DESIGN DEVELOPMENT STAGE ENERGY MODELING REPORT

Grosvenor and Grenville – North Tower

26 Grenville and 27 Grosvenor, Toronto, ON

November 11, 2020

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Issued for:

SPA / Toronto Green Standard

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EXECUTIVE SUMMARY

EQ Building Performance has created an energy model for Grosvenor and Grenville, located in Toronto, Ontario, for the purposes of TGS V3.0 Tier 1 compliance.

The project is currently on track to achieve TGS V3.0 Tier 1 compliance, using NECB 2015 as amended by Supplementary Standard SB-10 Division 3 - Chapter 3.

Table i - Savings Summary

Metric	% Savings	Tier 1 Compliance?	OBC Compliance?
Energy Use	19.59%	Yes	Yes
Peak kW	9.91%	Yes	Yes
Carbon Emissions	24.05%	-	Yes

Effective May 1 2018, version 3 of the Toronto Green Standard will come into effect. The new version of the Toronto Green Standard includes a shift from a percent better than reference building approach to new absolute targets. The Grosvenor and Grenville project has been evaluated against these targets in order to give guidance on how the current design features will fare under the new standard.

Table ii - Building Performance Summary

Metric	Proposed Design	Tier 1	Tier 2
Energy Use Intensity (kWh/m^2)	174.7	170	135
Thermal Energy Demand Intensity (kWh/m^2)	44.6	70	50
Green House Gas Intensity (kgCo2/m^2)	21.3	20	15

The key energy efficiency measures that contribute to this performance are as follows:

- High performance glazing: low-e coating, thermally broken Al frames, Argon fill, warm edge spacers
- Window-wall-ratio of approximately 49% (vision glass only)
- Lighting levels as per NECB 2015 as modified by SB-10
- In-suite energy recovery ventilators, amenity and retail heat recovery ventilators
- Hot water, chilled water fan coils serving suites, lobbies and amenity areas
- ECM motors on all fan coils
- High efficiency, variable speed chillers and 95% efficiency condensing boilers

Contents

1. PROJECT SUMMARY

Building Description:

Grosvenor and Grenville is a multi-unit residential development that will be located in Toronto, Ontario. The project consists of two high-rise towers, north and south, with a shared podium, underground parking and associated amenity areas. The north tower is a 31-storey tower and the south tower is a 46-storey tower. The podium and parking levels have been split between the north tower and south tower as per the architectural drawings. This report is for the north tower.

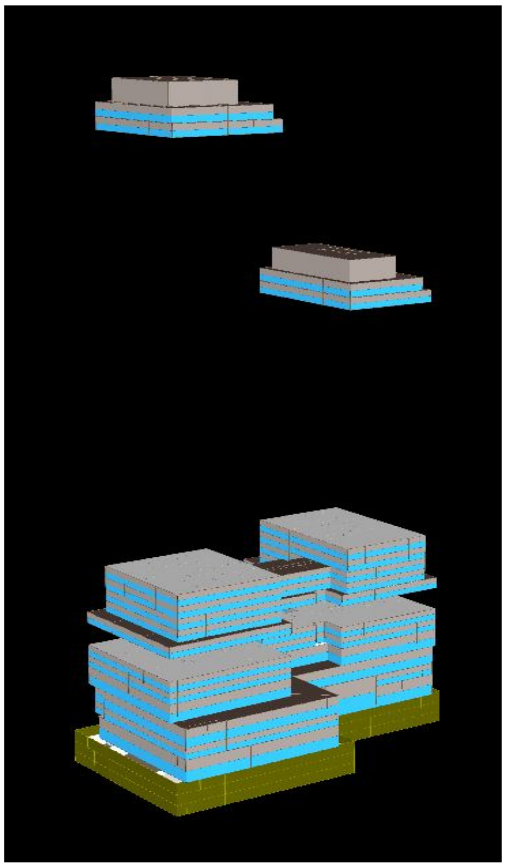

Figure 1 - eQuest Building Rendering

Key characteristics of the energy model are as follows:

