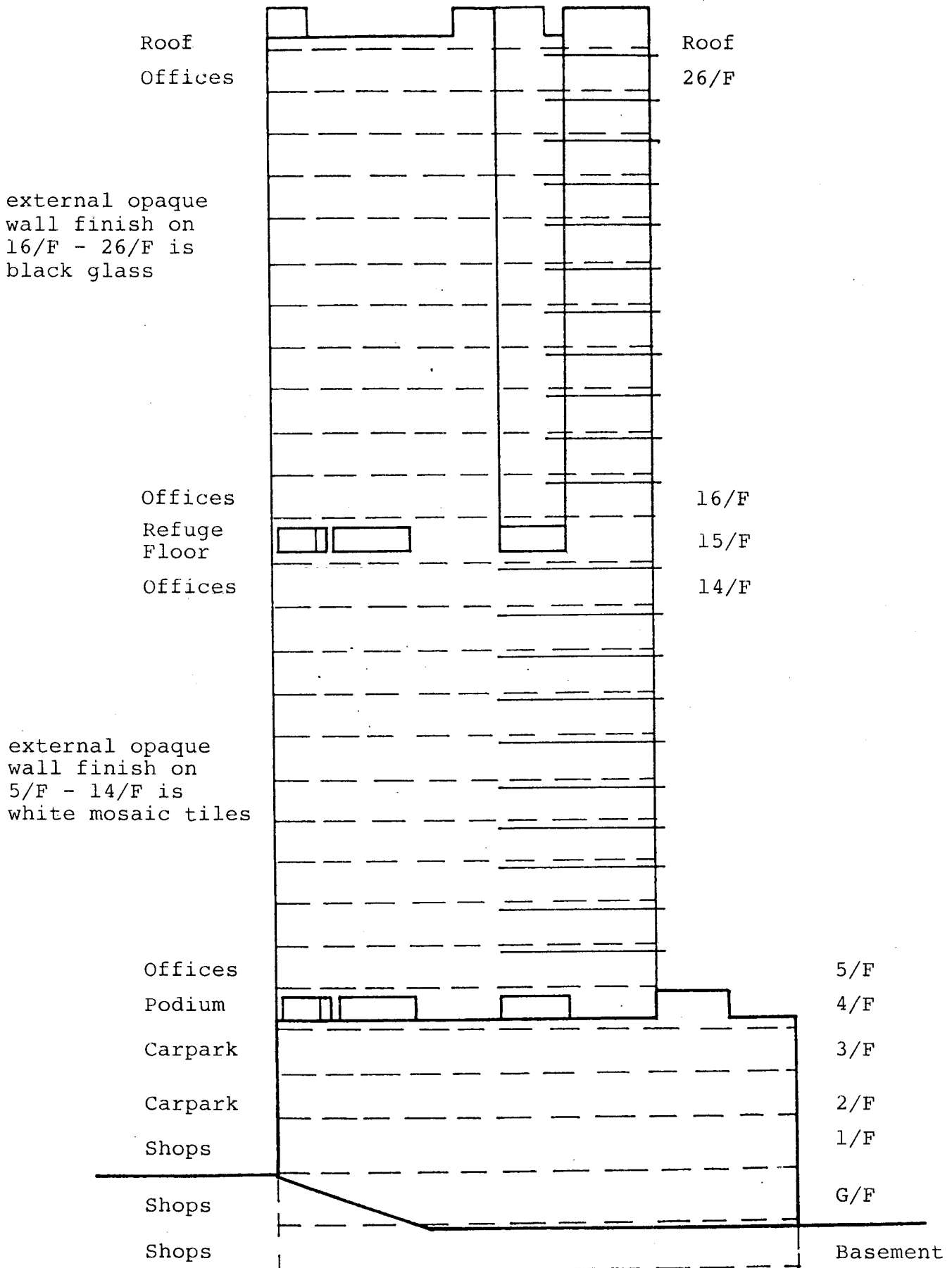


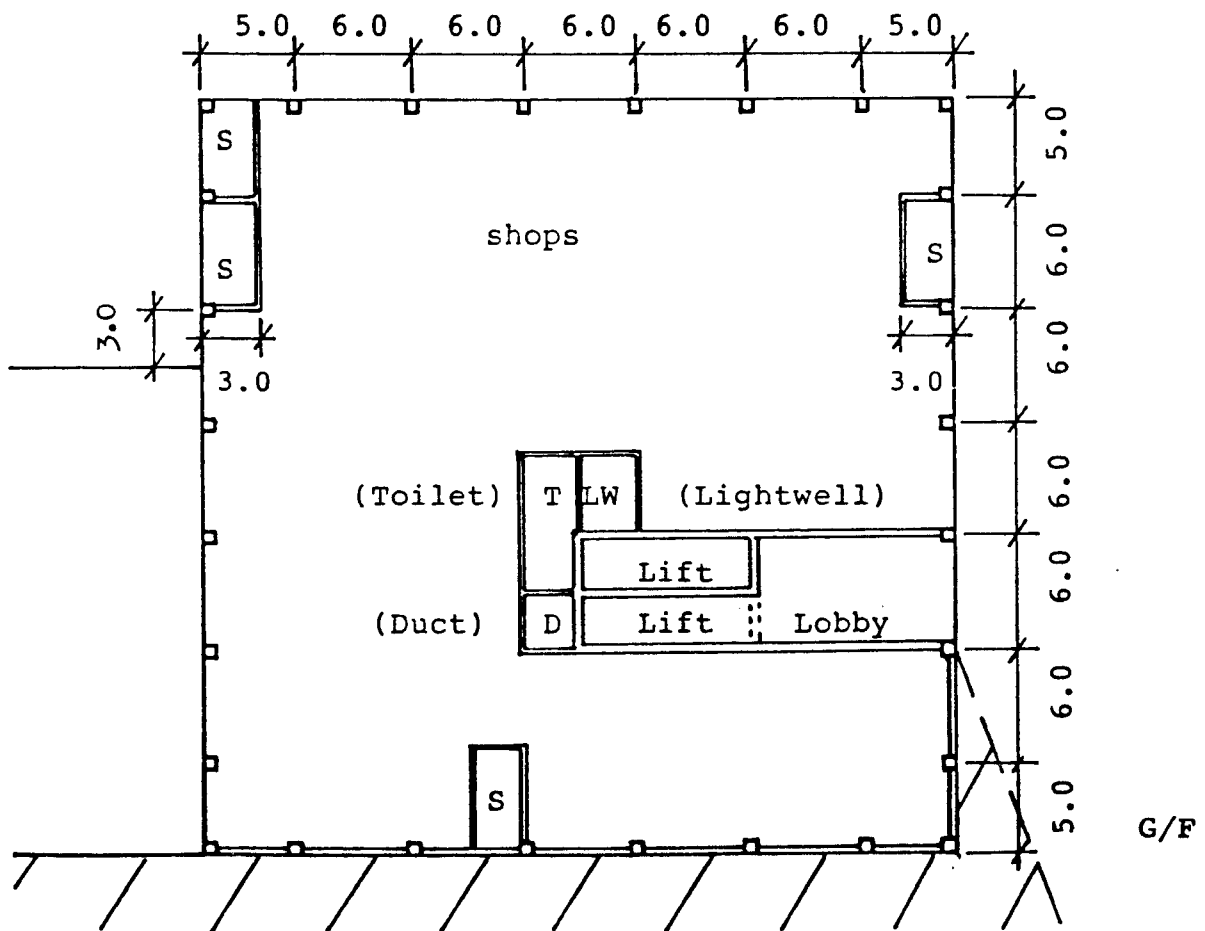
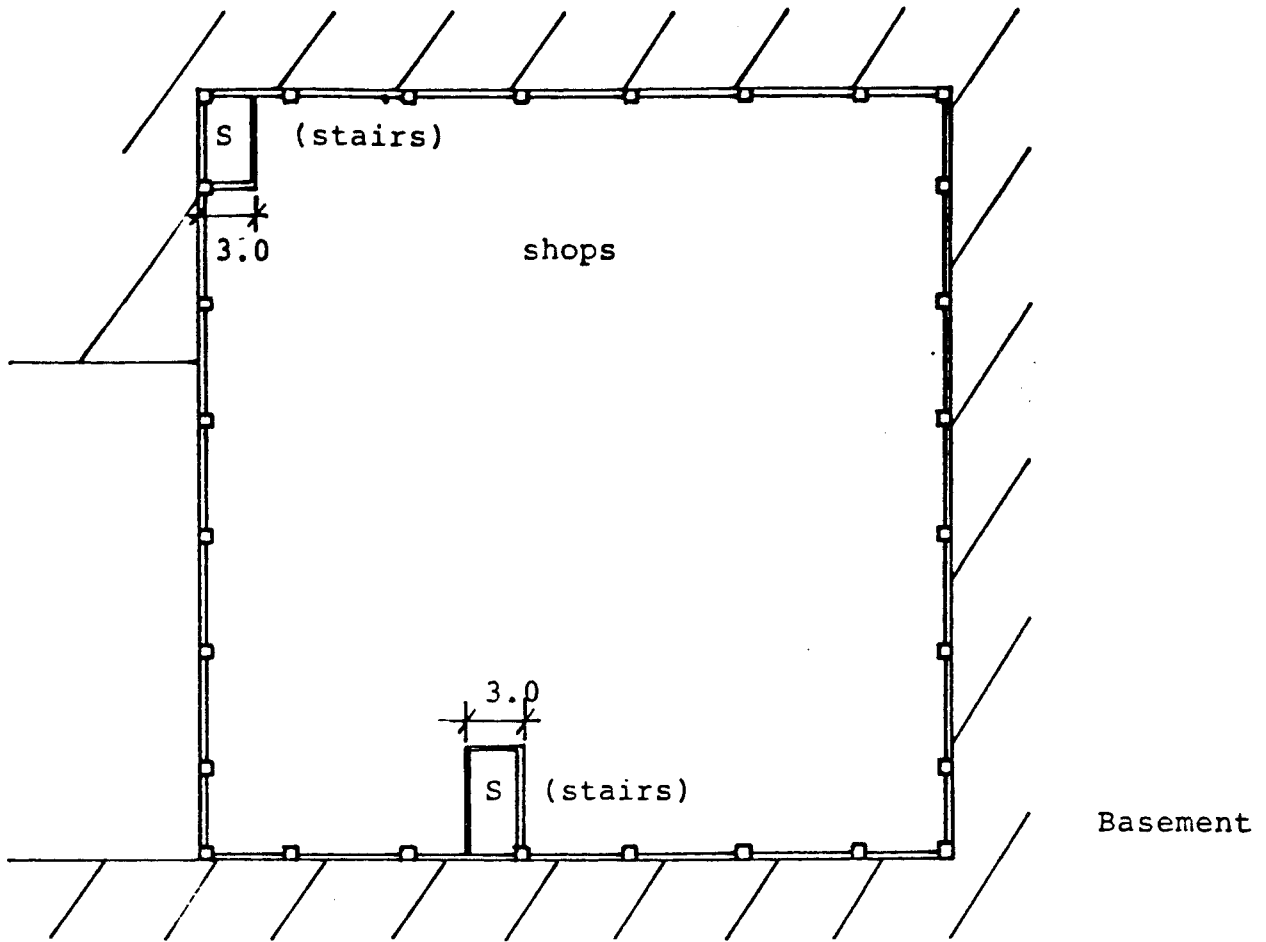
Appendix A

