



**APPENDIX-A1 (Absolute Performance Targets Pathway)**  
**Better Buildings Partnership**  
**TORONTO GREEN STANDARD**  
**Energy Efficiency Report**



**PROJECT INFORMATION:**

Project Address: 1500 Bayview Ave, Toronto, Ontario  
 SPA Number: \_\_\_\_\_  
 Date(dd-mm-yyyy): 29/09/2020  
 Building Type (Please Select): High-Rise Multi-Unit Residential Buildings

Total Modeled GFA (m<sup>2</sup>): 15,948.5  
 High-Rise Multifamily Residential GFA (m<sup>2</sup>): 14,322.8  
 Low-Rise Multifamily Residential GFA (m<sup>2</sup>): 0.00  
 Commercial Office GFA (m<sup>2</sup>): 0.00  
 Retail GFA (m<sup>2</sup>): 1,625.7  
 Non-Archetype GFA (m<sup>2</sup>) *If applicable*: 0.00

**Energy Modeller Information:**

Company Name: EVNA Services Contact Person: Ryan Evans, P.Eng  
 email: ryan.evans@evna.ca Telephone # 416-900-8822 x 1001

**Architect Information:**  
 Company Name: Quadrangle Contact Person: Ossie Airewele  
 email: airewele@quadrangle.ca Telephone # (416) 598-1240 x 367  
 Energy Simulation Software Used: eQUEST v3.65-7175 DOE 2.3

TGS Benchmark Matrix	Proposed Building					Estimated Savings		Notes					
	SB10	Tier-1	Tier-2	Tier-3	Tier-4	Measures	Electrical Annual Consumption (kWh)		Natural Gas Annual Consumption (kWh)	EUI kWh/m <sup>2</sup>	TEDI <sup>b</sup> kWh/m <sup>2</sup>	GHGI <sup>a</sup> kgCO <sub>2</sub> e/m <sup>2</sup>	Total Annual Energy Savings (kWh) <sup>c</sup>
EUI kWh/m <sup>2</sup>	225	170	135	100	75	Lighting	377,148	0.00	143.5	40.0	17.7	1,299,582.56	163.8
TEDI kWh/m <sup>2</sup>	80	70	50	30	15	Misc. Equipment	288,958	0.00					
GHGI kgCO <sub>2</sub> e/m <sup>2</sup>	28	20	15	10	5	Space Heating	2,164	642,884.86					
						Space Cooling	102,206	0.00					
						Heat Reject	2,326	0.00					
						Pumps	65,215	0.00					
						Fans	164,865	0.00					
						Service Hot Water	0	643,036.63					
						Other	0	0.00					
						<b>Total</b>	<b>1,002,882.11</b>	<b>1,285,921.48</b>					
<b>Total Annual Heat Demand - for TEDI</b> <b>637,573.32</b> kWh <i>Please see Appendix-C for the calculation</i>													

Remarks: TGS TARGET MET Tier<sup>d</sup>: Tier-1

a. GHGI is automatically calculated using the emission factor extracted from SB10 (0.05kg of CO<sub>2</sub>/kWh Electric & 1.899kg of CO<sub>2</sub>/m<sup>3</sup> Nat. gas). (1m<sup>3</sup> = 10.5ekWh)  
 b. TEDI value must be input. See Energy Terms of Reference and Modelling guideline V3 for TEDI definition. Supporting calculation required to review TEDI value.  
 c. Total Annual Energy Savings and GHGI Tons of CO<sub>2</sub> Saved is the sum of Annual Electrical and Natural Gas in comparison with the estimated typical SB-10 Building.  
 d. Absolute targets and level of Tier achieved will be verified with relevant supporting documents.  
 e. Non Archetype Reference Target only required if modelled GFA of the non-archetype portion is greater than 10% of the GFA for the whole building refer section 5.6. Mixed Use building in the modelling guideline.

I hereby certify that the proposed energy consumption and TEDI are properly representative of the Energy Modelling Report submitted for the above project.

Energy Modeller Name: Ryan Evans, P.Eng  
 Signature:

Architect Name: Richard Witt  
 Signature:

## APPENDIX-B1

# Better Buildings Partnership - Toronto Green Standard Energy Modelling Simulation Summary Report - Absolute Performance Targets Pathway

Date( dd-mm-yyyy):

29/09/2020

Project Description:

The proposed 1500 Bayview project is a 9-storey mid-rise multi-residential tower having a Buildable Floor Area (BFA) of approximately 21,589 m<sup>2</sup> (232,302 ft<sup>2</sup>), and is located in Toronto, Ontario. The Modeled Floor Area (MFA) which excludes parking areas and is used to calculate the EUI, TEDI and GHGI metrics was calculated to be approximately 15,948 m<sup>2</sup> (171,606 ft<sup>2</sup>).

