TEUI 3.0 Case Study 01

Thomson Architecture, Inc.

Three Feathers Terrace

Completed: 2022, Innisfil, ON

Project Team

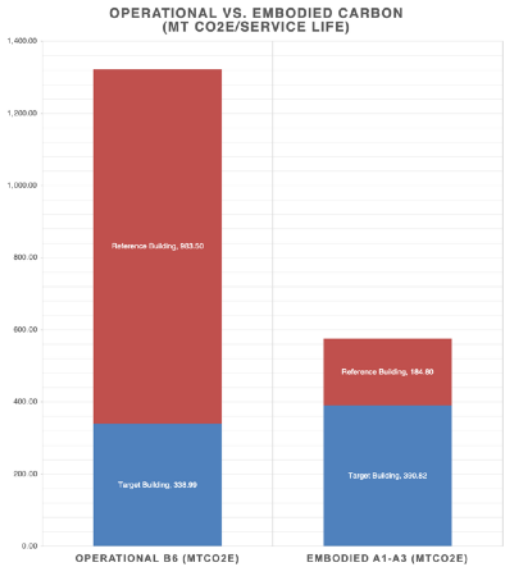
Architect:	Thomson Architecture, Inc.
Certifier:	Andy Thomson, OAA 8154
Civil:	Pearson Engineering, Ltd.
MEP:	EME Engineering, Inc.
Structural:	Contact Engineering, Inc.
GC:	J.Guergis Construction
Developer:	SP Developments, Inc.
Owner:	Three Feathers Terrace

Lifetime Energy Cost Savings: **$ 2,154,850.08**
Avoided B6 Emissions: **845 MT CO2e**

Web page: https://www.thomsonarchitecture.ca/portfolio/2020-012-three-feathers-terrace/

Modelling Notes: *All common defaults used.*

** Lifetime Energy Costs do not consider escalation costs of energy, and are simply the current costs of energy multiplied by the stated service life of the building, which by default is set to 50 years. Avoided emissions and energy costs savings are compared against the stated reference case for a building meeting only the building code minimum requirements. In many cases, these high performance targets are achievable with only a marginal and in many cases no capital cost premiums.*



OBJECTIVE

The Targeting EUI Calculator **BETA** v3.035
(for use with MS Excel Only)

2025.04.02

Blue = Required User Input Cells
Plum = Defaults but Editable
Black = Locked - Calculated
Red = Reference Values

SECTION 1. Key Values	Reference	Target	Actual	
Lifetime Emissions Intensity kgCO2e/m²/Service Life (Yrs)	Reference 100% (Baseline)	Targeted (Design) 51% Reduction	Actual (Utility Bills)	Reference %
T.1 Lifetime Carbon	**23.6**	**11.7**	**11.7**	**N/A**
Annual Operational Emissions Intensity kgCO2e/m²	Reference 100% (Baseline)	Targeted (Design) 71% Reduction	Actual (Utility Bills)	
T.2 Annual Carbon	**16.6**	**4.7**	**4.8** ✓	**29%**
Total Annual Operational Energy Use Intensity kWh/m²/yr	Reference 100% (Baseline) $ 42.31/m2	Targeted (Design) 71% Reduction	Actual (Utility Bills) $ 12.11/m2	Reference %
T.3 TEUI	**325.4** tier1	**93.0** tier5	**93.1** ✓	**29%**

SECTION 2. Building Information				T.6.7 Cost of Energy by Source		
B.1 Major Occupancy	A - Assembly	D.1 Reporting Period	2022	Electricity	$0.1300	/kWh
S.1 Reference Standard	OBC SB10 5.5-6 Z6	D.2 Service Life (yrs)	50	Gas	$0.5070	Gas/m³
S.2 Actual (Bills) or Targeted (Design) Use	Utility Bills	B.2 Project Name	Three Feathers Terrace	Propane	$1.6200	Propane/kg
S.3 Carbon Benchmarking Standard	Self Reported	B.3 Conditioned Area (Net m²)	1,427.20	Wood	$180.00	Wood/m³
S.4 Embodied Carbon Target	345.82 kgCO2e/m2	Certifier:	Thomson Architecture, Inc.	Oil	$1.5000	Oil/litre
		Licence No:	8154			

SECTION 3. Climate Calculations	°C	°F		°C	°F			Reference
L.1 Province	ON		L.2 City	Alexandria	Climate Zone 6	L.3.3 Length of Cooling Season		120
L.2.1 Heating Degree Days (HDD)	4600		L.2.3. Current or Future Values	Present		HDD Reference Lookup	HDD - Energy Star	
L.2.2 Cooling Degree Days (CDD)	196		G.4.2 Capacitance Factor	Capacitance	50%	CDD Reference Lookup	CDD - Energy Star	
L.2.4 Ground Facing **GF** HDD	1960		L.2.5 **GF** CDD	-1680				
L.3.1 Coldest Days (Location Specific)	-26	-22	B.1.2 Tset Heating	18	66			✓ **122%**
L.3.2 Hottest Days (Location Specific)	34	98	B.1.3 Tset Cooling	24	78			✓ **108%**