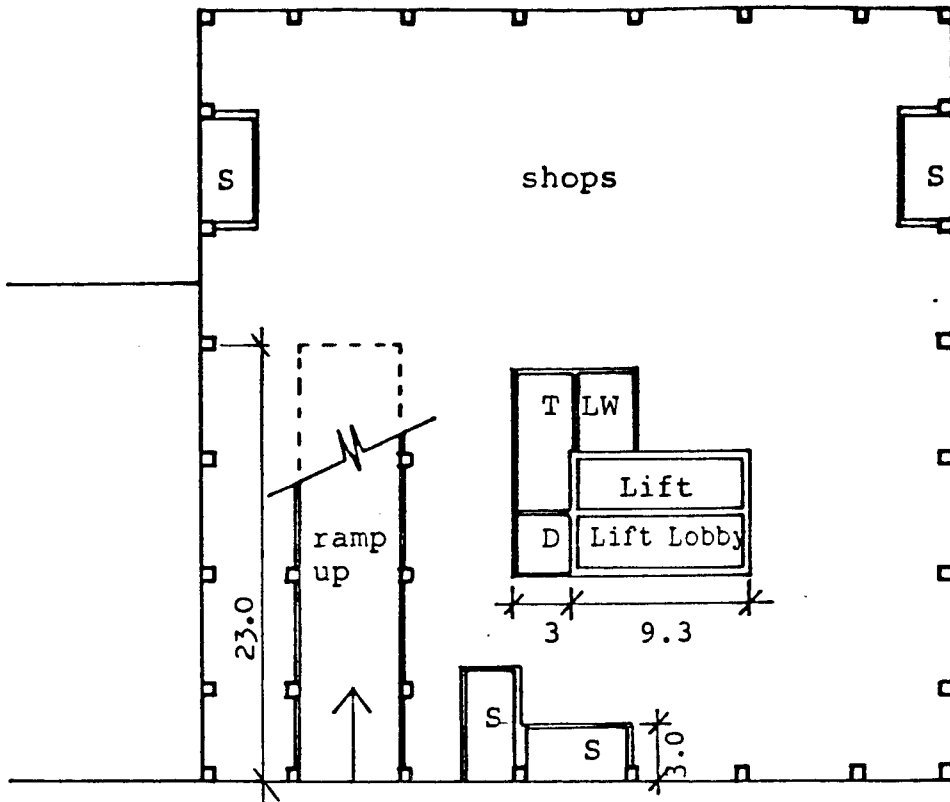
A sample of OTTV calculation for
a typical commercial building