Project's key energy efficiency measures proposed:

- Low window to wall ratio (approximately 32%)
- High efficiency condensing HW boilers and Domestic Hot Water (DHW) heaters
- In-suite ERVs
- High performance building envelope.

**Provide a complete summary of energy simulation inputs and assumptions, referencing the relevant plans, drawings or reports.**

Location:

Toronto, Ontario

Building Sector:

Multi-Unit Residential Building (≥4 Storeys)

Space Use Classification:

Residential (dwelling units, amenity spaces, corridors/lobbies) | Retail on ground floor | Underground parking

Simulation Software Used:

eQUEST 3.65-7175 DOE 2.3

Modeled Gross Floor Area (square meter):

15,948.5

No. of Floors:

9

Gross Exterior Wall Area (Sq.meter):

7,265.9

Gross Exterior Window Area (Sq.meter):

2,348.0

Window-Wall Ratio:

32%

Gross Roof Area (Sq.meter):

2,162.2

Skylight Area (if applicable) (Sq.meter):

0.0

Skylight-Roof Ratio (if applicable):

0%

Passive Design Measure Description:

\* R-Value in F-sqft-hr/BTU

**Exterior Wall**

Wall Type:

		Overall R-Value	Thermal Layer Description / Reference
Wall Type 5C: Aluminum Cladding, Steel Stud Backup	Assembly	Nominal: Effective:	<b>Nominal: R-28.1</b> <b>Effective: R-14.9</b>
	Clear Field	R-21.7	50mm semi-rigid insulation (Nominal R-8)   152mm batt insulation (Nominal R-20)
	Balcony at Opaque Wall	Psi-0.445 (BTU/h-ft-°F)	Architectural Drawing Reference: 3/A651
	Balcony at Window-Wall	Psi-0.974 (BTU/h-ft-°F)	Architectural Drawing Reference: 3/A652
	Partition & Ext Wall Junction	Psi-0.014 (BTU/h-ft-°F)	Architectural Drawing Reference: 11/A652
	Shelf angle	Psi-0.197 (BTU/h-ft-°F)	Architectural Drawing Reference: 7/A651

**Roof**

Roof Type:

		Overall R-Value	Thermal Layer Description
Roof Type R2	Assembly	Nominal: Effective:	<b>Nominal: R-30</b> <b>Effective: R-23.1</b>
	Clear Field	R-23.1	50mm rigid roof insulation (Nominal R-10)   100mm rigid roof insulation (Nominal R-20)
	Parapet	Psi-0.260 (BTU/h-ft-°F)	Architectural Drawing Reference: 14/A651

**Floor**

Floor Type:

	Overall R-Value		Thermal Layer Description
N/A	--	--	No exposed floor applicable

**Windows**

\* U-Value in BTU/sqft-F-hr

Window Type:

	Overall U-Value	Shading Coefficient (SHGC)	Description
Vision Glass	0.34	0.40	Applies to all window systems and glass doors. Includes frame and glazing

### **Lighting**

*Fixture Types:*  
*Lighting Power Density (W/sq.ft):*  
*Light schedule:*  
*Lighting Controls:*

LED
0.47
A, B, C, G and K (NECB 2015 Table A-8.4.3.2.(2)-A)
Not modeled

### **Other Equipment Load**

*Equipment Description:*  
*Equipment Schedule:*  
*Peak Load Density (W/sq.m):*

Plug Loads and Elevator Load
Plug Loads: A, B, C, G and K (NECB 2015 Table A-8.4.3.2.(2)-A)   Elevator Load per BC Hydro Energy Modelling Guideline
0.28

### **HVAC**

#### **Plant**

*Central Cooling Type:*  
*Capacity (Tons):*  
*Efficiency (COP):*  
*Primary Cooling Pumps:*  
*Cooling Tower:*  
*Central Heating Type:*  
*Capacity (MBH):*  
*Thermal Efficiency:*  
*Primary Heating Pumps:*

One (1) Centrifugal water-cooled water chiller							
137							
6.08							
<i>Head(ft)</i>	115		<i>Power(hp)</i>	15 (VFD)	<i>GPM</i>	275	
Open axial fan cooling tower							
Two (2) condensing gas fired boilers							
1,256 MBH/unit							
96%							
<i>Head(ft)</i>	115		<i>Power(hp)</i>	15 (VFD)	<i>GPM</i>	275	