SECTION 4. Actual vs. Target Energy & (	ACTUAL ENERGY (Utility Bills)	ACTUAL NET ekWh	E.1 EMISSIONS kgCO2/yr	TARGET ENERGY (Design)	TARGET NET ekWh	E.1 EMISSIONS kgCO2/yr	EMISSION FACTORS per Reporting Period/TAF
T.3.1 Total Electricity Use	132,938.00 kWh/yr	132,938.00	6,779.84	132,765.65 kWh/yr	132,765.65	6,771.05	51.00 gCO2e/kWh
T.3.2 Total Fossil Gas Use	0.00 m³/yr	0.00	0.00	0.00 m³/yr	0.00	0.00	1,921.00 gCO2e/m3
T.3.3 Total Propane Use	0.00 kg/yr	0.00	0.00	0.00 kg/yr	0.00	0.00	2,970.00 gCO2e/kg
T.3.4 Total Oil Use	0.00 litres/yr	0.00	0.00	0.00 litres/yr	0.00	0.00	2,753.00 gCO2e/litre
T.3.5 Total Wood Use	0.00 m³/yr	0.00	0.00	0.00 m³/yr	0.00	0.00	150.00 kgCO2e/m3
E.1.1 Operational GHG & Energy Subtotals		132,938.00	6,779.84		132,765.65	6,771.05	
T.3.6 Total Net Energy	478.58 GJ/yr			477.96 GJ/yr			
T.3.7 Annual Percapita Energy	1,055.06 kWh *Actual*	3.80 GJ *Actual*		1,053.70 kWh *Target*	3.79 GJ *Target*		53.74 kWh/pp
T.3.8 Primary Energy	132,938.00 kWh/yr	93.15 kWh/m²/yr		1.0 PER Factor			**N/A**

SECTION 5. CO2e Emissions (E.1 = Scope 1&2, E.3 = Scope 3)		kgCO2e/m²	kgCO2e/m²		
E.1.2 GHGI Operational (B6) Emissions/yr	6.78 MT CO2e/yr	4.75	237.52 (B6 Annual Emissions * Service Life)		
E.3.1 Typology-Based Carbon Intensity (A1-3)	Pt.3 Mass Timber	E.3.2 Typology-Based Cap (TGS4)	350.00	✓	**99%**
E.3.3 Total Embedded Carbon Emitted (A1-3)	390.82 MT CO2e/Service Life	S.4 Embodied Carbon Target	345.82	✓	**69%**
E.1.3 Lifetime Avoided (B6) Emissions	845.36 MT CO2e	E.3.4 Modelled Value (A1-3)	345.82	✓	**100%**

SECTION 6. Renewable Energy	kWh/yr		kWh/yr		kWh/yr
R.1 Onsite Energy Subtotals	0.00	R.5 Offsite Renewable (REC)	0.00	P.5 Exterior/Site/Other Loads	0.00
R.2 Photovoltaics	0.00	R.6 WWS Electricity	0.00		
R.3 Wind	0.00	R.7 Green Natural Gas	0.00 ekWh/yr	0.00 m³	
R.4 Remove EV Charging from TEUI	0.00	R.8 Reserved (other removals)	0.00		

SECTION 7. Water Use (B7)	Targeted			litres/pp/day	litresyr	Annual kWh/yr	Annual kWh/yr		Reference
W.1.0 Total Water Use (Method)	User Defined	40.00 l/pp/day IF User Defined		40.00	1,839,600				✓ **15%**
W.1.2 DHW Use (40% of W.1.0)		10,000.00 kWh/yr IF By Engineer		16.00	735,840	38,484.43			✓ **15%**
W.3.1 DHW or SHW Energy Source	Heatpump	0.00 Gas m³/yr	W.3.2 ekWh/yr Net Themal Demand			12,828.14	12,828.14	W.3.3 Net Electrical Demand	
W.4 DHW or SHW Efficiency Factor (EF)	300%	3.00 COPdhw	W.5.2 (W2DN) Net Demand (- Recovered Energy)			12,828.14			✓ **333%**
W.5.1 Drain Water Heat Recovery Efficiency	0%	0.00 kWh/yr	W.5.3 (W.2.W) SHW Wasted			12,828.14			**N/A**
W.6.1 System Losses (% → W.1.3 Eqpt Gains)	0.00 kWh/yr		W.X Exhaust (if Gas or Oil)			0.00	0.00	W.3.4 Net Oil Demand Litres	

SECTION 8. Indoor Air Quality	Targeted	Guidance Limits	% per Health Canada/NBC
A.2 Radon (annual avg.)	50 Bq/m³	150 Bq/m³	✓ **33%**
A.3 CO2 (annual avg.)	550 ppm	1000 ppm	✓ **55%**
A.4 TVOC (annual avg.)	100 ppm	400 ppm	✓ **25%**
A.5 Rel. Indoor Humidity (annual avg.)	45% RH	30-60 %	● **45%**
A.6 Atmospheric Offsets	0.00 MT/yr CO2e		

