



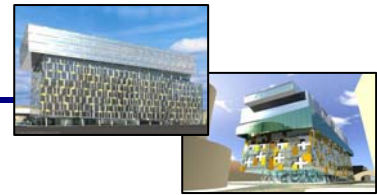
The Palestra Building

London, England



**APPENDIX A:
Existing Conditions – Internal Loads**

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Fabric Heating Load			
Total Fabric insulation (from Appendix H)	17014	W/K	
External temperature	-3	deg.C	
Internal temperature (Assume identical throughout)	22	deg.C	
Total Fabric load	425351	W	
Infiltration Heating Load			
Total Façade area	10800	m ²	
Infiltration rate	2.5	m ³ /hr/m ²	
temperature difference (as above)	25	K	
Volume of infiltration	7.5	m ³ /s	
Thermal capacity of air	1200	J/m ³ .K	
Total Infiltration load	225000	W	
			Indexes
			Building Floor height
			3.6
			Air changes per hour
			0.23
Mechanical Ventilation Heating Load			
Total floor area	26677	m ²	
Occupancy	12	m ² /occupant	
Ventilation Flow rate	16	l/s/occupant	
Air tempered to	22	deg.C	
External air	-3	deg.C	
Thermal Efficiency of ventilation plant	50	%	
Temperature difference	12.5	K	
Ventilation Flow rate	35.6	m ³ /s	
Air thermal Capacity	1200.0	J/m ³ .K	
System losses	10%		
Ventilation heat load	586894	W	
Total Heating Load			
Total Heating Load	1,237	kW	
Spare capacity	10%		
Pre-heat period	32%		
Installed Heating Load	1,796	kW	
			Indexes
			Building Floor area
			26677
			Load per m ² (W/m ²)
			67.3



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Breakdown of cooling loads

BH proposed Brief

Internal Cooling Load

persons	10 W/m2	m ² /occupant
light	15 W/m2	W/m ²
equip	30 W/m2	W/m ²
Fan Coil units	6 W/m2	W/m ²
total - Internal	61 W/m2	W/m ²

Environmental Cooling Load

Room Temperature	22	deg.C
Outdoor temperature	29	deg.C
Difference	7	deg.C
Solar cooling load	25	W/m ² (estimate) *
Fabric cooling load	5	W/m ² (estimate) *
Infiltration cooling load	1.9	W/m ² (estimate) *
Total Environmental	32 W/m2	

Mechanical Ventilation Cooling Load

Total floor area	26677	m ²
Occupancy	12	m ² /occupant
Ventilation Flow rate	16	l/s/occupant
Air tempered to	22	deg.C
External air	29	deg.C
Thermal Efficiency of ventilation plant	50	% (estimate) *
Temperature difference	-3.5	K
Ventilation Flow rate	35.6	m ³ /s
Air thermal Capacity	1200.0	J/m ³ .K
Ventilation cooling load	149391	W (estimate) *
Ventilation cooling load	5.6	W/m ² (estimate) *

Total

total W/m2	99	W/m ²
Area	26416	m ²
Total Cooling Load	2602	W
Sensible Heat Ratio	15%	
System Losses	10%	
Total	3,291 kW	

Proposed chillers

Capacity

Spare

6 x 0.553 MW	3,318 kW	0.81%
7 x 0.553 MW	3,871 kW	17.61%