Plans and Elevation of a Typical Commercial Building

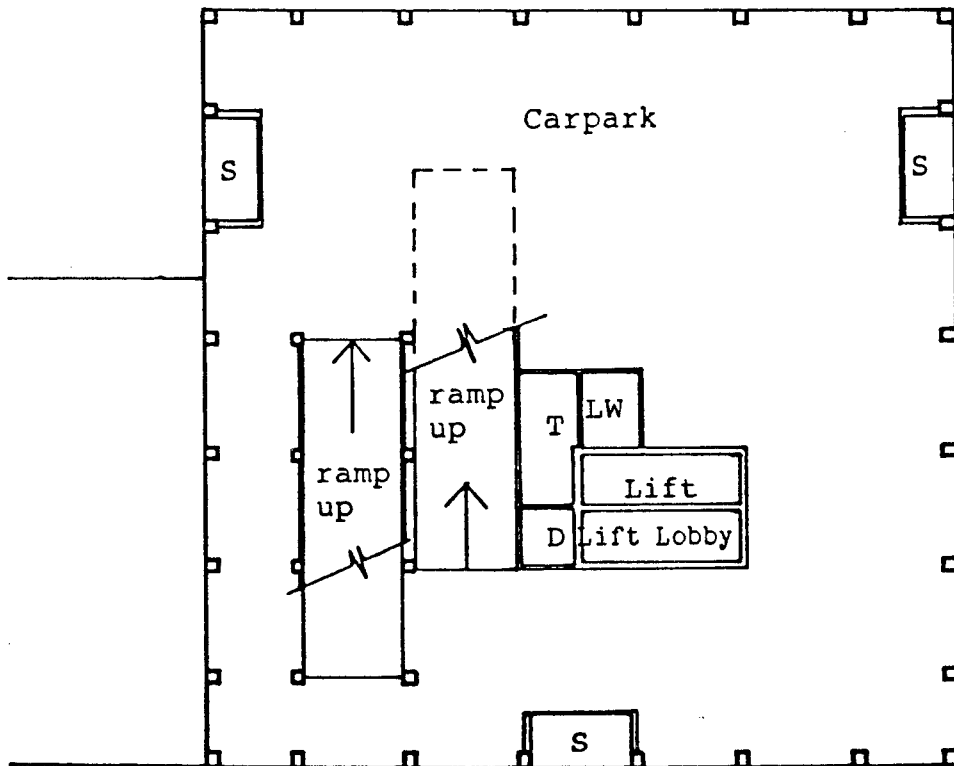


East Elevation

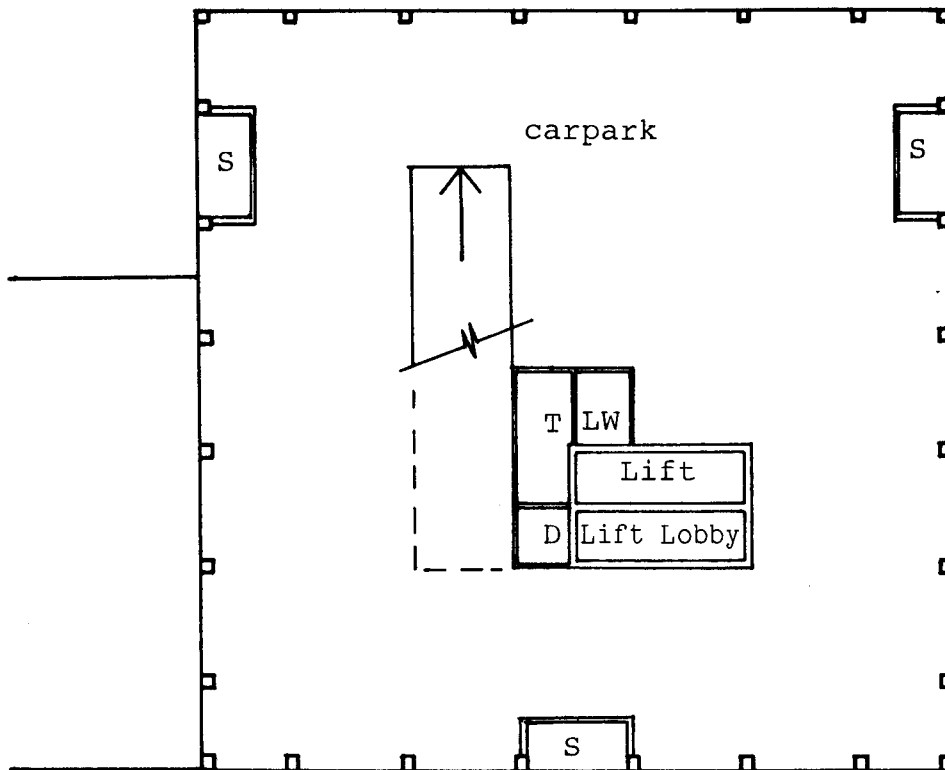




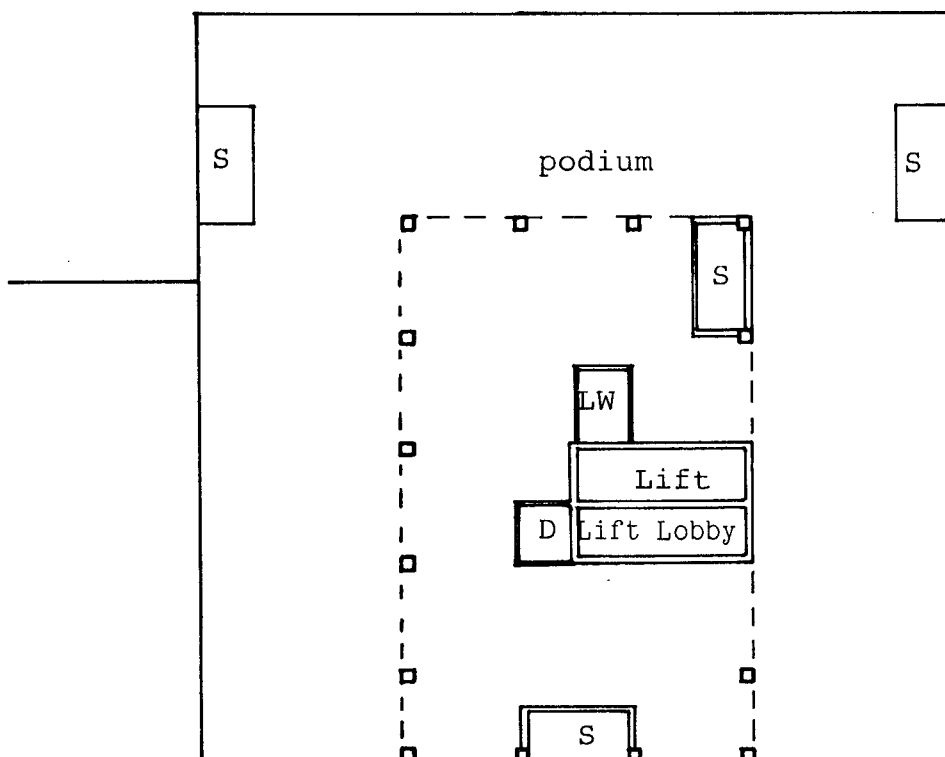
1/F



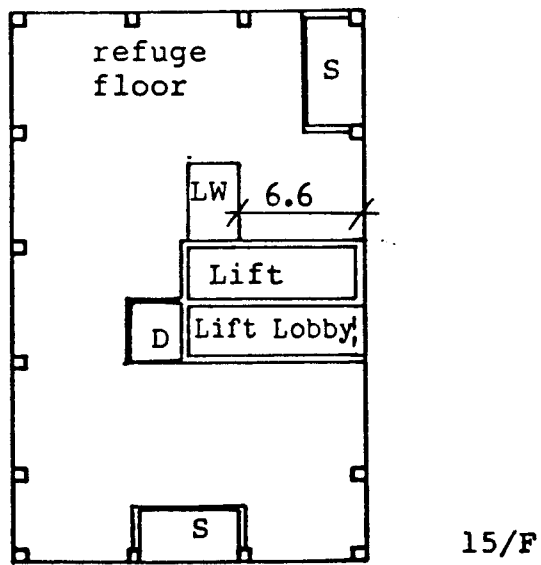
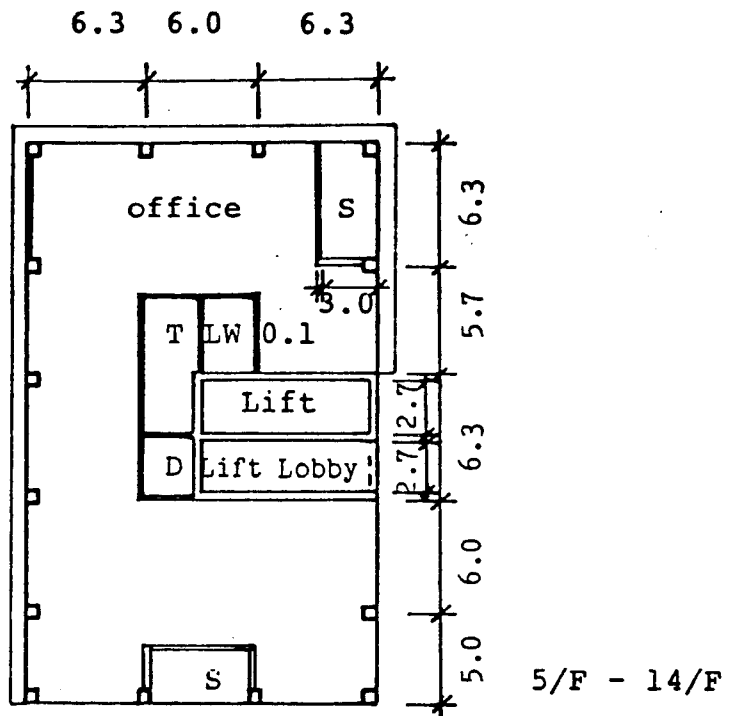
2/F

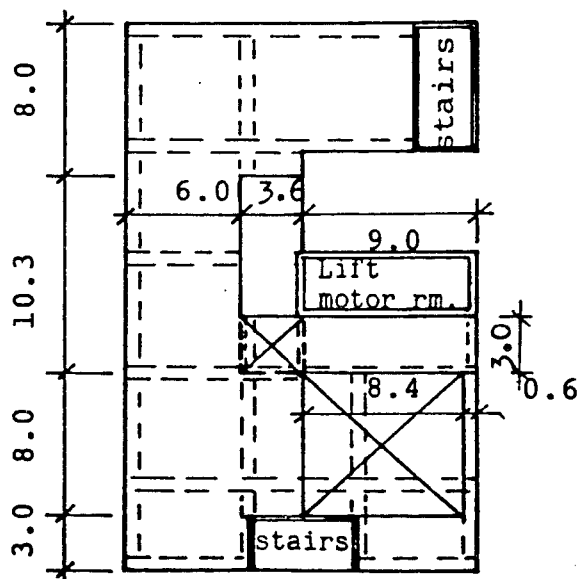
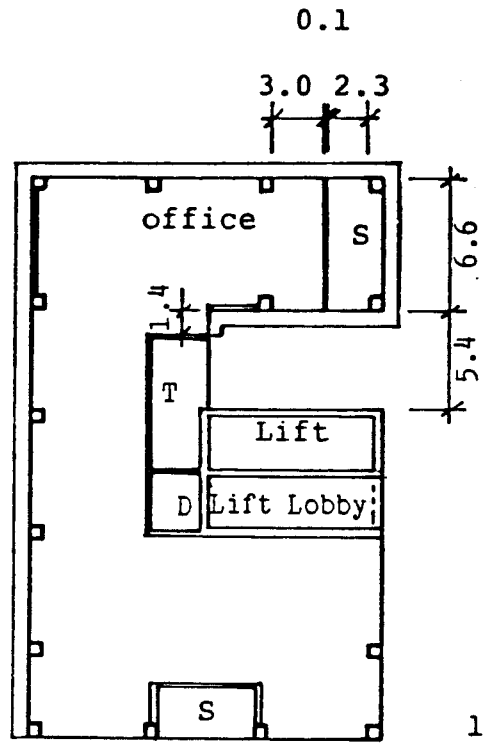