SECTION 9. Occupant + Internal Gains	Unit Qty		Annual kWh/yr	Htg Gain kWh/yr	Htg Gain %	Cooling Gain kWh/yr	Htg Gain %	Reference
G.1.1 Occupants per Building (declared)	126	G.1.3 Avg. Daily Occupied Hrs 12		4380 / 8760				
G.1.2 Occupant Activity	Normal	Watts/pp (Sensible + Latent) 117	64,696.02	43,426.10	43.39%	21,269.93	43.39%	
P.1 Plug Loads	7		43,757.95	29,371.78	29.35%	14,386.18	29.35%	✓ **100%**
P.2 Lighting Loads	1.5		9,376.70	6,293.95	6.29%	3,082.75	6.29%	✓ **133%**
P.3.1 Equipment Loads	5.00	P.3.3 Eqpt. Energy Spec Low Energy	31,255.68	20,979.84	20.96%	10,275.84	20.96%	
P.3.2 Elevator Loads (W/m² → Eqpt Gains)	No Elevators							
W.1.3 DHW System Losses			0.00	0.00	0.00%	0.00	0.00%	
G.2 Plug/Light/Eqpt. Subtotals			**84,390.34**	**56,645.57**		**27,744.77**		
Internal Gains Totals			**149,086.36**	**100,071.67**	**100%**	**49,014.69**	**100%**	

SECTION 10. Radiant Gains		Orientation Alter if Skewed	SHGC 0.5 is Default	Winter Shading %	Summer Shading %	Solar Gain Heating kWh/yr	Solar Gain Heating %	Solar Gain Cool Load kWh/yr	Solar Gain Cool Load %	Gain Factor kWh/m2/yr
G.7 Doors	7.50	Average	0.50	0%	100%	375.00	2.56%	0.00	0.00%	**50.00**
G.8.1 Window Area North	81.14	North	0.50	0%	100%	106.29	0.73%	0.00	0.00%	**1.31**
G.8.2 Window Area East	3.83	East	0.50	0%	100%	294.68	2.01%	0.00	0.00%	**76.94**
G.8.3 Window Area South	159.00	South	0.50	0%	100%	11,247.66	76.90%	0.00	0.00%	**70.74**
G.8.4 Window Area West	100.66	West	0.50	0%	90%	2,603.07	17.80%	130.15	100.00%	**25.86**
G.8.5 Skylights	0.00	Skylight	0.50	0%	80%	0.00	0.00%	0.00	0.00%	**75.00**
G.1 Subtotal Solar Gains						**14,626.70**	**100%**	**130.15**	**100%**	
G.2 Gains Utilization Factor (n-Factor)	NRC 40%	114,698.37	Total Gains	40.00%		**45,879.35**	G.3 Net Usable Gains by Method Selected			
G.4 Net Usable Heating Season Gains	PH Method	114,698.37	Total Gains	94.43%		108,307.67	Net Usable Gains by PHPP Method (Reference)			
G.5 Net **UN-usable** Htg. Gains						**68,819.02**				

SECTION 11. Transmission Losses	Areas m2	Rimp ft²F•hr/Btu	RSI K•m²/W	U-Value W/m2•K	% of Ae & Ag	Heatloss kWh/yr	Heatloss %	Heatgain kWh/Cool Season	Heatgain %	Reference
B.4 Roof	1,411.52	53.09	9.35	0.107	56.99%	16,666.50	21.53%	710.14	21.56%	✓ **176%**
B.5 Walls Above Grade *(Exclude Openings!)*	712.97	37.99	6.69	0.149	28.79%	11,765.60	15.20%	501.32	15.22%	✓ **163%**
B.6 Floor Exposed	0.00	54.05	9.52	0.105	0.00%	0.00	0.00%	0.00	0.00%	✓ **144%**
B.7.0 Doors	7.50	6.31	1.111	0.900	0.30%	745.20	0.96%	31.75	0.96%	✓ **221%**
B.8.1 Window Area North	81.14	6.31	1.111	0.900	3.28%	8,062.07	10.41%	343.51	10.43%	✓ **158%**
B.8.2 Window Area East	3.83	6.31	1.111	0.900	0.15%	380.55	0.49%	16.21	0.49%	✓ **158%**
B.8.3 Window Area South	159.00	6.31	1.111	0.900	6.42%	15,798.24	20.41%	673.14	20.44%	✓ **158%**
B.8.4 Window Area West	100.66	6.31	1.111	0.900	4.06%	10,001.58	12.92%	426.15	12.94%	✓ **158%**
B.8.5 Skylights	0.00	6.31	1.111	0.900	0.00%	0.00	0.00%	0.00	0.00%	✓ **158%**
B.9 Walls Below Grade (Conditioned Space)	0.00	22.71	4.00	0.250	0.00%	0.00	0.00%	0.00	0.00%	✓ **222%**
B.10 Floor Slab (Conditioned Space)	1,100.42	21.01	3.70	0.270	100.00%	13,990.20	18.07%	-5,995.80	-182.05%	✓ **106%**
B.11 Interior Floors (incl. garages)	29.70	-	-	-	-	-	-	-	-	
B.12 Thermal Bridge Penalty (min. 5-70%)	20%					15,481.99	20.00%	-658.71	-20.00%	
Envelope Totals	3,577.04	17.51			100%	**77,409.95**	100%	**-3,293.57**	100%	

