel	Audrey Parkinson, General Manager Diane Horvat, Senior Property Manager Randall Bugg, Director of Technical Services Caroline Bordeaux, Director of Sustainability Romain Stephano, Energy and Sustainability Analyst
	Forgestone	David Becket, Vice-President, Asset Management
LEED Consultants	WSP	Matthew Hirsch, Project Director Priscilla Chew, Project Manager Kristen Jaczko, Project Associate
Engineering (energy, water)	WSP	Alexander Crandall, Project Manager Tiphany Monplaisir, Project Analyst
Engineering (air quality)	REA	John Murphy, President
Transportation Consultants	Advitek	Joyce Rees, President