3/F

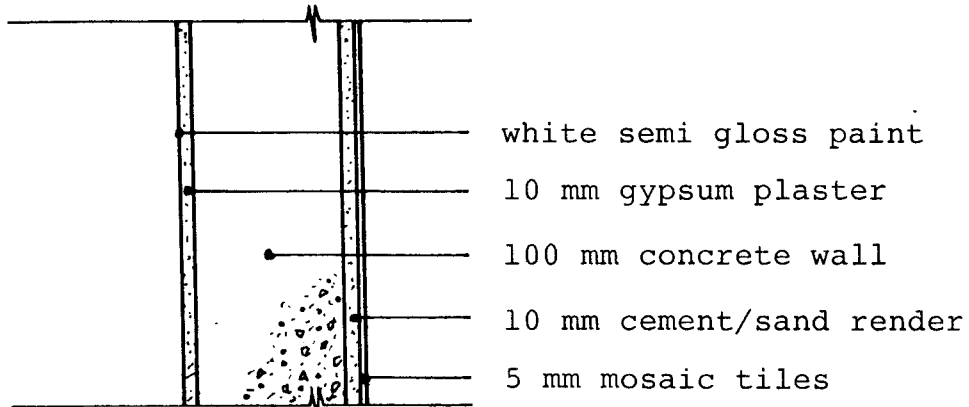


4/F

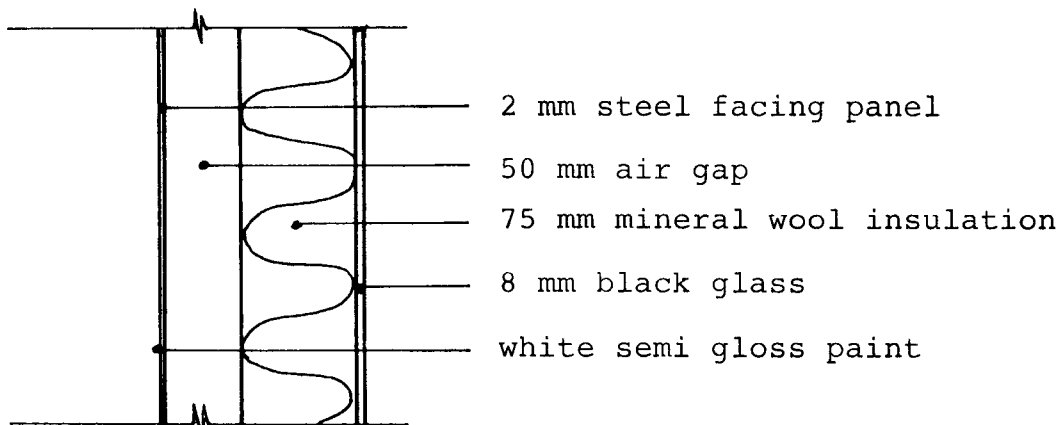




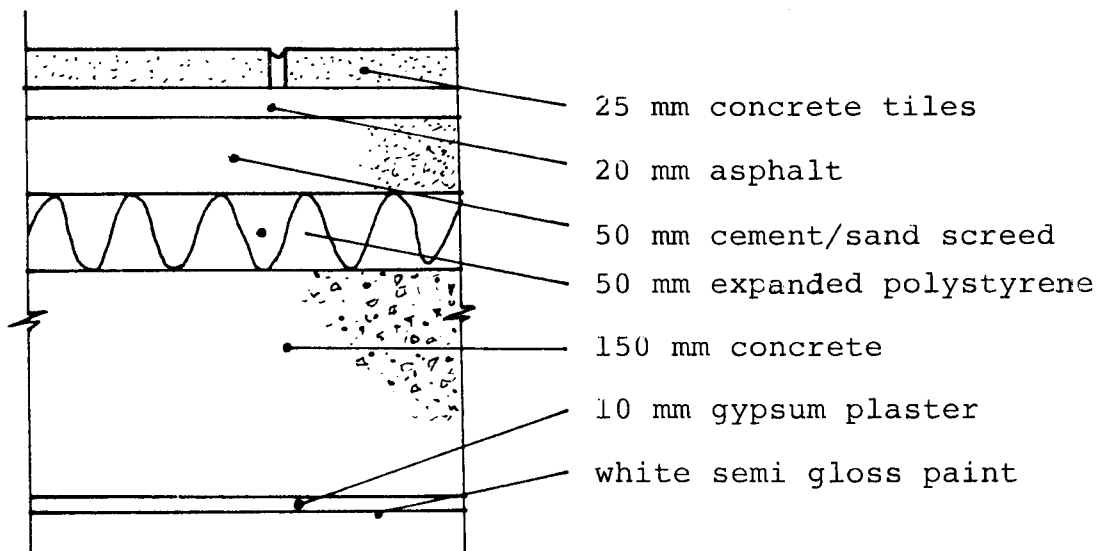
Construction of Walls and Roof



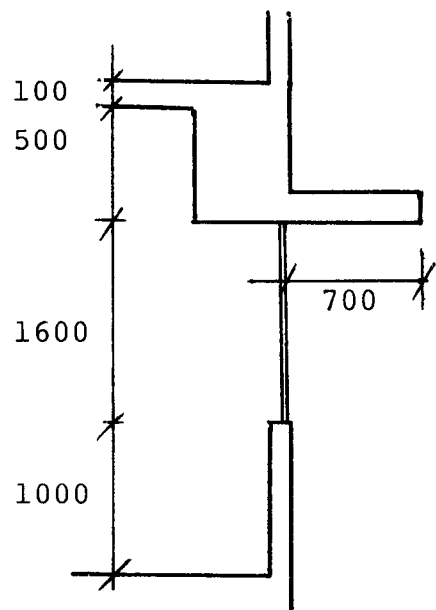
PANEL WALLS
GROUND - 15TH FLOOR



CURTAIN WALL
16TH FLOOR - 26TH FLOOR



ROOF



TYPICAL SECTION
5TH FLOOR - 26TH FLOOR

Gross Wall Calculations

Storey heights :

Ground and First Floors	4.0 m
2nd & 3rd floors	3.5 m
4th to 26th floors	3.2 m
All columns 600 x 600 mm	All beams 600 x 600 mm

East Elevation

P	G/F	$11.0 \times 4.0 \div 2 + 29 \times 4.0$	=	138.00 m ²	
	1/F	$40 \times 4.0 + 23 \times 4 \times 0.5$	=	206.00 m ²	344.00 m ²
<hr/>					
T	5/F-14/F	$23.0 \times 3.2 \times 10$	=	736.00 m ²	
	16/F-26/F	$23.0 \times 3.2 \times 11$	=	809.60 m ²	1,545.60 m ²
<hr/>					
	5/F-14/F	$6.3 \times 3.2 \times 10$	=	201.60 m ²	
	16-26/F	$6.3 \times 3.2 \times 11$	=	221.76 m ²	423.36 m ²
<hr/>					

North Elevation

P	G/F	40.0×4.0	=	160.00 m ²	
	1/F	40.0×4.0	=	160.00 m ²	320.00 m ²
<hr/>					
T	5-14/F	$18.6 \times 3.2 \times 10$	=	595.20 m ²	
	16-26/F	$(18.6 + 9) \times 3.2 \times 11$	=	971.52 m ²	1,566.72 m ²
<hr/>					

West Elevation

P	G/F	40×4.0	=	160.00 m ²	
	1/F	$40 \times 4.0 + 23 \times 4 \times 0.5$	=	206.00 m ²	366.00 m ²
<hr/>					
T	5/F-14/F	$29.3 \times 3.2 \times 10$	=	937.60 m ²	
	16/F-26/F	$29.3 \times 3.2 \times 11$	=	1,031.36 m ²	1,968.96 m ²
<hr/>					

South Elevation

P	G/F	Nil	=	-	
	1/F	$40 \times 4.0 + (5.4 \times 23.35 - 5.4 \times 4.0)$	=	264.49 m ²	264.49 m ²
<hr/>					
T	5/F-14/F	$18.6 \times 3.2 \times 10$	=	595.20 m ²	
	16/F-26/F	$(18.6 + 9) \times 3.2 \times 11$	=	971.52 m ²	1,566.72 m ²
<hr/>					

