



# ENERGY MODELLING REPORT

## ASHRAE 90.1-2010 Appendix G Comparison

**Date:** 2022-05-05  
**Project:** 81 Bay Street  
**Location:** Toronto, ON

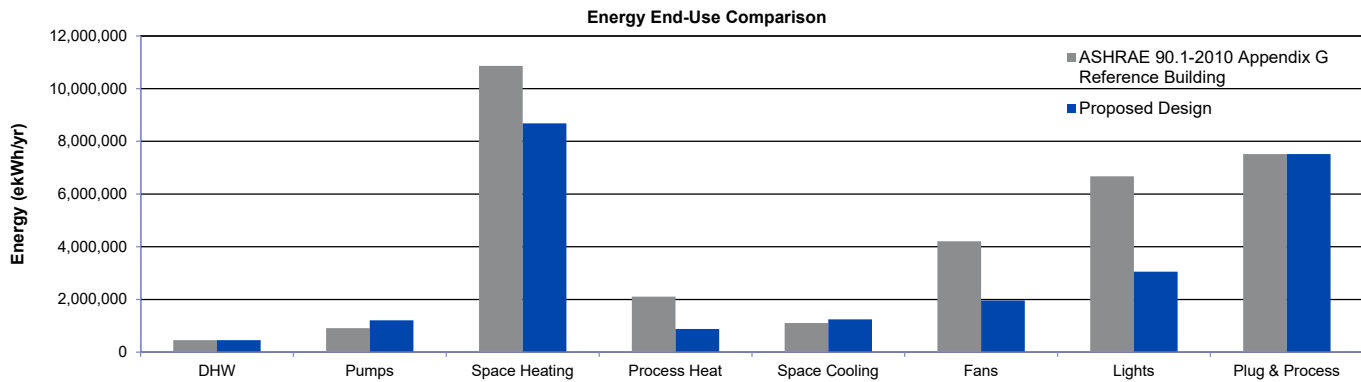
**Modelling Software:** eQuest v3-65 (DOE 2.3)  
**Reference Building:** ASHRAE 90.1-2010 Appendix G  
**Proposed Simulation:** 81 Bay - PROPOSED-3.pd2  
**Reference Simulation:** 81 Bay - REF ASH 2010-8.pd2  
**Weather File:** Toronto, Ontario  
**Climate Zone:** 5A, per MMAH Supplementary Std SB-1  
**Documents Referenced:** IFC Coordination Set (provided Feb 28th, 2019)

Model	Electricity (MWh)	Natural Gas (MWh)	Total (MWh)	EUI (ekWh/m <sup>2</sup> )
Reference	20,866	12,969	33,835	192
Proposed	15,471	9,517	24,988	142

Model	Electricity GHG Emissions (tonne)	Natural Gas GHG Emissions (tonne)	Total GHG Emissions (tonne)	GHGI (kgCO <sub>2</sub> e/m <sup>2</sup> )
Reference	417	2,308	2,726	15.5
Proposed	309	1,694	2,003	11.4

Model	Electricity Cost (\$)	Natural Gas Cost (\$)	Total Cost (\$)	Operating Cost \$/m <sup>2</sup>
Reference	3,409,638	303,981	3,713,619	21.1
Proposed	2,499,812	223,371	2,723,183	15.5

Energy Savings vs. Reference	26.1%
GHG Emission Savings vs. Reference	26.5%
Energy Cost Savings vs. Reference	26.7%