SECTION 12. Volume and Surface Metrics			U-Value W/m²•K	Loss Rate kWh/m²	Heatloss kWh/yr	Gain Rate kWh/m²	Heatgain kWh/Cool Season	Heatloss %	Reference
B.16 Total Area Exposed to Air (**Ae**)	2,476.62 m²	U-Val. for ***Ae***	0.278	30.73	76,103.69	1.31	3,242.68	65.57%	
B.17 Total Area Exposed to Ground (**Ag**)	1,100.42 m²	U-Val. for ***Ag***	0.324	15.26	16,788.25	-13.08	-14,389.92	14.46%	
B.18.3 Heating Natural Air Leakage Heatloss	1.5 Stories	B.18.3 Shielding	Normal	16.24	**23,178.39**	0.69	987.60	19.97%	
T.4 Building U-Value Combined Total & Transmission Losses & Gains			**0.292**		**116,070.33**		**-3,293.57**	**100%**	**N/A**

B.13 Total Conditioned Volume	8,000.00 m³	Volume/Area	323%	Area/Volume	31%		
B.14 Total Floor Area (Cond. + Uncond.)	1,130.12 m² - *Only used in E.3.2*						
B.15 Window:Wall Ratio (WWR)	33.06%					✓	**61%**
B.18.1 NRL_{50} Target Method NBC2025 (Part 9)	AL-1B	B.18.1 Target	1.17	L/s•m²			
B.18.2 ACH_{50} Target (Converts B.18.1)	1.30 ACH_{50}	B.18.2 Measured	1.50			✓	**133%**
B.18.4 Ae_{10} or ELA_{10} (m²)	2.898	B.18.5.1 n-Factor	16.7	B.18.3 Zone	2	✓	**173%**

SECTION 13. Mechanical Loads	kWh/yr								kWh/yr	Reference
M.1.0 Primary Heating System	Heatpump	M.1.1 HSPF	12.5	M.1.2 COPheat	3.66	M.1.3 COPcool	2.7	M.1.4 Sink	86,642.65	✓ **176%**
M.2.1 Heating System Demand	32,529.13					M.1.5. CEER	9.1	M.1.6 Sink	5,020.63	
M.2.2 Heating Fuel Impact (ekWh/yr)	0.00	M.2.3 Oil l/yr 0.00		M.2.4 Gas m3/yr 0.00		M.2.5 AFUE 0.98		M.2.5 Exhaust	-	✓ **109%**
M.3.0 Heatpump or Dedicated Cooling System	Cooling			M.3.3 COPcool ONLY when Dedicated Cooling			2.7	M.3.4 Sink	5,009.95	✓ **124%**
M.3.5 Heatpump Cool Elect. Load	3,018.04		2.11 kWh/m²/yr			M.3.6 CEER	9.1			✓ **4%**
V.1.1 HRV/ERV/MVHR Efficiency (SRE)	89.00%	V.1.2 Ventilation Method	Volume by Schedule			V.1.3 ACH (Only if Volume-Based			3	✗ **25%**
V.1.4 Per Person Ventilation Rate	14.00 l/s per person	29.66 cfm		50.40 m³/hr		V.1.5 Summer Boost Rate			None	✓ **112%**
V.1.6 Volumetric Ventilation Rate	3,333.33 l/s	7,062.93 cfm		12,000.00 m³/hr						
V.2.1 Heating Season Ventil. Energy	445,280.00	V.2.2 Heating Season Ventil. Energy Recovered		396,299.20		V.2.3 Net Heating Season Ventilation Lost				48,980.80
V.3.1 Incoming Cooling Season Ventil. Energy	30,257.37	V.3.2 Latent Load Factor (Calculated on Cooling Worksheet)				159%				
V.3.3 Outgoing Cooling Season Ventil. Energy	26,929.06									
V.4.1 Ventilation **Free Cooling**/Vent Capacity	54%	V.4.2 Free Cooling Limit		41,469.81 kWh/yr		Days Active Cooling Required (Experimental)				✓ **-31**

SECTION 14. TEDI & TELI *Targeted*	kWh/yr		kWh/m² /yr		kWh//yr
T.4.0 TED Targeted	119,171.78	T.4.1 TEDI	83.50	*Includes V.5 Net Ventilation Losses, Excludes T.7.3 CEDI Ae*	**N/A**
T.4.2 TED Envelope (Excludes Ventilation)	70,190.98	T.4.3 TEDI (Excludes Ventilation)	49.18		
T.4.4 CED Cooling Load *Unmitigated*	76,437.53	T.4.5 CEDI *Unmitigated*	53.56	T.5.2 less Free Cool. & Vent. Exhaust	8,038.67
T.4.6 CEDI Cooling Load	6.11 W/m² *Unmitigated*	T.4.7 CEDI *Mitigated*	0.64 W/m² *Mitigated*		
T.5.1 TEL Total Envelope Heatloss	116,070.33	T.5.2 TELI	81.33		
T.5.3 CEG Cooling Envelope Heatgain	-2,964.68	T.5.4 CEGI	-2.08		