Window Schedule

Building Address

Typical Commercial Building

Orientation of Facade	Floor	Class Thickness m	Type	Sizes and no./floor m	Total area per floor m ²
East	G/F	0.012	plain	(5.4 x 4 + 4.1) 3.4	87.38
	1/F	0.012	plain	(4.1x2 + 5.4x5) 3.4	119.68
	2-4/F	Nil	Nil	-	-
	5-14/F	0.008	tinted	(4.1+5.7+5.4x2) 1.6	32.96
	5-14/F	0.008	tinted	2.7 x 1.6	4.32
	15/F	Nil	tinted	-	-
	16-26/F	0.008	tinted	(4.1+5.7+1.4+5.4) 1.6 +3.9x0.8	29.68
	16-26/F	0.008	tinted	2.7 x 1.6	4.32
North	G/F	0.012	plain	(4.1+5.4x5+1.7+2.3) 3.4	119.34
	1/F	0.012	plain	(4.1x2+5.4x5) 3.4	119.68
	2-4/F	Nil	Nil	-	-
	5-14/F	0.008	tinted	(2.3+3.0+5.4x2) 1.6	25.76
	15/F	Nil	Nil	-	-
	16-26/F	0.008	tinted	(2.3+3.0+5.4x2) 1.6	25.76
West	G/F	0.012	plain	(4.1+5.4+2.7) 3.4	41.48
	1/F	0.012	plain	(4.1+5.4+2.7) 3.4	41.48
	2-4/F	Nil	Nil	-	-
	5-14/F	0.008	tinted	(5.4x3+4.1) 1.6	32.48
	15/F	Nil	Nil	-	-
	16-26/F	0.008	tinted	(5.4x3+4.1) 1.6	32.48
South	G/F	Nil	Nil	-	-
	1/F	0.012	plain	(4.1x2+2.7+2.6+5.4x3) 3.4	100.98
	2-4/F	Nil	Nil	-	-
	5-14/F	0.008	tinted	(5.4x3) 1.6	25.92
	15/F	Nil	Nil	-	-
	16-26/F	0.006	reflective	(5.4x3) 1.6	25.92
	16-26/F	0.008	tinted	(3.0 + 2.3) 1.6	8.48

East Elevation (Tower) Gross Wall Area $1,545.60 + 423.36 = 1,968.96 \text{ m}^2$

Wall composite areas

Beams and Column Areas

5/F - 14/F $[0.6 (11.0+5.7+6.3)+(0.6 \times 2.6 \times 4)] \times 10 = 200.40 \text{ m}^2$
 15/F Nil
 16/F - 26/F $[0.6 (11.0+5.4+6.6)+(0.6 \times 2.6 \times 4)] \times 11 = 220.44 \text{ m}^2$ 420.84 m²

Glazing Areas in 100 mm panel/curtain wall from Window Schedule

5/F - 14/F $32.96 \times 10 = 329.60 \text{ m}^2$
 15/F Nil
 16/F - 26/F $29.68 \times 11 = 326.48 \text{ m}^2$ 656.08 m²

Glazing Area in 300 mm Structural Walls from Window Schedule

5/F - 14/F $4.32 \times 10 = 43.20 \text{ m}^2$
 15/F $4.32 \times 11 = 47.52 \text{ m}^2$ 90.72 m²

100 mm Panel/Curtain Wall Areas

5/F - 14/F $736.00 - (200.40 + 329.60) = 206.00 \text{ m}^2$
 15/F Nil
 16/F - 26/F $809.60 - (220.44 + 326.48) = 262.68 \text{ m}^2$ 468.68 m²

300 mm Structural Walls to Lift & Lift Lobby

5/F - 14/F $0.3 \times 3.2 \times 3 \times 10 = 28.80 \text{ m}^2$
 16/F - 26/F $0.3 \times 3.2 \times 3 \times 11 = 31.68 \text{ m}^2$ 60.48 m²

300 mm Panel Walls to Lift & Lift Lobby

5/F - 14/F $201.60 - (43.20 + 28.80) = 129.60$
 16/F - 26/F $221.76 - (47.52 + 31.68) = 142.56 \text{ m}^2$ 272.16 m²

Lift shaft walls without gypsum plaster

5/F - 14/F $2.7 \times 3.2 \times 10 = 86.40 \text{ m}^2$
 16/F - 26/F $2.7 \times 3.2 \times 11 = 95.04 \text{ m}^2$ 181.44 m²

Fenestration between 5/F - 14/F

Total Glazing in 100 mm panel walls = 329.60
 $(4.1 + 5.7) 1.6 \times 10 = 156.80$ unshaded
172.80 shaded

Fenestration between 16/F - 26/F

Total Glazing in curtain wall = 326.48
 $[(4.1+5.7)1.6+(3.9 \times 0.8)] \times 11 = 206.80$ unshaded
119.68 shaded

'U' value of composite wall of columns and beams :-

G/F, 1/F, 5/F-14/F

W ₁ for beam and column		Weight
external surface film	R _o = 0.044	
5 mm white mosaic tiles	$\frac{0.005}{1.5} = 0.003$	0.005 x 2500 = 12.50
10 mm cement/sand render	$\frac{0.01}{0.72} = 0.014$	0.01 x 1860 = 18.60
600 mm concrete beam & column	$\frac{0.60}{2.16} = 0.278$	0.60 x 2400 = 1440.00
10 mm gypsum plaster	$\frac{0.01}{0.38} = 0.026$	0.01 x 1120 = 11.20
Internal surface film (absorptivity below 0.5)	R _i = 0.299	
Totals	0.664	1482.30 kg/m ²

$$U_w = \frac{1}{0.664} = 1.51 \text{ W/m}^2\text{°C}$$

(for west podium wall without tiles or render 'U' value is 1.55 W/m²°C)

'U' value of composite wall panels :-

G/F, 1/F, 5/F-14/F

W ₃ for wall panel		Weight
external surface film	R _o = 0.044	
5 mm white mosaic tiles	= 0.003	0.005 x 2500 = 12.50
10 mm cement/sand render	= 0.014	0.01 x 1860 = 18.60
100 mm concrete panel	$\frac{0.1}{2.16} = 0.046$	0.10 x 2400 = 240.00
10 mm gypsum plaster	= 0.026	0.01 x 1120 = 11.20
Internal surface film	R _i = 0.299	
Totals	0.432	282.30 kg/m ²

$$U_w = \frac{1}{0.432} = 2.32 \text{ W/m}^2\text{°C}$$

(for west podium wall without tiles and render 'U' value is 2.41 W/m²°C)

'U' value of composite columns and beams :-

16/F - 26/F

W ₂ for beam and column		Weight
External surface film	R _o = 0.044	
8 mm black glass	$\frac{0.008}{1.05} = 0.0076$	0.008 x 2500 = 20.00
50 mm Air space resistance (absorptivity above 0.5)	R _a = 0.153	
600 mm concrete beam and column	$\frac{0.60}{2.16} = 0.278$	0.6 x 2400 = 1440.00
10 mm gypsum plaster	$\frac{0.01}{0.38} = 0.026$	0.01 x 1120 = 11.20
Internal surface film	R _i = 0.299	
Totals	0.808	1471.20 kg/m ²

$$U_w = \frac{1}{0.808} = 1.24 \text{ W/m}^2\text{°C}$$

'U' value of composite curtain wall panels :-

16/F - 26/F

W ₄ for panel wall		Weight
External surface film	R _o = 0.044	
8 mm black glass	$\frac{0.008}{1.05} = 0.0076$	0.008 x 2500 = 20.00
75 mm mineral wool felt insulation	$\frac{0.075}{0.039} = 1.923$	0.075 x 50 = 3.75
50 mm Air space resistance (absorptivity above 0.5)	R _a = 0.153	-
2 mm pressed steel panel	$\frac{0.002}{50} = 0.00004$	0.002 x 7800 = 15.60
Internal surface film	R _i = 0.299	
Totals	2.427	39.35 kg/m ²

$$U_w = \frac{1}{2.427} = 0.41 \text{ W/m}^2\text{°C}$$

'U' value of structural walls :-

G/F, 1/F, 5/F-14/F

W ₅ for wall panel		Weight
external surface film	Ro = 0.044	
5 mm white mosaic tiles	$\frac{0.005}{1.5} = 0.003$	0.005 x 2500 = 12.50
10 mm cement/sand render	$\frac{0.01}{0.72} = 0.014$	0.01 x 1860 = 18.60
300 mm concrete wall	$\frac{0.30}{2.16} = 0.139$	0.30 x 2400 = 720.00
10 mm gypsum plaster	$\frac{0.01}{0.38} = 0.026$	0.01 x 1120 = 11.20
Internal surface film (absorptivity below 0.5)	Ri = 0.299	
Totals	0.525	762.3 kg/m ²

$$U_w = \frac{1}{0.525} = 1.91 \text{ W/m}^2\text{°C}$$

(for carpark ramp and walls without tiles or render 'U' value is 1.97 W/m²°C)
(for lift wall without gypsum plaster 'U' value is 3.13 W/m²°C)