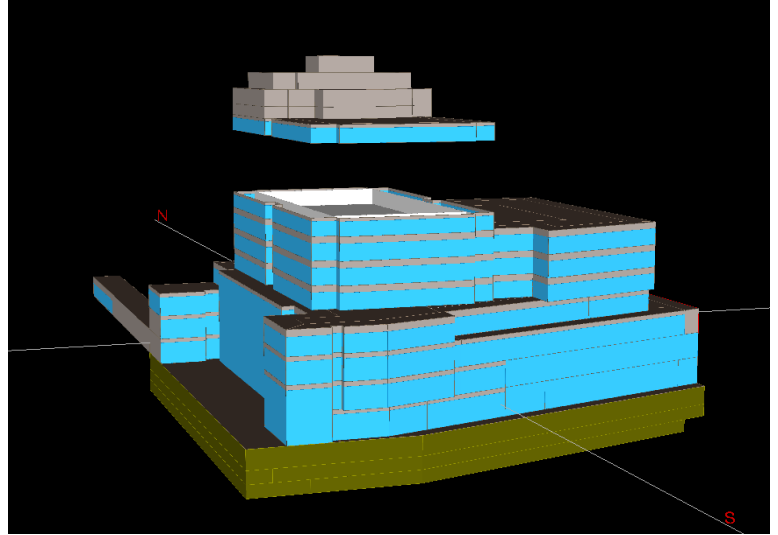


## 1. ARCHITECTURAL SYSTEMS DESCRIPTION

**Table 1.1 Average Window-to-Wall Ratio**

Orientation	PROP*	ASHRAE
N	62%	34%
E	75%	41%
S	74%	42%
W	76%	41%
<b>TOTAL</b>	<b>72%</b>	<b>40%</b>

\*spandrel assumed as opaque wall



**Table 1.2 Predominant Spaces**

Building Section	Space Use Category	Area (m <sup>2</sup> )	% of Tot.	Reference Case	Comments
Lobby	Lobby	1,100	1%	Equal to proposed	
Office	Office	123,800	70%		
Retail & Amenity	Retail & Amenity	4,500	3%		
Bus Terminal	Terminal Waiting	8,800	5%		
Circulation	Corridors/Stairs	15,000	9%		
Storage & Washrooms	Storage & Washrooms	8,500	5%		
M&E	M&E	14,300	8%		
Parking	Parking	31,200	18%		
<b>TOTAL:</b>		<b>207,200</b>			
<b>Modelled Floor Area</b>		<b>176,000</b>			



**BUILDING ENVELOPE**

**Table 1.3 Exposed Walls, Roofs, and Opaque Doors**

Construction	Description	R-IP (Nominal)	R-IP (Net)	Reference Case	Comments
Shear Wall	39" poured Concrete Wall abutting rail tracks		R-3.2	Overall R-15.6 (R-13 + R-7.5 c.i.)	
PH Panel Systems	Insulated Wall Panels 75mm polyisocyanurate core	R-21		Overall R-15.6 (R-13 + R-7.5 c.i.)	
Curtainwall Spandrel Panel	102 mm thick Roxul insulation in backpan	R-12	R-6.3	Overall R-15.6 (R-13 + R-7.5 c.i.)	
Exposed Soffit	pre-finished aluminum panel 102 mm mineral fibre insulation	R-16		Overall R-26.3	
Roof	Topped with concrete pavers or roofing membrane 150 mm rigid XPS insulation	R-30		Overall R-20.8	
Parkade Roof	Insulated parkade roof with 150mm rigid XPS insulation, landscaping	R-35		Overall R-20.8	
<b>Total opaque, exposed surfaces:</b>					

**Table 1.4 Ground-Contact Walls and Floors**

Construction	Description	R-IP (Net)	Reference Case	Comments
Below Grade Wall	Cast-in-place concrete, 37.5mm rigid insulation (R-7.5)	C-0.119	matches proposed	
Slab on grade	Cast-in-place concrete, uninsulated.	F-0.730	matches proposed	

**Table 1.5 Windows and Glass Doors**

Components		T-vis	SHGC	U-IP	Reference Case	Comments
Typical CW	Glazings: Outboard lite: 10mm VUE 24-40 semi low iron (#2) Inboard lite: 6mm Optiwhite lite	0.42	0.22	0.26		Center of glass
	Space Fill: 19mm, 90% Argon, 10% Air					
	Low-E: #2					
	Spacer: Stainless steel					
Total	Frame:	0.38	0.20	0.32	U-IP = 0.45 SHGC = 0.40	Overall frame and window
	T-Break:					

Notes:

Net R-Value includes the effect of thermal bridging.