SECTION 15. TEUI *Targeted*				
T.6.0 TEU *Targeted Electricity*	219,408.30 ekWh/yr	T.6.1 TEUI	153.73 kWh/m²/yr	*Excludes ekWh of any Gas or Oil loads*
T.6.2 TEU *Targeted Electricity if HP/Gas/Oil Bld*	132,765.65 kWh/yr	T.6.3 TEUI	93.03 kWh/m²/yr	*Excludes ekWh of any Gas loads, and Applies COP for HP Equipment*
T.6.4 Peak **Heating** Load (Enclosure Only)	46.03 kW	T.6.4 TEUI-imp	157,076 BTU/hr	
T.6.5 Peak **Cooling** Load (Enclosure Only)	10.46 kW	T.6.6-imp	2.97 Tons-Cooling	35,699 BTU/hr
T.6.7 Peak **Cooling** Load (Enclosure + Gains)	48.04 kW	T.6.7-imp	13.66 Tons-Cooling	163,912 BTU/hr
T.6.8 Max. Heating Load Intensity	32.26 W/m²	T.6.8-imp	7.33 T.6.6 Mx. Cool Intsty in W/m² (Enclosure Only)	✓ **65%**
T.7.1 Annual Cost of Electricity	$28,523.08	T.7.2 pre and	$17,259.53 *post heat pump*	T.7.3 Sum of Other Energy $0.00	
T.7.4 Cost Premium of HP Equipment	$30,000.00	T.7.5 ROI	2.66 Years to Amortize		
T.3.1 TEUI Reference (Performance Gap)	325.43 *Reference*	T.3.2 Target	93.03 *Target (Design)*	T.3.3 Actual	93.15 *Actual (Utility Bills)*
T.8.1 TEUI Energy *Reduction from Reference*	71%	T.8.2 Target	100% *of Utility Bill Data*	T.8.3 Actual	100% *of Targeted Design*
T.9.1 GHGe *Reduction from Reference*	71%				

Developed by OpenBuilding.ca

The OBJECTIVE TEUI3 Framework, Calculator and Workshop Resources are generously supported by: Ontario Association of Architects / Ordre des architectes de l'Ontario

1

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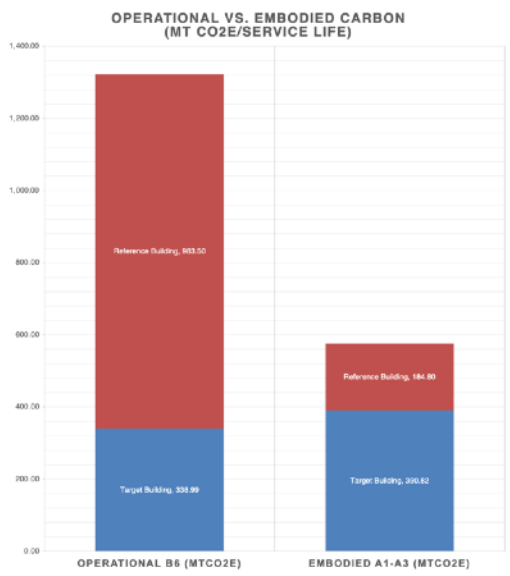

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Total Annual Operational Energy Use Intensity kWh/m²/yr	Reference 100% (Baseline)	Targeted (Design) 71% Reduction	Actual (Utility Bills)	% Nat. Avg*
T.3 TEUI	325.4 tier1	93.0 tier5	93.1	✗ 188%

SECTION 2. Building Information					T.6.7 Cost of Energy by Source		
B.1 Major Occupancy	A - Assembly	D.1 Reporting Period	2022		Electricity	$0.1300	/kWh
S.1 Reference Standard	NECB T1 (Z6)	D.2 Service Life (yrs)	50		Gas	$0.5070	Gas/m³
S.2 Reference Model Always Uses Targeted	Targeted Use	B.2 Project Name	Three Feathers Terrace		Propane	$1.6200	Propane/kg
S.3 Carbon Benchmarking Standard	Not Reported	B.3 Conditioned Area (Net m²)	1,427.20		Wood	$180.00	Wood/m³
S.4 Embodied Carbon Target	N/A kgCO2e/m2	Certifier:	Thomson Architecture, Inc.		Oil	$1.5000	Oil/litre
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L.2.1 Heating Degree Days (HDD)	4600		L.2.3. Current or Future Values	Present				
L.2.2 Cooling Degree Days (CDD)	196		G.4.2 Capacitance Factor	Capacitance	50%			
L.2.4 Ground Facing **GF** HDD	1960		L.2.5 **GF** CDD	-1680				
L.3.1 Coldest Days (Location Specific)	-26	-22	B.1.2 Tset Heating	22	74		✓	100%
L.3.2 Hottest Days (Location Specific)	34	98	B.1.3 Tset Cooling	24	78		✓	100%

SECTION 4. Actual vs. Target Energy & (	ACTUAL ENERGY (Utility Bills)	ACTUAL NET ekWh	E.1 EMISSIONS kgCO2/yr	TARGET ENERGY (Design)	TARGET NET ekWh	E.1 EMISSIONS kgCO2/yr	EMISSION FACTORS per Reporting Period/TAF
T.3.1 Total Electricity Use	132,938.00 kWh/yr	132,938.00	6,779.84	464,453.40 kWh/yr	464,453.40	23,687.12	51.00 gCO2e/kWh
T.3.2 Total Fossil Gas Use	0.00 m³/yr	0.00	0.00	0.00 m³/yr	0.00	0.00	1,921.00 gCO2e/m3
T.3.3 Total Propane Use	0.00 kg/yr	0.00	0.00	0.00 kg/yr	0.00	0.00	2,970.00 gCO2e/kg
T.3.4 Total Oil Use	0.00 litres/yr	0.00	0.00	0.00 litres/yr	0.00	0.00	2,753.00 gCO2e/litre
T.3.5 Total Wood Use	0.00 m³/yr	0.00	0.00	0.00 m³/yr	0.00	0.00	150.00 kgCO2e/m3
E.1.1 Operational GHG & Energy Subtotals		132,938.00	6,779.84		464,453.40	23,687.12	
T.3.6 Total Net Energy	478.58 GJ/yr			1672.03 GJ/yr			
T.3.7 Annual Percapita Energy	1,055.06 kWh *Actual*	3.80 GJ *Actual*		3,686.14 kWh *Target*	13.27 GJ *Target*		187.99 kWh/pp
T.3.8 Primary Energy	464,453.40 kWh/yr	325.43 kWh/m²/yr		1.0 PER Factor			N/A