'U' value of structural walls :-

16/F-26/F

W ₆ for beam and column		Weight
external surface film	Ro = 0.044	
8 mm black glass	$\frac{0.008}{1.05} = 0.0076$	0.008 x 2500 = 20.00
50 mm Air space resistance (absorptivity above 0.5)	Ra = 0.153	
300 mm concrete wall	$\frac{0.30}{2.16} = 0.139$	0.3 x 2400 = 720.00
10 mm gypsum plaster	$\frac{0.01}{0.38} = 0.026$	0.01 x 1120 = 11.20
Internal surface film	Ri = 0.299	
Totals	0.669	751.20 kg/m ²

$$U_w = \frac{1}{0.669} = 1.50 \text{ W/m}^2\text{°C}$$

(for lift wall without gypsum plaster 'U' value is 2.16 W/m²°C)

'U' value of Lift Lobby wall :-

5/F - 14/F

W7 for beam and column		Weight
External surface film	Ro = 0.044	
5 mm white mosaic tiles	= 0.003	0.005 x 2500 = 12.50
10 mm cement/sand render	= 0.014	0.01 x 1860 = 18.60
*3.0 m concrete lobby wall	3.00 —— = 1.389 2.16	3.00 x 2400 = 7200.00
Totals	1.450	7231.10 kg/m ²

$$U_w = \frac{1}{1.45} = 0.69 \text{ W/m}^2\text{°C} \quad * 3.0 \text{ m length assumed for simplicity}$$

'U' value of Lift Lobby wall :-

16/F - 26/F

W8 for beam and column		Weight
External surface film	Ro = 0.044	
8 mm black glass	= 0.0076	0.008 x 2500 = 20.00
50 mm Air space resistance (absorptivity above 0.5)	Ra = 0.153	
*3.0 m concrete lobby wall	= 1.389	3.00 x 2400 = 7200.00
Totals	= 1.594	7220.00 kg/m ²

$$U_w = \frac{1}{1.594} = 0.63 \text{ W/m}^2\text{°C}$$

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 1

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing East (Tower)Solar Factor (SF) is 168

*Wall/Roof Code No.	*W ₁ /R ₁	*W ₂ /R ₂	*W ₃ /R ₃	*W ₄ /R ₄
Location of Wall/Roof	Beams & Cols 5/F-14/F	Beams & Cols 16/F-26/F	Panel Curtain Walls 5/F-14/F	Panel Curtain Wall 16/F-26/F
External Finish Material				
Conductivity W/m°C	1.50	1.05	1.50	1.05
Density kg/m ³	2500	2500	2500	2500
Thickness m	0.005	0.008	0.005	0.008
Absorptivity (α)	0.58	1.00	0.58	1.00
Intermediate component	cement render	air gap	cement render	mineral wool
Conductivity W/m°C	0.72		0.72	0.039
Density kg/m ³	1860		1860	50
Thickness m	0.01	0.05	0.01	0.075
Intermediate component	r. concrete	r. concrete	r. concrete	air gap
Conductivity W/m°C	2.16	2.16	2.16	
Density kg/m ³	2400	2400	2400	
Thickness m	0.60	0.60	0.10	0.05
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Internal Finish Material		white semi gloss paint on gypsum plaster		white semi gloss paint on steel panel
Conductivity W/m°C	0.38	0.38	0.38	50
Density kg/m ³	1120	1120	1120	7800
Thickness m	0.01	0.01	0.01	0.002
Absorptivity α	0.30	0.30	0.30	0.30
'U' value of composite *Wall/Roof	1.51	1.24	2.32	0.41
Area of *Wall/Roof m ²	200.40	220.44	206.00	262.68
Density of composite *Wall/Roof kg/m ²	1482	1471	282	39
Equivalent temperature difference (TD _{EQ})	2.40	2.40	5.01	6.68

*Delete as appropriate

First issue April 1995

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 1(A)

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing East (Tower)Solar Factor (SF) is 168

*Wall/Roof Code No.	*W ₅ /R ₅	*W ₆ /R ₆	*W ₇ /R ₇	*W ₈ /R ₈
Location of Wall/Roof	300 Panel Walls 5/F-14/F	300 Panel Walls 16/F-26/F	Lift Lobby Wall 5/F-14/F	Lift Lobby Wall 16/F-26/F
External Finish Material	white mosaic tiles	black glass	white mosaic tiles	black glass
Conductivity W/m°C	1.50	1.05	1.50	1.05
Density kg/m ³	2500	2500	2500	2500
Thickness m	0.005	0.008	0.005	0.008
Absorptivity (α)	0.58	1.00	0.58	1.00
Intermediate component	cement render	air gap	cement render	air gap
Conductivity W/m°C	0.72		0.72	
Density kg/m ³	1860		1860	
Thickness m	0.01	0.05	0.01	0.05
Intermediate component	r. concrete	r. concrete	r. concrete	r. concrete
Conductivity W/m°C	2.16	2.16	2.16	2.16
Density kg/m ³	2400	2400	2400	2400
Thickness m	0.30	0.30	3.00	3.00
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Internal Finish Material	white semi gloss paint on gypsum plaster			
Conductivity W/m°C	0.38	0.38		
Density kg/m ³	1120	1120		
Thickness m	0.01	0.01		
Absorptivity α	0.30	0.30		
'U' value of composite *Wall/Roof	1.91(3.13)	1.50(2.16)	0.69	0.63
Area of *Wall/Roof m ²	43.20(86.4)	47.52(95.04)	28.80	31.68
Density of composite *Wall/Roof kg/m ²	762(751)	751(740)	7231	7220
Equivalent temperature difference (TD _{EQ})	2.40	2.40	2.40	2.40

() Lift shaft walls without gypsum plaster

*Delete as appropriate

Building (Energy Efficiency) Regulation
Form OTTV 2

Window/Rooflight Schedule

Sheet No. B 1

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data on *window/rooflight

Facade Orientation facing East (Tower)Solar Factor (SF) is 168

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight	5/F-14/F shaded	5/F-14/F unshaded	16/F-26/F shaded	16/F-26/F unshaded
Glazing type	tinted	tinted	tinted	tinted
Thickness m	0.008	0.008	0.008	0.008
Shading Coefficient (SC)	0.70	0.70	0.70	0.70
Type of shading device	solid overhang	-	aluminium foils	-
External Shading Multiplier (ESM)	0.7	-	0.7	-
Area of glazing m ²	172.80	156.80	119.68	206.80

Physical data on *window/rooflight

Facade Orientation facing East (Tower)Solar Factor is 168

Window/Rooflight Code No.	*F ₅ /RL ₅	*F ₆ /RL ₆	*F ₇ /RL ₇	*F ₈ /RL ₈
Location of *Window/ Rooflight	5/F-14/F unshaded	16/F-26/F unshaded		
Glazing type	tinted	tinted		
Thickness m	0.008	0.008		
Shading Coefficient (SC)	0.70	0.70		
Type of shading device	-	-		
External Shading Multiplier (ESM)	-	-		
Area of glazing m ²	43.20	47.52		

* Delete as appropriate

First issue April 1995

Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 1

BD Ref 2/___/___/___

Building address Typical Commercial BuildingFacade Orientation facing East (Tower).