**Table 1.6 Infiltration**

Infiltration	Flow	Schedule	Comments
Infiltration	0.00025 m3/s per m2 of façade	Constant, 24h/7d	



## 2. MECHANICAL SYSTEMS DESCRIPTION

Table 2.1 Predominant Delivery Systems

System	Serving	Description		Reference Case	Comments		
AHU-1/2/3/4 AHU-5 Subsystems: CU-all AHU-7	Office Areas (L5-49), ventilation air  BOH	<b>General</b>					
		Description:	Dedicated OA units with VFDs, ERV recovering energy from washroom and general exhaust.  OA is conditioned to 12.8°C (55 F) year-round and delivered to on-floor compartmental units, and distributed via fan-powered boxes to zones.	n/a (no DOAS in ref)			
		Size:	see attached AHU summary				
		Supply Fan Power:	see attached AHU summary				
		Return Fan Power:	see attached AHU summary				
		<b>Ventilation</b>					
		Size:	100% OA (exception: AHU-14: 70% OA)	OA capacity equal to proposed and distributed amongst respective System 7's as described below.	OA rates to be commissioned to ASHRAE 62.1 values		
		Efficiency:	Energy Recovery Wheel Sensible Effectiveness 75-77% Latent Effectiveness 70-72%	See System 7 descriptions below.			
		Controls:	Demand Controlled Ventilation based on feedback from sub-systems		installed in base building equipment and required by tenant lease agreement - credit no modelled		
		<b>Pre-Heating</b>					
		Size:	470-1040 MBH				
		Source:	HW loop				
		Other:	SAT = 3.3°C (38 F) preheat for frost control				
		<b>Cooling</b>					
		Size:	260-2310 MBH				
		Source:	CHW loop				
		Other:	SAT = 12.8°C (55 F)				
		<b>Sub-systems: AHU 1-4 &amp; 5 - Compartment Units (see below)</b>					
		<b>Sub-systems: AHU 7</b>					
		Equipment Type:	Fan-coil Units (FCUs) Heat Pumps (HPs)		Combined under System 7 - VAV with reheat		
Size:	varies		Autosized Min flow is 30% of peak or min OA flow rate, whichever is greater.				
Ventilation:	ASHRAE 62.1		matches proposed				
Fan power:	FCUs: 0.000456 kW/cfm HPs: 0.000295 kW/cfm		Reference model fan power calculations performed outside the energy model (as per Appendix G, G3.1.2.10)				
Controls:	cycling		VAV, Air side economizer				
Cooling:	FCUs SAT = 55 F (hydronic) HPs SAT = 52 F (water-cooled CW connection)		SAT=55 F (hydronic) reset to 60 F				
Heating:	FCUs SAT = 95 F (hydronic) HPs SAT = 102 F (water-cooled CW connection)		SAT=90 F (hydronic) Reheat delta T of 25 F				