SECTION 5. CO2e Emissions (E.1 = Scope 1&2, E.3 = Scope 3)		kgCO2e/m²	kgCO2e/m²		
E.1.2 GHGI Operational (B6) Emissions/yr	23.69 MT CO2e/yr	16.60	829.85 (B6 Annual Emissions * Service Life)		
E.3.1 Typology-Based Carbon Intensity (A1-3)	Pt.3 Mass Timber	E.3.2 Typology-Based Cap (TGS4)	350.00	✓	100%
E.3.3 Total Embedded Carbon Emitted (A1-3)	395.54 MT CO2e/Service Life	S.4 Embodied Carbon Target	N/A		N/A
E.1.3 Lifetime Avoided (B6) Emissions	845.36 MT CO2e	E.3.4 Modelled Value (A1-3)	350.00		N/A

SECTION 6. Renewable Energy	kWh/yr		kWh/yr		kWh/yr
R.1 Onsite Energy Subtotals	0.00	R.5 Offsite Renewable (REC)	0.00	P.5 Exterior/Site/Other Loads	0.00
R.2 Photovoltaics	0.00	R.6 WWS Electricity	0.00		
R.3 Wind	0.00	R.7 Green Natural Gas	0.00 ekWh/yr	0.00 m³	
R.4 Remove EV Charging from TEUI	0.00	R.8 Reserved (other removals)	0.00		

SECTION 7. Water Use (B7)	Targeted			litres/pp/day	litres/yr	Annual kWh/yr	Annual kWh/yr		Reference
W.1.0 Total Water Use (Method)	User Defined	40.00 l/pp/day IF User Defined		40.00	1,839,600				✓ 18%
W.1.2 DHW Use (40% of W.1.0)		10,000.00 kWh/yr IF By Engineer		16.00	735,840	38,484.43			
W.3.1 DHW or SHW Energy Source	Electric	- Gas m³/yr	W.3.2 ekWh/yr Net Themal Demand			42,760.48	42,760.48	W.3.3 Net Electrical Demand	
W.4 DHW or SHW Efficiency Factor (EF)	90%	0.90 COPdhw	W.5.2 (W2DN) Net Demand (- Recovered Energy)			42,760.48			✓ 100%
W.5.1 Drain Water Heat Recovery Efficiency	0%	0.00 kWh/yr	W.5.3 (W.2.W) SHW Wasted			42,760.48			N/A
W.1.3 System Losses (% → W.1.3 Eqpt Gains)	3848.44 kWh/yr		W.X Exhaust (if Gas or Oil)			0.00	0.00	W.3.4 Net Oil Demand Litres	

SECTION 8. Indoor Air Quality	Targeted	Guidance Limits			% per Health Canada/NBC
A.2 Radon (annual avg.)	150 Bq/m³	150	Bq/m³		✓ 100%
A.3 CO2 (annual avg.)	1,000 ppm	1000	ppm		✓ 100%
A.4 TVOC (annual avg.)	150 ppm	400	ppm		✓ 38%
A.5 Rel. Indoor Humidity (annual avg.)	45% RH	30-60	%	! Important - combined w V.1.1 large effect on TEUI	45%
A.6 Atmospheric Offsets	0.00 MT/yr CO2e				

SECTION 9. Occupant + Internal Gains	Unit Qty			Annual kWh/yr	Htg Gain kWh/yr	Htg Gain %	Cooling Gain kWh/yr	Htg Gain %	Reference
G.1.1 Occupants per Building (declared)	126	G.1.3 Avg. Daily Occupied Hrs	12		4380	/ 8760			
G.1.2 Average Daily Activity Level	Normal	W/pp (Sensible + Latent)	117	64,696.02	43,426.10	39.28%	21,269.93	39.28%	
P.1 Plug Loads	7			43,757.95	29,371.78	26.57%	14,386.18	26.57%	✓ 100%
P.2 Lighting Loads	2			12,502.27	8,391.94	7.59%	4,110.34	7.59%	✓ 100%
P.3.1 Equipment Loads	7.00	P.3.3 Eqpt. Energy Spec	Regular	43,757.95	29,371.78	26.57%	14,386.18	26.57%	
P.3.2 Elevator Loads (W/m² → Eqpt Gains)	No Elevators								
W.1.3 DHW System Losses				3,848.44	2,583.20	2.34%	1,265.24	2.34%	
G.2 Plug/Light/Equipment Subtotal				100,018.18	69,718.69		34,147.93		
Internal Gains Total				164,714.20	110,561.59	100%	54,152.61	100%	