**Domestic Hot Water**

Heating Type:	Two (2) gas fired DHW heaters
Capacity (MBH):	936 MBH/unit
Thermal Efficiency:	96%

**HVAC Air Side System Type/Efficiencies:**

**Fans:**

**Heat Recovery:**

2-Pipe Fan Coil Units: CHW Cooling   HW Heating	0.075 W/cfm (ECM Motor)	75% sensible & latent ERV Fan Power: 1.2 W/cfm
Make-up Air Unit: Air-cooled DX cooling (10.1 EER)   Gas-fired heating (90%)	0.76 W/cfm (VFD)	Not Installed

**Others**

N/A
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## APPENDIX-C

### Better Buildings Partnership - Toronto Green Standard Thermal Energy Demand Intensity (TEDI) Documentation

Date( dd-mm-yyyy):

14/09/2020

Project Name and Address:

1500 Bayview Ave, Toronto, Ontario

#### Peak Heating Load

The peak heating load of the building considers energy gained or lost due to envelope conduction, internal gains, and air infiltration. Outside air ventilation loads are excluded.

eQUEST: The peak heating load of the building can be found in the LS-C report under Total Load, Heating Load

IES: Using VistaPro to look at the Room Heating Loads (.htg file), sum the "Space conditioning sensible" variable for all rooms in the model.

EnergyPlus: In 'Output Reporting - Output:Table:Summary Reports' field in the idf file of the EnergyPlus model, add the report 'Facility Component Load Summary', and find the report after simulation. Use the 'Grand Total' in the column of 'Total [W]' of the table 'Estimated Heating Peak Load Components'.

<b>Total Peak Heating Load (kW):</b>	<b>374.83</b>	<b>eQUEST: LS-C Report</b>
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*Provide a complete summary of the annual space heating energy delivered to the building spaces.*

#### Hydronic Space Heating

The space heating energy provided by all hydronic loops in the model is summed to determine a total hydronic heating load.

eQUEST: The space heating load for each loop can be found in Report PS-D under Coil Load, Sum

IES: Using VistaPro to look at the HVAC network, select the "HWL space heating load" variable for each loop under Waterside: Hot water loops

EnergyPlus: in the 'Energy Meters - Annual and Peak Values - Other' report, use the 'Plant Loop Heating Demand: Facility' maximum value [W].

Modelled Hydronic Loop Name	Space Heating Load (GJ)	Notes / Source
Total Hydronic Heating Load (GJ)	<b>0.00</b>	

#### Direct Space Heating (e.g. Furnace, Direct Fire, Electric Resistance, Unit Heater, Force Flow)

The space heating energy provided by all direct heat sources in the model is summed to determine a total direct space heating load.

eQUEST: The space heating load for each heat source can be found by running an hourly report for each applicable system under Variable Type: HVAC Systems, 'Total Central/Zone Heat Coil Output' or by reviewing the SV-A report as applicable.

IES: Using VistaPro to look at the HVAC network, select the "GHS space heating load" variable for each heat source under Plant equipment: Generic Heat Sources

EnergyPlus: in the 'HVAC Sizing Summary - Zone Sensible Heating' report, use 'Calculated Design Load'.

Modelled Heat Source Name	Space Heating Load (GJ)	Notes / Source
<i>Building HVAC</i>	2,295.26	eQUEST: SS-D Report
Total Direct Space Heating Load (GJ)	<b>2,295.26</b>	

**Heat Pump Heating**

The space heating energy provided by all heat pumps in the model is summed to determine a total heat pump heating load.

eQUEST: The space heating load for each heat pump can be found by running an hourly report for each applicable system under Variable Type: HVAC Systems, 'Total Central/Zone Heat Coil Output' or by reviewing the SV-A report as applicable.

IES: Using VistaPro to look at the HVAC network, select the "HTL heating load" variable for each loop under Waterside: Heat transfer loops

EnergyPlus: in the 'HVAC Sizing Summary - Zone Sensible Heating' report, use 'Calculated Design Load'.

<b>Modelled Heat Pump Name</b>	<b>Space Heating Load (GJ)</b>	<b>Notes / Source</b>
Total Heat Pump Heating Load (GJ)	<b>0.00</b>	

Gross Floor Area (m2)	15,948.38
Total Heating Load (GJ)	2,295.26
<b>TEDI (kWh/m2)</b>	<b>39.98</b>