System	Serving	Description		Reference Case	Comments
Compartment Units (all)	Office Floor FPBs (L5-49)	<b>General</b>			
		Description:	VAV compartment units on each floor serving series fan powered boxes (with reheat coils). Compartmental units are provided with acoustic attenuation and MERV 13 filters.	System 7: VAV with reheat	
		Size:	see attached AHU summary	Autosized Min flow is 30% of peak or min OA flow rate, whichever is greater.	
		Controls:	Variable delivery of air to terminal VAV and FPB units; dual-control VAV strategy uses CO2 levels and zone temperatures to reduce required airflow to zones.  min flow: 25%	VAV, Air side economizer	
		Supply/Return/ Exhaust Fan Power:	see attached AHU summary	Reference model fan power calculations performed outside the energy model (as per Appendix G, G3.1.2.10)	
		<b>Ventilation</b>			
		Size:	ASHRAE 62.1: 2,269 l/s (23% OA) (ea.) Outdoor air provided by DOAS described above.	OA rates matching proposed.	
		Efficiency:	Energy Recovery Wheel Sensible Effectiveness 75-77% Latent Effectiveness 70-72%	Per ASHRAE Table 6.5.6.1, 50% energy recovery on respective reference systems (CU 5-2 & 5-3 only).	
		Controls:	The 100% OA risers will feed a CO2 controlled variable volume unit at the takeoff to each on-floor compartment unit room. Fresh air will be mixed with return air before distribution to the on-floor HVAC system.	100% OA economizer	
		<b>Heating</b>			
		Size:	Varies	Autosized with 1.25 sizing factor	
		Source	HW loop	HW Loop	
		Efficiency:	n/a	n/a	
		Control:	Coldest zone reset	Constant	
		Other:	SAT =86 F Reheat delta T of 35 F	SAT = 90 F (hydronic) Reheat delta T of 25 F	
		<b>Cooling</b>			
		Size:	see attached AHU summary	Autosized with 1.15 sizing factor	
		Source	CHW loop	CHW loop	
		Other:		SAT=55 F (hydronic) reset to 60 F	
		<b>Zone HVAC Equipment</b>			
		Equipment Type:	Fan-Powered Boxes (FPB)	VAV box with reheat	
		Fan power:	ECM fans with variable flow: 0.00029-0.00032 kW/cfm	n/a	
		Controls:	Upon call for cooling, primary air damper and fan discharge flowrate modulate between min and max cooling flowrate requirements; upon a call for heating, fan discharge flowrate modulate to maintain the space temperature heating setpoint. If airflow is max, and there are still heating requirements, heating coil valve modulate to maintain the heating setpoint  SAT = 10.6°C (51F) reset to 17.8°C (64F) during min cooling and 30°C (86F) during peak heating  min flow = 25%		
Heating:	No heating in the compartmental units; perimeter zones are provided with dedicated series fan powered boxes with reheat coils  heating capacity: varies				



System	Serving	Description		Reference Case	Comments	
AHU-9	Bus terminal (L1 & L2)	<b>General</b>				
		Description:	VAV air handler serving bus terminal areas	System 7: VAV with reheat		
		Size:	see attached AHU summary	Autosized Min flow is 30% of peak or min OA flow rate, whichever is greater.		
		Supply Fan Power:	see attached AHU summary	Reference model fan power calculations performed outside the energy model (as per Appendix G, G3.1.2.10)		
		Return Fan Power:	see attached AHU summary			
		<b>Ventilation</b>				
		Size:	see attached AHU summary	matches proposed		
		Efficiency:	No heat recovery	Not Required		
		Controls:	differential enthalpy OA economizer Return CO2 sensor demand control ventilation	100% OA economizer	DCV credit not modelled	
		<b>Heating</b>				
		Size:	see attached AHU summary	Autosized with 1.25 sizing factor		
		Source	HW Loop	HW Loop		
		Other:	SAT = 32.2°C (90F)	SAT = 90 F (hydronic) Reheat delta T of 25 F		
		<b>Cooling</b>				
		Size:	see attached AHU summary	Autosized with 1.15 sizing factor		
		Source	CHW loop	CHW Loop		
		Other:	SAT = 7.7°C (46F) RH = max 55%	SAT=55 F (hydronic) reset to 60 F		
<b>Zone HVAC Equipment - Bus Terminal</b>						
Equipment Type:	Air handling unit serves VAV boxes Perimeter heating handled by Trench Heaters (THs)	VAV box with reheat	TH fan power captured in eQuest using parallel induction unit (see description below)			
System	Serving	Description		Reference Case	Comments	
AHU-11/12 AHU-14 AHU-8/15/17	Main Lobby South West Podium (lvl 1-4) Amenity (L4)	<b>General</b>				
		Description:	AHU-11/12, AHU-14: VAV air handlers serving main Lobby AHU-8/15/17 & 14: Capped VAV air handlers serving shelled spaces intended for dining/cafeteria/other amenity and banking/office use	System 7: VAV with reheat		
		Size:	see attached AHU summary	Autosized Min flow is 30% of peak or min OA flow rate, whichever is greater.		
		Humidifier:	Lobby / AHU-14: 30% RH, electric All other: no humidification	matches proposed		
		Supply Fan Power:	see attached AHU summary	Reference model fan power calculations performed outside the energy model (as per Appendix G, G3.1.2.10)		
		Return Fan Power:	see attached AHU summary			
		<b>Ventilation</b>				
		Size:	see attached AHU summary	matches proposed		
		Efficiency:	AHU-14: ERV (see attached AHU summary) others: No heat recovery	Per ASHRAE Table 6.5.6.1, 50% energy recovery on respective reference systems for AHU 8, 14 & 15.		
		Controls:	differential enthalpy OA economizer (except AHU-14) Return CO2 sensor demand control ventilation	100% OA economizer	DCV credit not modelled	
		<b>Heating</b>				
		Size:	see attached AHU summary	Autosized with 1.25 sizing factor		
		Source	HW Loop	HW Loop		
		Other:	SAT: 32.2°C (90F)	SAT = 90 F (hydronic) Reheat delta T of 25 F		
		<b>Cooling</b>				
		Size:	see attached AHU summary	Autosized with 1.15 sizing factor		
		Source	CHW loop	CHW loop		
Other:	SAT = 11.7°C (53F) 85% RH (Lobby), 55% RH (Amenity)	SAT=55 F (hydronic) reset to 60 F				
<b>Zone HVAC Equipment - Main lobby</b>						
Equipment Type:	Continuous primary supply air diffusers. Perimeter FCUs with heating and cooling capacity	VAV box with reheat				
Controls:	Central system airflow-first control (heating & cooling) c/w perimeter Trench Heaters and FCUs (heating/cooling)		Terminal unit fan power captured in eQuest using parallel induction unit (see description below)			