SECTION 10. Radiant Gains		Orientation Alter if Skewed	SHGC 0.5 is Default	Winter Shading %	Summer Shading %	Solar Gain Heating kWh/yr	Solar Gain Heating %	Solar Gain Cool Load kWh/yr	Solar Gain Cool Load %	Gain Factor kWh/m2/yr
G.7 Doors	7.50	Average	0.50	0%	0%	375.00	2.56%	187.50	2.56%	50.00
G.8.1 Window Area North	81.14	North	0.50	0%	0%	106.29	0.73%	53.15	0.73%	1.31
G.8.2 Window Area East	3.83	East	0.50	0%	0%	294.68	2.01%	147.34	2.01%	76.94
G.8.3 Window Area South	159.00	South	0.50	0%	0%	11,247.66	76.90%	5,623.83	76.90%	70.74
G.8.4 Window Area West	100.66	West	0.50	0%	0%	2,603.07	17.80%	1,301.53	17.80%	25.86
G.8.5 Skylights	0.00	Skylight	0.50	0%	0%	0.00	0.00%	0.00	0.00%	75.00
G.1 Subtotal Solar Gains						14,626.70	100%	7,313.35	100%	
G.2 Gains Utilization Factor (n-Factor)	NRC 50%	125,188.29	Total Gains	50.00%		62,594.14	(Assume 40-50% for Code Minimum Methods)			
G.4 Net Usable Heating Season Gains	PH Method	125,188.29	Total Gains	99.97%		125,151.30	G.3 Net Usable Gains by PHPP Method (Reference)			
						62,594.14	G.5 Net **UN-usable** Htg. Gains			

SECTION 11. Transmission Losses	Areas m2	Rimp ft²F·hr/Btu	RSI K·m²/W	U-Value W/m2·K	% of Ae & Ag	Heatloss kWh/yr	Heatloss %	Heatgain kWh/Cool Season	Heatgain %	Reference
B.4 Roof	1,411.52	41.14	7.25	0.138	56.99%	21,505.91	14.63%	916.34	7.50%	✓ 100%
B.5 Walls Above Grade *(Exclude Openings!)*	712.97	23.65	4.17	0.240	28.79%	18,893.88	12.85%	805.04	6.59%	✓ 100%
B.6 Floor Exposed	0.00	36.40	6.41	0.156	0.00%	0.00	0.00%	0.00	0.00%	✓ 100%
B.7.0 Doors	7.50	2.99	0.526	1.900	0.30%	1,573.20	1.07%	67.03	0.55%	✓ 100%
B.8.1 Window Area North	81.14	3.28	0.578	1.730	3.28%	15,497.09	10.54%	660.31	5.41%	✓ 100%
B.8.2 Window Area East	3.83	3.28	0.578	1.730	0.15%	731.50	0.50%	31.17	0.26%	✓ 100%
B.8.3 Window Area South	159.00	3.28	0.578	1.730	6.42%	30,367.73	20.66%	1,293.93	10.59%	✓ 100%
B.8.4 Window Area West	100.66	3.28	0.578	1.730	4.06%	19,225.25	13.08%	819.16	6.71%	✓ 100%
B.8.5 Skylights	0.00	3.28	0.578	1.730	0.00%	0.00	0.00%	0.00	0.00%	✓ 100%
B.9 Walls Below Grade (Conditioned Space)	0.00	19.99	3.52	0.284	0.00%	0.00	0.00%	0.00	0.00%	✓ 100%
B.10 Floor Slab (Conditioned Space)	1,100.42	7.49	1.32	0.758	100.00%	39,214.97	26.68%	-16,806.41	-137.61%	✓ 100%
B.11 Interior Floors (incl. garages)	29.70	-	-	-	-	-	-	-	-	
B.13.1 Thermal Bridge Penalty (min. 5-70%)	50% (Assume Code Minimum Construction at 50%)					73,504.76		-6,106.71		
Envelope Totals	3,577.04	5.00			100%	147,009.52	100%	-12,213.43	100%	

SECTION 12. Volume and Surface Metrics				Loss Rate kWh/m²	Heatloss kWh/yr	Gain Rate kWh/m²	Heatgain kWh/Cool Season	Heatloss %	Reference
B.16 Total Area Exposed to Air (**Ae**)	2,476.62 m²	U-Val. for ***Ae***	0.591	65.29	161,691.84	2.78	6,889.48	66.35%	
B.17 Total Area Exposed to Ground (**Ag**)	1,100.42 m²	U-Val. for ***Ag***	1.136	53.45	58,822.45	-45.82	-50,419.24	24.14%	
B.18.3 Heating Natural Air Leakage Heatloss	1.5 Stories	B.18.3 Shielding	Normal	16.24	23,178.39	0.69	987.60	9.51%	
T.4 Building U-Value Combined Total & Transmission Losses & Gains			0.759		243,692.67		-12,213.43	100%	✗ 66%

B.13 Total Conditioned Volume	8,000.00 m³	Volume/Area	323%	Area/Volume	31%			
B.14 Total Floor Area (Cond. + Uncond.)	1,130.12 m² - *Only used in E.3.2*							
B.15 Window:Wall Ratio (WWR)	33.06%							✓ 61%
B.18.1 NRL_{50} Target Method NBC2025 (Part 9)	AL-1B	B.18.1 Target	1.17	L/s•m²				
B.18.2 ACH_{50} Target (Converts B.18.1)	1.30 ACH 50Pa	B.18.2 Measured	1.50					✓ 167%
B.18.4 Ae_{10} or ELA_{10} (m²)	2.898	B.18.5.1 n-Factor	16.7	B.18.3 Zone	2			✓ 242%