Use/Occupancy:	Residential / Amenity / Retail
Project Stage:	SPA / Toronto Green Standard
Nominal Size:	29,704 m^2
Modeled Size:	27,635 m^2*
Suite Count:	292
Climate Zone:	Toronto (5A)
Weather File:	Toronto, ON CWEC
Lighting Method:	Space type
Key Schedules:	MNECB G – Residential MNECB C – Retail/Amenity

*Modeled square footage may vary slightly from the actual GFA due to modeling rules that exclude certain non-heated or non-regulated spaces, exclusion of some shafts and wall cavity space, and variation in measurement techniques from official site statistics. Nominal size may equal modeled size if architectural statistics are not available.

Project Goals:

The energy efficiency goals relevant to the project throughout its timeline are presented in Table 2. The intent of this report is to analyze only goals that are indicated below.

Table 1 - Project Energy Efficiency Goals

Goal	Requirement / Compliance method
TGS Tier 1 v3	1. 15% reduction over OBC SB-10 Division 3 (GJ) Summer & Winter peak electricity better than OBC SB-10 (kW) **OR** 2. Meet the absolute EUI (ekWh/m^2), TEDI (ekWh/m^2) and GHGI (kg CO_2e/m^2) targets.

2. BACKGROUND

Building energy modeling provides a means to simulate building energy performance during the design stage of a project to quickly and effectively evaluate the impact of various design measures on building energy performance. In addition, building energy modeling allows the predicted building performance to be evaluated against key benchmarks such as the National Energy Code for Buildings (NECB), and ASHRAE 90.1.

Relevant Terms:

EUI:	Energy Use Intensity (ekWh/m^2)
TEDI:	Thermal Energy Demand Intensity (ekWh, demand of the building
GHGI:	Green House Gas Intensity (kg CO_2e/m^2)

The use of energy simulation software for benchmark comparison is recognized by programs such as the CaGBC's LEED Rating System, as well as to demonstrate compliance with Ontario Building Code SB-10, and Toronto Green Standard Tier 1 and 2.

EQ Building Performance has been retained to assess the building energy performance using building energy simulation software, and to suggest design alternatives to achieve optimal energy savings where appropriate.

3. METHODOLOGY

The building was modeled using eQuest 3-65 energy simulation software. eQuest is a widely-recognized hourly energy analysis program based on the DOE-2.2 software engine. Energy modeling was performed under the general techniques recognized in the following documents:

- NECB 2015
- Performance Compliance for Buildings, Specifications for Calculation Procedures for Demonstrating Compliance to the Model National Energy Code for Buildings Using Whole-Building Performance (May 1999);
- LEED Canada 2009 Supplementary Energy Modeling Guidelines; and
- ecoEnergy EE4 software modeling guide.

The following project specific documents were used to develop the energy model:

- Architectural drawings prepared by *Sweeny&Co Architects;* dated November 9, 2020
- Mechanical drawings prepared by *SNC Lavalin;* dated October 31, 2018

Additional assumptions may have been used to fill in gaps in information, based on modeling experience and knowledge of building systems.

4. RESULTS SUMMARY

A summary of the proposed building design performance can be seen in Table 3.

Table 4 provides an assessment of the building performance relative to the project goals.

	Proposed	Tier 1	Tier 2
EUI	174.7	170	135
TEDI	44.6	70	50
GHGI	21.3	20	15

Table 2 - Proposed Design Summary

The results indicate that the proposed building design is **compliant with Ontario Building Code SB-10 Division 3 and TGS Tier 1.**

A detailed breakdown of energy usage can be found in Appendix A, and a detailed list of model inputs is provided in Appendix B. It is the responsibility of the design team to review these appendices and ensure all assumptions are accurate, or represent a *conservative* estimate of energy use.