System	Serving	Description		Reference Case	Comments	
AHU-10/16	PATH & NW zones (L1-4)	<b>General</b>				
		Description:	CAV air handler serving NW podium level spaces (multiple zone)	System 7: VAV with reheat		
		Size:	see attached AHU summary	Autosized		
		Supply Fan Power:	see attached AHU summary	Reference model fan power calculations performed outside the energy model (as per Appendix G, G3.1.2.10)		
		Return Fan Power:	see attached AHU summary AHU-16: oversized for pressurization (atypical operation)			
		<b>Ventilation</b>				
		Size:	see attached AHU summary	matches proposed		
		Efficiency:	No heat recovery	Not Required		
		Controls:	100% OA economizer (dual enthalpy) Return air CO2 sensor demand control	100% OA economizer	DCV credit not modelled	
		<b>Heating</b>				
		Size:	see attached AHU summary	Autosized with 1.25 sizing factor		
		Source	HW Loop	HW Loop		
		Other:	SAT = 32.2°C (90F)	SAT = 90 F (hydraulic) Reheat delta T of 25 F		
		<b>Cooling</b>				
		Size:	see attached AHU summary	Autosized with 1.15 sizing factor		
		Source	CHW Loop	CHW loop		
		Other:	SAT = 11.7°C (53F) RH = max 55%	SAT=55 F (hydraulic) reset to 60 F		
<b>Zone HVAC Equipment</b>						
Equipment Type:	Perimeter baseboards, Trench Heaters and FCUs (heating)	VAV box with reheat	Terminal unit fan power captured in eQuest using parallel induction unit (see description below)			
<b>System</b>	<b>Serving</b>	<b>Description</b>		<b>Reference Case</b>	<b>Comments</b>	
AHU-6	Sky Lobby	<b>General</b>				
		Description:	Single-zone VAV system serving Sky Lobby	System 7: VAV with reheat		
		Size:	see attached AHU summary	Autosized Min flow is 30% of peak or min OA flow rate, whichever is greater.		
		Humidifier:	electric	matches proposed		
		Supply Fan Power:	see attached AHU summary	Reference model fan power calculations performed outside the energy model (as per Appendix G, G3.1.2.10)		
		Return Fan Power:	see attached AHU summary AHU-6: shared RF with AHU-12			
		<b>Ventilation</b>				
		Size:	ASHRAE 62.1-2007	matches proposed		
		Efficiency:	No heat recovery	Per ASHRAE Table 6.5.6.1, 50% energy recovery on respective reference system.		
		Controls:	100% OA economizer (dual enthalpy) Demand Controlled Ventilation	100% OA economizer	DCV credit not modelled	
		<b>Heating</b>				
		Size:	see attached AHU summary	Autosized with 1.25 sizing factor		
		Source	HW Loop	HW Loop		
		Other:	SAT = 32.2°C (90F)	SAT = 90 F (hydraulic) Reheat delta T of 25 F		
		<b>Cooling</b>				
		Size:	see attached AHU summary	Autosized with 1.15 sizing factor		
		Source	CHW loop	CHW loop		
Other:	SAT = 11.7°C (53F)	SAT=55 F (hydraulic) reset to 60 F				



