Office Building

Ryerson University

101-111 Gerrard St. East, Toronto
AGENDA

01
PROJECT OVERVIEW
Site analysis, design goals and constraints

02
ARCHITECTURE
Floorplan, design, and occupant comfort & IEQ

03
ENGINEERING
Structure, enclosure, and mechanical

04
ENERGY PERFORMANCE
Energy modelling

05
COSTS AND SAVINGS
Project cost and savings analysis

06
LIFE CYCLE ASSESSMENT
Life Cycle Assessment results
01 Project Overview

Location: 101-111 Gerrard Street East, Toronto, ON

Site Owner: Ryerson University

Climate Zone: ASHRAE 5A

Lot Size: 13251.94 ft² (1231 m²)

Building Size: 70,683 ft² (6566.67 m²)

Occupancy: 320 people (220 ft² per person)

Projected Costs: $304.86USD/ft² ($380.66 CAD/ft²)
Project Goals

- Net-Zero Energy
- Foster Social Interactions
- Promote circularity
- Resilient and durable
- Aesthetically pleasing
- Inspiring
Project Constraints

CLIMATE
Cold climate that requires high-performance enclosures

AIR QUALITY
Pollutants in a busy downtown area pose health risks

SITE LIMITATIONS
Limited solar potential.
Retail Space

1st floor layout & zoning
The Atrium

2nd, 3rd, 4th floor layout
Promote physical activity

Foster physical and mental health

Ensure healthy indoor air quality
Mass Timber

- Lower embodied carbon
- Structurally sound
- Largely prefabricated
- Faster onsite construction
- CLT panels and Glulam beams
Enclosure

Opaque Wall - R38

Below-Grade Wall - R40

Green Roof - R53

Low-Slope Roof - R52
Enclosure

Roof-Opaque Wall
Ψ = 0.121 W/mK

Opaque wall-floor
Ψ = 0.038 W/mK

Curtain-wall Footer
Ψ = 0.301 W/mK

CLT Total water content over 3 years
Mechanical Engineering

Heating and Cooling:
VRF and Geothermal with Ground Source Heat Pump

Ventilation:
DOAS with ERV
Mechanical Engineering

Photovoltaic System

- Electricity Demand: 463,331 kWh/year
- Produced Onsite: 295,358 kWh/year
- Produced on Pitman Hall building: 490,560 kWh/year
- Total Electricity Produced: 785,918 kWh/year

Water Management

- Building-Level Metering
- Rainwater Harvesting
- High-Efficiency Water Fixtures: (7% reduction)
- Water-Efficient Toilets: (6% reduction)
Project EUI: 25.67 KBtu/ft²
Energy Performance Results

Energy Consumption kbtu

- Heating: 83%
- Cooling: 28%
- Interior Equipment: 7%
- Interior Lighting: 77%
- Fans & Pumps: 78%
Total Project Cost

$21,315,043.60 USD

$304.86 USD Per ft²
Annual Savings

Electricity
170%

$66,640
Total Annual Operational Savings

Water
23%
06 Life Cycle Assessment

Total Emissions
3,397 T CO₂e

Emissions Intensity
30.32 lb CO₂e / ft²

148 Kg CO₂e / m²
The Team

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The Team
THANK YOU

Any questions?

Ryerson University

Sprout Building Team
References