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
W1	Beams & Cols 5/F-14/F	200.40	1.51	0.58	2.40	421.22
W2	Beams & Cols 16/F-26/F	220.44	1.24	1.00	2.40	656.03
W3	Panel Curtain Walls 5/F-14/F	206.00	2.32	0.58	5.01	1,388.74
W4	Panel Curtain Walls 16/F-26/F	262.68	0.41	1.00	6.68	719.43
W5	300 Panel Walls 5/F-14/F	43.20	1.91	0.58	2.40	114.86
W5A	300 Lift Walls	86.40	3.13	0.58	2.40	376.44
W6	300 Panel Walls 16/F-26/F	47.52	1.50	1.00	2.40	171.07
W6A	300 Lift Walls	95.04	2.16	1.00	2.40	492.69
W7	Lift/Lobby wall 5/F-14/F	28.80	0.69	0.58	2.40	27.66
W8	Lift/Lobby wall 16/F-26/F	31.68	0.63	1.00	2.40	47.90
Subtotals		1,222.16	(A)	Heat Gain		4,416.04 (C)

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
F1	5/F - 14/F shaded	172.80	0.70	0.7	168	14,224.90
F2	5/F - 14/F unshaded	156.80	0.70	-	168	18,439.68
F3	16/F - 26/F shaded	119.68	0.70	0.7	168	9,852.06
F4	16/F - 26/F unshaded	206.80	0.70	-	168	24,319.68
F5	5/F-14/F unshaded	43.20	0.70	-	168	5,080.32
F6	16/F - 26/F unshaded	47.52	0.70	-	168	5,588.35
Subtotals		746.80	(B)	Heat Gain		77,504.99 (D)

Gross Heat Gain (C + D) 81,921.03Gross Area (A + B) 1,968.96

$$\text{OTTV} = \frac{C + D}{A + B} = \underline{41.61} \text{ W/m}^2$$

* Delete as appropriate

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North Elevation (Tower)

Gross Wall Area

1,566.72 m²Wall composite areasBeams and Column Areas

5/F - 14/F	(0.6 x 18.6 + 0.6 x 2.6 x 4) 10	=	174.00 m ²	
15/F	Nil	=	-	
16/F - 26/F	(0.6 x 18.6 + 0.6 x 2.6 x 4) 11	=	191.40 m ²	365.40 m ²
				<hr/>

300 mm Structural Wall to Lift

16/F-26/F	0.3 x 3.2 x 11	=	10.56 m ²	
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300 mm Structural Panel Walls to Lift

16/F-26/F	9.0 x 3.2 x 11 - 10.56	=	306.24 m ²	316.80 m ²
				<hr/>

Glazing Areas

5/F - 14/F	25.76 x 10	=	257.60 m ²	
15/F	Nil	=	-	
16/F - 26/F	25.76 x 11	=	283.36 m ²	540.96 m ²
				<hr/>

100 mm Staircase Wall

5/F - 14/F	0.1 x 2.6 x 10	=	2.60 m ²	
16/F - 26/F	0.1 x 2.6 x 11	=	2.86 m ²	5.46 m ²
				<hr/>

100 mm Wall Panel Areas

5/F - 14/F	595.20 - (174.00 + 257.60 + 2.60)	=	161.00 m ²	
15/F	Nil	=	-	
16/F - 26/F	971.52 - (191.40 + 316.80 + 283.36 + 2.86)	=	177.10 m ²	338.10 m ²
				<hr/>

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 2

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing North (Tower)Solar Factor (SF) is 104

*Wall/Roof Code No.		*W ₁ /R ₁	*W ₂ /R ₂	*W ₃ /R ₃	*W ₄ /R ₄
Location of Wall/Roof		Beams & Coils 5/F-14/F	Beams & Coils 16/F-26/F	Panel Walls 5/F-14/F	Curtain wall panel 16/F-26/F
External Finish Material		white mosaic tiles	black glass	white mosaic tiles	black glass
Conductivity	W/m°C	1.50	1.05	1.50	1.05
Density	kg/m ³	2500	2500	2500	2500
Thickness	m	0.005	0.008	0.005	0.008
Absorptivity	(α)	0.58	1.00	0.58	1.00
Intermediate component		cement render	air gap	cement render	air gap
Conductivity	W/m°C	0.72		0.72	0.039
Density	kg/m ³	1860		1860	50
Thickness	m	0.01	0.05	0.01	0.075
Intermediate component		r. concrete	r. concrete	r. concrete	air gap
Conductivity	W/m°C	2.16	2.16	2.16	
Density	kg/m ³	2400	2400	2400	
Thickness	m	0.60	0.60	0.10	0.05
Intermediate component					
Conductivity	W/m°C				
Density	kg/m ³				
Thickness	m				
Intermediate component					
Conductivity	W/m°C				
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Density	kg/m ³				
Thickness	m				
Intermediate component					
Conductivity	W/m°C				
Density	kg/m ³				
Thickness	m				
Intermediate component					

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 3

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing North (Tower)Solar Factor (SF) is 104

*Wall/Roof Code No.	*W ₆ /R ₆	*W ₇ /R ₇	*W ₈ /R ₈	*W _{8A} /R _{8A}
Location of Wall/Roof	300mm Structural Panel Walls 16/F-26/F	100mm Staircase wall 5/F-14/F	100mm Stair wall 16/F-26/F	300mm Structural Lift Walls 16/F-26/F
External Finish Material	black glass	white mosaic tiles	black glass	black glass
Conductivity W/m°C	1.05	1.50	1.05	1.05
Density kg/m ³	2500	2500	2500	2500
Thickness m	0.008	0.005	0.008	0.008
Absorptivity (α)	1.00	0.58	1.00	1.00
Intermediate component	air gap	cement render	air gap	air gap
Conductivity W/m°C		0.72		
Density kg/m ³		1860		
Thickness m	0.05	0.01	0.05	0.05
Intermediate component	r. concrete	r. concrete	r. concrete	r. concrete
Conductivity W/m°C	2.16	2.16	2.16	2.16
Density kg/m ³	2400	2400	2400	2400
Thickness m	0.30	3.00	3.00	3.00
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Internal Finish Material				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Absorptivity α				
'U' value of composite *Wall/Roof	2.16	0.69	0.63	0.63
Area of *Wall/Roof m ²	306.24	2.60	2.86	10.56
Density of composite *Wall/Roof kg/m ²	740	7231	7220	7220
Equivalent temperature difference (TD _{EQ})	1.70	1.70	1.70	1.70

*Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 2

Window/Rooflight Schedule

Sheet No. B 2

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data on *window/rooflight

Facade Orientation facing North (Tower) Solar Factor (SF) is 104

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight	5/F-14/F shaded	16/F-26/F shaded		
Glazing type	tinted	tinted		
Thickness m	0.008	0.008		
Shading Coefficient (SC)	0.70	0.70		
Type of shading device	solid overhang	aluminium foils		
External Shading Multiplier (ESM)	0.80	0.80		
Area of glazing m ²	257.60	283.36		

Physical data on *window/rooflight

Facade Orientation facing _____ Solar Factor is _____

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight				
Glazing type				
Thickness m				
Shading Coefficient (SC)				
Type of shading device				
External Shading Multiplier (ESM)				
Area of glazing m ²				

* Delete as appropriate

Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 2

BD Ref 2/___/___/___

Building address Typical Commercial BuildingFacade Orientation facing North (Tower).

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
W1	Beams & Col. 5/F-14/F	174.00	1.51	0.58	1.70	259.06
W2	Beams & Col. 16/F-26/F	191.40	1.24	1.00	1.70	403.47
W3	Panels Walls 5/F-14/F	161.00	2.32	0.58	2.72	589.27
W4	Panels Walls 16/F-26/F	177.10	0.41	1.00	3.38	245.43
W6	300 mm Structural Panel 16/F-26/F	306.24	2.16	1.00	1.70	1,124.51
W7	100 mm Stair wall 5/F-14/F	2.60	0.69	0.58	1.70	1.77
W8	100 mm Stair wall 16/F-26/F	2.86	0.63	1.00	1.70	3.06
W8A	300 mm Lift wall 16/F-26/F	10.56	0.63	1.00	1.70	11.31
Subtotals		1,025.76	(A)	Heat Gain		2,637.88 (C)

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
F1	5/F - 14/F	257.60	0.70	0.80	104	15,002.62
F2	16/F - 26/F	283.36	0.70	0.80	104	16,502.89
Subtotals		540.96	(B)	Heat Gain		31,505.51 (D)

Gross Heat Gain (C + D) 34,143.39Gross Area (A + B) 1,566.72

$$\text{OTTV} = \frac{C + D}{A + B} = \underline{21.79} \text{ W/m}^2$$

* Delete as appropriate

West Elevation (Tower) Gross Wall Area 1,968.96 m²

Wall composite areas

Beams and Column Areas

5/F - 14/F	(0.6 x 29.3 + 0.6 x 2.6 x 6) 10	=	269.40 m ²	
15/F	Nil	=	-	
16/F - 26/F	(0.6 x 29.3 + 0.6 x 2.6 x 6) 11	=	296.34 m ²	565.74 m ²
				<hr/>

Glazing Areas

5/F - 14/F	32.48 x 10	=	324.80 m ²	
15/F	Nil	=	-	
16/F - 26/F	32.48 x 11	=	357.28 m ²	682.08 m ²
				<hr/>