System	Serving	Description		Reference Case	Comments	
AHU-13	Central Food Hall	<b>General</b>				
		Description:	Capped 100% OA air handler serving shelled interior spaces intended for dining/cafeteria/other amenity use	System 7: VAV with reheat		
		Size	see attached AHU summary	Autosized Min flow is 30% of peak or min OA flow rate, whichever is greater.		
		Humidifier:	30% RH, electric	matches proposed		
		Supply Fan Power:	see attached AHU summary	Reference model fan power		
		Return Fan Power:	see attached AHU summary	calculations performed outside the energy model (as per Appendix G, G3.1.2.10)		
		<b>Ventilation</b>				
		Size:	ASHRAE 62.1-2007	matches proposed		
		Efficiency:	ERV (see attached AHU summary)	Per ASHRAE Table 6.5.6.1, 50% energy recovery on respective reference system.		
		Controls:	mixed air reset	100% OA economizer		
		<b>Heating</b>				
		Source	HW Loop Trench Heaters	HW Loop		
		Other:	n/a	SAT = 90 F (hydraulic)		
		<b>Cooling</b>				
		Size:	see attached AHU summary			
Source	CHW loop	CHW loop				
Other:	SAT = 13.9°C (57F)	SAT=55 F (hydraulic) reset to 60 F				
<b>System</b>	<b>Serving</b>	<b>Description</b>		<b>Reference Case</b>	<b>Comments</b>	
perimeter FCUs	Vestibules and ground level perimeter	<b>General</b>				
		Description:	Fan coil units with constant speed fan, chilled water cooling coil and hot water heating coil.	n/a	Respective zones included within System 7's.	
		Cooling source:	CHW loop			
		Heating source:	HW Loop			
Fan power	0.000488 kW/cfm (typ)	none				
<b>System</b>	<b>Serving</b>	<b>Description</b>		<b>Reference Case</b>	<b>Comments</b>	
Unit Heaters	Parking and Mechanical Rooms	<b>General</b>				
		Description:	Unit heaters with forced flow heaters equipped with hot water coils with modulating control valve.	matches proposed		
		Heating source:	Secondary HW Loop 2			
Fan power	0.000107 kW/cfm (typ)	none				
<b>System</b>	<b>Serving</b>	<b>Description</b>		<b>Reference Case</b>	<b>Comments</b>	
Trench Heaters	Bus terminal and Lvl 4 perimeter	<b>General</b>				
		Description:	Supplemental trench heaters with forced flow heaters equipped with hot water coils with modulating control valve.	n/a		
		Heating source:	HW Loop			
Fan power	0.000102 kW/cfm (typ)	none				