SECTION 13. Mechanical Loads	kWh/yr										Reference
M.1.0 Primary Heating System	Heatpump	M.1.1 HSPF	6.4	M.1.2 COPheat	1.88	M.1.3 COPcool	0.9	M.1.4 Sink	254,327.29	✓	100%
M.2.1 Heating System Demand	290,416.57					M.1.5. CEER	3.0	M.1.6 Sink	(3,884.37)		
M.2.2 Heating Fuel Impact (ekWh/yr)	0.00	M.2.3 Oil l/yr	0.00	M.2.4 Gas m3/yr	0.00	M.2.5 AFUE	0.98	M.2.5 Exhaust	-	✓	109%
M.3.0 Heatpump or Dedicated Cooling System	Cooling			M.3.3 COPcool ONLY when Dedicated Cooling			3.3	M.3.4 Sink	71,893.79	✓	100%
M.3.5 Heatpump Cool Elect. Load	31,258.17		21.90 kWh/m²/yr			CEER	11.3			✓	44%
V.1.1 HRV/ERV/MVHR Efficiency (SRE)	65.00%	V.1.2 Ventilation Method		Volume Constant		V.1.3 ACH (Only if Volume-Based		3.5		✗	19%
V.1.4 Per Person Ventilation Rate	12.50 l/s per person		26.49 cfm		45.00 m³/hr	V.1.5 Summer Boost Rate		None		✓	100%
V.1.6 Volumetric Ventilation Rate	7,777.78 l/s		16,480.18 cfm		28000.00 m³/hr						
V.2.1 Heating Season Ventil. Energy	1,038,986.67	V.2.2 Heating Season Ventil. Recovered			675,341.33	V.2.3 Net Heating Season Ventilation Losses					363,645.33
V.3.1 Incoming Cooling Season Ventil. Energy	70,600.53	V.3.2 Latent Load Factor (Calculated on Cooling Worksheet)				159%					
V.3.3 Outgoing Cooling Season Ventil. Energy	45,890.34										
V.4.1 Ventilation **Free Cooling**/Vent Capacity	36%	V.4.2 Free Cooling Limit			41,469.81 kWh/yr	Days Active Cooling Required (Experimental)				✓	-31

SECTION 14. TEDI & TELI *Targeted*	kWh/yr		kWh/m²/yr		
T.4.0 TED Targeted	544,743.86	T.4.1 TEDI	381.69	*Includes V.5 Net Ventilation Losses, Excludes T.7.3 CEDI Ae*	N/A
T.4.2 TED Envelope Only (No Ventilation)	181,098.53	T.4.3 TEDI no vent.	126.89		
T.4.4 CED Cooling Load	114,733.95	T.4.5 CEDI Unmitigated	80.39	T.5.2 less Free Cool. & Vent. Exhaust	27,373.80
T.4.6 CEDI Cooling Load	9.18 W/m² Unmitigated	T.4.7 CEDI Mitigated	2.19 W/m² Mitigated		
T.5.1 TEL Total Envelope Heatloss	243,692.67	T.5.2 TELI	170.75		
T.5.3 CEG Cooling Envelope Heatgain	-17,332.54	T.5.4 CEGI	-12.14		

SECTION 15. TEUI *Targeted*					
T.6.0 TEU *Targeted Electricity*	718,780.69 ekWh/yr	T.6.1 TEUI	503.63 kWh/m²/yr	*Excludes ekWh of any Gas loads*	
T.6.2 TEU if Electric/Heatpump/Gas	464,453.40 kWh/yr	T.6.3 TEUI	325.43 kWh/m²/yr		
T.6.4 Peak **Heating** Load (Enclosure Only)	130.32 kW	T.6.4 TEUI-imp	444,683 BTU/hr		
T.6.5 Peak **Cooling** Load (Enclosure Only)	27.15 kW	T.6.6-imp	7.72 Tons-Cooling	92,642 BTU/hr	
T.6.7 Peak **Cooling** Load (Enclosure + Gains)	84.80 kW	T.6.7-imp	24.11 Tons-Cooling	289,337 BTU/hr	
T.6.8 Max. Heating Load Intensity	91.31 W/m²	T.6.8-imp	19.02 T.6.6 Mx. Cool Intsty in W/m² (Enclosure Only)		✗ 183%
T.7.1 Annual Cost of Electricity	$93,441.49	T.7.2 pre and	$60,378.94 *post heat pump*	Sum of Other Energy Costs $0.00	
T.7.4 Cost Premium of HP Equipment	$30,000.00	T.7.5	0.91 Years to Amortize		
T.3.1 TEUI Reference (Performance Gap)	325.43 *Reference (Baseli*	T.3.2 Target	93.03 *Target (Design)*	N/A *Actual (Utility Bills)*	
T.8.1 TEUI Energy *Reduction from Reference*	71%	T.8.2 Target	N/A *of Utility Bill Data*	N/A *of Targeted Design*	
T.9.1 GHGe *Reduction from Reference*	71%				

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