Table 3 - Project Performance Summary

Metric	Baseline Design	Proposed Design	% Savings	OBC Compliance	Tier 1 Compliance
Energy Use (GJ)	21,616	17,382	19.59%	Yes	Yes
Peak (kW)	566.6	510.4	9.91%	Yes	Yes
Carbon Emissions (kg)	775,754	589,162	24.05%	Yes	-

5. Detailed Simulation Results

Table 4- Detailed Results Breakdown

End Use	Baseline Energy Use (GJ)		Proposed Design Energy Use (GJ)		Savings
	Electricity	Natural Gas	Electricity	Natural Gas	
Lighting	2,265		2,265		0.0%
Misc. Equipment	1,809		1,809		0.0%
Heating	28	8,492	15	5,037	40.7%
Cooling	1,299		1,268		2.4%
Pumps	788		641		18.7%
Fans	2,317		1,791		22.7%
Domestic Hot Water		4,598		4,535	1.4%
Exterior Lights	20		20		0.0%
Total	21,616		17,382		19.6%
Total Cost	$451,800		$396,000		12.4%

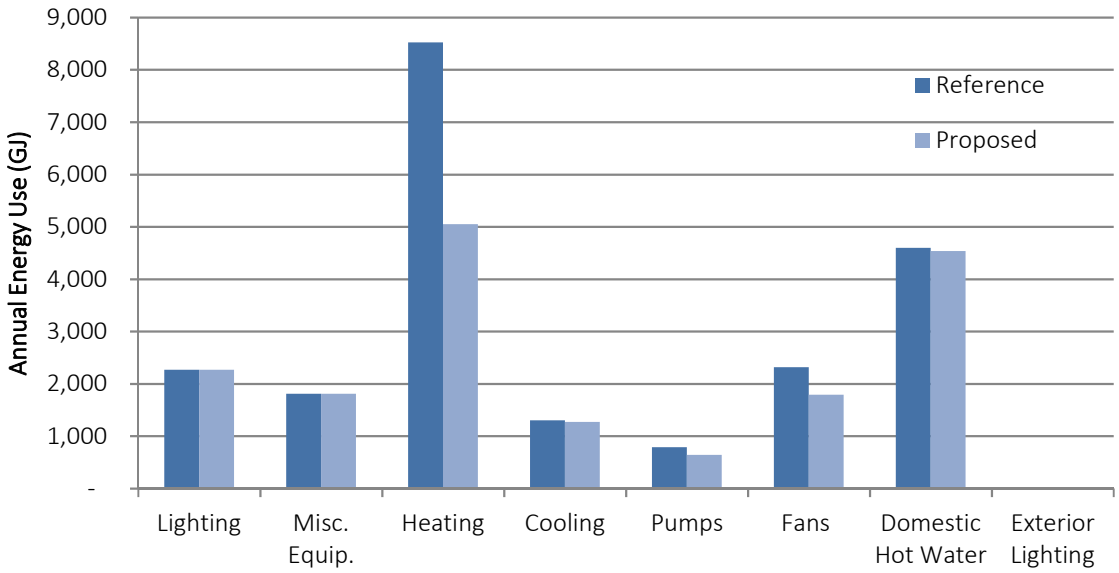

Figure 2 - Detailed Annual Energy Use (GJ)