**Table 2.2 Distribution Loops**

System	Serving	Description		Reference Case	Comments
Primary HW Loop	Tower FPBs Secondary HW Loops	Description:	HW loop serving perimeter heating in office spaces.	HW Loop, Primary Only	
		Setpoints:	145 F (delta T = 20 F)	180 F (delta T = 30 F)	
		Control:	HWST reset based on OAT	180 F at 20 F and below 150 F at 50 F and above Ramped linearly between.	
		Distribution Pumps:	220 kW VFD; head = 125 ft	19 W/GPM Variable Speed Required	
Secondary HW Loops	AHU Preheat Coils, Zone Reheat Coils, Bus Parking Snow Melting	Description:	HW loop serving preheat coils in all the AHUs.	<i>combined with above</i>	
		Setpoints:	130 F (delta T = 20 F)		
		Control:	Heating water temperature reset based on OAT		
		Distribution Pumps:	112 kW & 23 kW VFD; head = 133 ft & 100 ft		
dummy CW Loop (for WLHP)	BOH WLHP Zones	Description:	CW Loop serving BOH WLHP sub-systems	<i>n/a</i>	proposed: modelled in eQuest on WLHP loop with dummy CT representing main equipment
		Setpoints:	Heating/Cooling: 55 F / 90 F		
		Distribution Pumps:	8.3 kW VFD; head = 75 ft		
CHW Loop	AHU Cooling coils	Description:	CHW loop serving all AHUs	CHW Loop, Primary-Secondary Configuration. Primary loop is constant flow, secondary loop is variable flow.	
		Setpoints:	40 F (delta T = 16 F)	44 F (delta T = 12 F)	
		Control:	Fixed supply water temperature	44 F at 80 F and above 54 F at 60 F and below Ramped linearly between.	
		Distribution Pumps:	260 kW VFD; head = 150 ft	22 W/GPM Variable Speed Required on Secondary Loop.	
CW Loop	CHW Loop  Water-side Economizer System	Description:	Serves chillers	Condensor Water Loop, separate loop for each Chiller.	
		Setpoints:	85 F (delta T = 10F)	85 F (delta T = 15F)	
		Control:	Variable flow	Variable flow	
		Distribution Pumps:	395 kW VFD; head = 115 ft	19 W/GPM Constant Speed	

**Table 2.3 Plant Equipment**

System	Serving	Description		Reference Case	Comments
Boilers	HWL	Description:	Gas Fired Condensing Boilers (qty 10)	Two (2) equally sized NG HW Boiler	
		Size:	10 x 1758.4 kW	autosized	
		Efficiency:	92.5%	80% (non-condensing) MNECB non-condensing part load curve	Reference Efficiency Per Table 6.8.1F
		Control:	Boilers staged to meet load.	Boilers staged to meet load.	
Chillers	CHWL	Description:	VFD centrifugal chillers (qty: 4)	6 equally sized water-cooled centrifugal chillers. No chiller is >800 tons.	
		Size:	3 x 1,250 tons & 1 x 500 tons	Autosized with no chiller being >800 tons.	
		COP (peak load):	COP = 5.85	COP = 6.17	Reference COP Per Table 6.8.1C
		Control:	Lead/ lag operation. VFD for centrifugal chillers.	no VSD	
Cooling Towers	CHWL	Description:	Induced draft cooling towers (qty 4; 2 cells ea.)	Open-Circuit Cooling Tower (one per chiller)	
		Size:	1100 ton (ea.)	autosized	
		Efficiency:		38.2 gpm/hp	
		Control:	Fans: 55.9 kW VFD ; airflow: 555,900 cfm (ea.)	two-speed	

**Table 2.4 Domestic Hot Water**

System	Load	Description		Reference Case	Comments
DHW		Description:	Base building DHW generated by electric hot water tanks	Electric DHW tanks	
		Efficiency:	100% (electric)	100% (electric)	
		Setpoints:	Supply = 135 F, mixed to 100 F at point of use	135 F (delta T 80 F)	
		Fixture Flow:	LEED WEp1/WEc3 - design	matching proposed	



### 3. ELECTRICAL SYSTEMS DESCRIPTION

#### LIGHTING SYSTEMS

Table 3.1 Interior Lighting

Space Use Classification: Space / Building Type - REFERENCE: MNECB

Serving	Description		Reference Case	Comments
Tenant Office (tower and podium)	Fixture:	LED		
	Installed LPD (W/ft2):	7.9 W/m2 (per mandatory tenant lease agreements)	10.6 W/m2	
	Controls:	OS & Daylight Controls		modelled as %-reduction per LEED Guidelines
SW Podium (Retail/Bank)	Fixture:	LED		
	Installed LPD (W/ft2):	11.2 W/m2 (per mandatory tenant lease agreements)	14.9 W/m2 (bank areas)	
	Controls:	none		
Amenities	Fixture:	LED		
	Installed LPD (W/ft2):	5.25 W/m2 (per mandatory tenant lease agreements)	13.2 W/m2	
	Controls:	none		
Bus Terminal	Fixture:	LED		
	Installed LPD (W/ft2):	3.8 - 6.0 W/m2	11.6 W/m2	
	Controls:	none		
Parking	Fixture:	LED		
	Installed LPD (W/ft2):	1.0 W/m2	2.1 W/m2	
	Controls:	none		
<b>Total Building LPD:</b>		<b>4.5 W/m2</b>	<b>9.3 W/ft2</b>	

Table 3.2 Exterior Lighting

Serving	Area (ft²)	Description		Reference Case	Comments
Façade, diagonals, crown		Fixture:	LED Installed Lighting Power: 10.2 kW	matching proposed	No credit taken over reference lighting.
		Controls:	Photocell		

#### PLUGS & PROCESS ELECTRICAL SYSTEMS

Table 3.4 Plug & Process Loads

Serving	Description	Peak (kW)	Density (W/m2)	Reference Case	Comments
Office	Plug loads		7.5 W/m2	Matching Proposed	MNECB-A
SW Podium	Plug loads		14.5 W/m2		MNECB-C
Amenity	Plug loads		1 W/m2		MNECB-C
Other	Corridor, storage, M&E, parking		0 W/m2		n/a
Elevators	46 Elevators Regenerative drives	180.7 kW			input directly on EM1 (24/7 schedule)
IT Server Loads	Communications / Electrical rooms	251.8 kW			input directly on EM1 (24/7 schedule)
Exterior	Snow Melt	255 kW (load)			input as a direct load on HW Loop using a custom annual hourly schedule (based on controls)
Building	Misc Fans (including PG Exhaust)	29.1 kW			input directly on EM1 (24/7 schedule) VFD (size > 3.73 kW)
Building	Misc Pumps	28.7 kW		input directly on EM1 (24/7 schedule) VFD (size > 0.75 kW)	



#### 4. SITE CONDITIONS

**Table 4.1 Utility Rate Information**

Utility Type	Consumption		Demand	Rate Schedule	Provider
Electricity	\$0.137	per kWh	\$8.3/kW	Gen. Service, 1,000 kW - 4,999 kW	Toronto Hydro
Natural gas	0.285 \$/m3	First 500m3	n/a	Rate 6	Enbridge
	0.266 \$/m3	Next 1050m3			
	0.253 \$/m3	Next 4500m3			
	0.244 \$/m3	Next 7000m3			
	0.240 \$/m3	Next 15250m3			
	0.239 \$/m3	All Over 28300m3			

**Table 4.2 Emission Factor Information**

Energy	Emission Factor	Source
ON Grid Electricity	20.0 gCO2e/kWh	Energy Star Portfolio Manager Technical Reference: Greenhouse Gas Emissions (October 2020)
Natural Gas	178.0 gCO2e/kWh	Energy Star Portfolio Manager Technical Reference: Greenhouse Gas Emissions (October 2020)

#### SPACE CONDITIONS

**Table 4.3 Heating, Cooling & Humidity Setpoints**

Area	Heating (°C)		Cooling (°C)		Humidity (%RH)		Comments
	Occ.	Unocc.	Occ.	Unocc.	Min.	Max.	
Offices	70.9	55	73.4	90	30%	60%	
Lobby Amenities Bank	64.4	50	82.4	90	30%	60%	
Mech Rooms Storage Path	50	50	n/a	n/a	0%	100%	