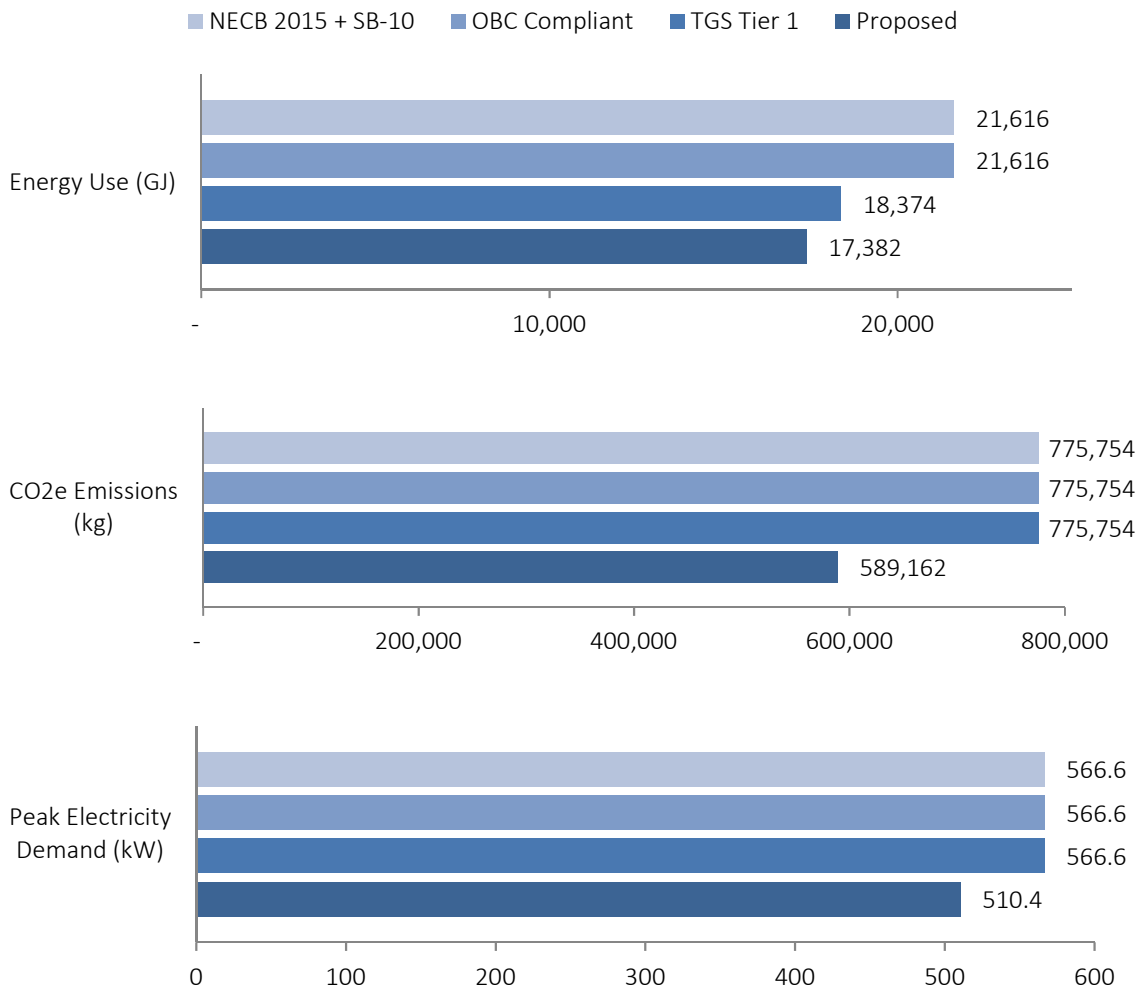

Figure 3 - Detailed Performance Analysis

6. Responsibilities and Next Steps

A detailed breakdown of energy usage can be found in Appendix A, and a detailed list of model inputs is provided in Appendix B.

The ability of a building design to achieve the stated project goals remains the responsibility of the design team. The design team should review the report and appendices to ensure all inputs and assumptions are accurate, or represent a *conservative* estimate of performance.

In addition, the architect, mechanical and electrical engineer must ensure the mandatory requirements of the NECB 2015 are met with the building design. Mandatory requirements checklists will be provided by EQ Building Performance but must be filled in and signed by the design team.

Review of product submittals, shop drawings and substitutions are not within the scope of this energy modeling exercise. It is the responsibility of the project team to determine whether or not deviations from the inputs included in this report will negatively impact Ontario Building Code SB-10 compliance.