Wall Panel Areas

5/F - 14/F	937.60 - (269.40 + 324.80)	=	343.40 m ²	
15/F	Nil	=	-	
16/F - 26/F	1,031.36 - (296.34 + 357.28)	=	377.74 m ²	721.14 m ²
				<hr/>

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 3

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing West (Tower)Solar Factor (SF) is 175

*Wall/Roof Code No.	*W ₁ /R ₁	*W ₂ /R ₂	*W ₃ /R ₃	*W ₄ /R ₄
Location of Wall/Roof	Beams & Cols 5/F-14/F	Beams & Cols 16/F-26/F	Panel Walls 5/F-14/F	Curtain Wall panel 16/F-26/F
External Finish Material	white mosaic tiles	black glass	white mosaic tiles	black glass
Conductivity W/m°C	1.50	1.05	1.50	1.05
Density kg/m ³	2500	2500	2500	2500
Thickness m	0.005	0.008	0.005	0.008
Absorptivity (α)	0.58	1.00	0.58	1.00
Intermediate component	cement render	air gap	cement render	mineral felt
Conductivity W/m°C	0.72		0.72	0.039
Density kg/m ³	1860		1860	50
Thickness m	0.01	0.05	0.01	0.075
Intermediate component	r. concrete	r. concrete	r. concrete	air gap
Conductivity W/m°C	2.16	2.16	2.16	
Density kg/m ³	2400	2400	2400	
Thickness m	0.60	0.60	0.10	0.05
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Internal Finish Material		white semi gloss paint on gypsum plaster		white semi gloss paint on steel panel
Conductivity W/m°C	0.38	0.38	0.38	50
Density kg/m ³	1120	1120	1120	7800
Thickness m	0.01	0.01	0.01	0.002
Absorptivity α	0.30	0.30	0.30	0.30
'U' value of composite *Wall/Roof	1.51	1.24	2.32	0.41
Area of *Wall/Roof m ²	269.40	296.34	343.40	377.74
Density of composite *Wall/Roof kg/m ²	1482	1471	282	39
Equivalent temperature difference (TD _{EQ})	2.10	2.10	4.35	5.79

*Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 3

BD Ref 2/___/___/___

Building address Typical Commercial Building

Facade Orientation facing West (Tower)

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
W1	Beams & Col. 5/F-14/F	269.40	1.51	0.58	2.10	495.48
W2	Beams & Col. 16/F-26/F	296.34	1.24	1.00	2.10	771.67
W3	Panels Walls 5/F-14/F	343.40	2.32	0.58	4.35	2,010.04
W4	Curtain Wall Panels 16/F-26/F	377.74	0.41	1.00	5.79	896.72
Subtotals		1,286.88	(A)	Heat Gain		4,173.91 (C)

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
F1	5/F - 14/F	324.80	0.70	0.70	175	27,851.60
F2	16/F - 26/F	357.28	0.70	0.70	175	30,636.76
Subtotals		682.08	(B)	Heat Gain		58,488.36 (D)

Gross Heat Gain (C + D) 62,662.27

Gross Area (A + B) 1,968.96

$$\text{OTTV} = \frac{C + D}{A + B} = \underline{31.83} \text{ W/m}^2$$

* Delete as appropriate

First issue April 1995

South Elevation (Tower)

Gross Wall Area

1,566.72 m²Wall composite areasBeam and Column Areas

5/F - 14/F	(0.6 x 18.6 + 0.6 x 2.6 x 4) 10	=	174.00 m ²	
15/F	Nil			
16/F - 26/F	[(0.6 x (18.6+9)+0.6 x 2.6 x 6)] 11	=	285.12 m ²	459.12 m ²

Glazing Areas

5/F - 14/F	25.92 x 10	=	259.20 m ²	
15/F	Nil			
16/F - 26/F	25.92 x 11	=	285.12 m ²	
16/F - 26/F	8.48 x 11	=	93.28 m ²	637.60 m ²

100 mm Stair case wall

16/F - 26/F	0.1 x 2.6 x 11	=	2.86 m ²	2.86 m ²
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Wall Panel Areas

5/F - 14/F	595.20 - (174.00 + 259.20)	=	162.00 m ²	
15/F	Nil			
16/F - 26/F	971.52 - (285.12+285.12+93.28+2.86)	=	305.14 m ²	467.14 m ²

Fenestration between 16/F - 26/F

Total Glazing	285.12 + 93.28 =	378.40 m ²	
	(5.4 x 3) x 1.6 x 11 =	285.12 m ²	Unshaded
		93.28 m ²	Shaded

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 4

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing South (Tower)Solar Factor (SF) is 191

*Wall/Roof Code No.	*W ₁ /R ₁	*W ₂ /R ₂	*W ₃ /R ₃	*W ₄ /R ₄
Location of Wall/Roof	Beams & Col 5/F-14/F	Beams & Col 16/F-26/F	Panel Walls 5/F-14/F	Curtain Wall panel 16/F-26/F
External Finish Material	white mosaic tiles	black glass	white mosaic tiles	black glass
Conductivity W/m°C	1.50	1.05	1.50	1.05
Density kg/m ³	2500	2500	2500	2500
Thickness m	0.005	0.008	0.005	0.008
Absorptivity (α)	0.58	1.00	0.58	1.00
Intermediate component	cement render	air gap	cement render	mineral felt
Conductivity W/m°C	0.72		0.72	0.039
Density kg/m ³	1860		1860	50
Thickness m	0.01	0.05	0.01	0.075
Intermediate component	r. concrete	r. concrete	r. concrete	air gap
Conductivity W/m°C	2.16	2.16	2.16	
Density kg/m ³	2400	2400	2400	
Thickness m	0.60	0.60	0.10	0.05
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Internal Finish Material		white semi gloss paint on gypsum plaster		white semi gloss paint on steel panel
Conductivity W/m°C	0.38	0.38	0.38	50
Density kg/m ³	1120	1120	1120	7800
Thickness m	0.01	0.01	0.01	0.002
Absorptivity α	0.30	0.30	0.30	0.30
'U' value of composite *Wall/Roof	1.51	1.24	2.32	0.41
Area of *Wall/Roof m ²	174.00	285.12	162.00	305.14
Density of composite *Wall/Roof kg/m ²	1482	1471	282	39
Equivalent temperature difference (TD _{EQ})	1.40	1.40	3.60	5.01

*Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 4

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing South (Tower)Solar Factor (SF) is 191

*Wall/Roof Code No.		*W _g /R _g
Location of Wall/Roof		16/F-26/F
External Finish Material		Staircase wall black glass
Conductivity	W/m°C	1.05
Density	kg/m ³	2500
Thickness	m	0.008
Absorptivity	(α)	1.00
Intermediate component		air gap
Conductivity	W/m°C	
Density	kg/m ³	
Thickness	m	0.05
Intermediate component		r. concrete
Conductivity	W/m°C	2.16
Density	kg/m ³	2400
Thickness	m	3.00
Intermediate component		
Conductivity	W/m°C	
Density	kg/m ³	
Thickness	m	
Intermediate component		
Conductivity	W/m°C	
Density	kg/m ³	
Thickness	m	
Internal Finish Material		
Conductivity	W/m°C	
Density	kg/m ³	
Thickness	m	
Absorptivity	α	
'U' value of composite *Wall/Roof		0.63
Area of *Wall/Roof	m ²	2.86
Density of composite *Wall/Roof	kg/m ²	7220
Equivalent temperature difference (TD _{EQ})		1.40

*Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 2

Window/Rooflight Schedule

Sheet No. B 4

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data on *window/rooflight

Facade Orientation facing South (Tower)Solar Factor (SF) is 191

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight	5/F-14/F unshaded	16/F-26/F unshaded	16/F-26/F shaded	
Glazing type	tinted	reflective	tinted	
Thickness m	0.008	0.006	0.008	
Shading Coefficient (SC)	0.70	0.40	0.70	
Type of shading device			aluminium foils	
External Shading Multiplier (ESM)			0.70	
Area of glazing m ²	259.20	285.12	93.28	

Physical data on *window/rooflight

Facade Orientation facing _____

Solar Factor is _____

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight				
Glazing type				
Thickness m				
Shading Coefficient (SC)				
Type of shading device				
External Shading Multiplier (ESM)				
Area of glazing m ²				

* Delete as appropriate

Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 4

BD Ref 2/___/___/___

Building address Typical Commercial Building

Facade Orientation facing South (Tower)

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
W1	Beams & Col. 5/F-14/F	174.00	1.51	0.58	1.40	213.34
W2	Beams & Col. 16/F-26/F	285.12	1.24	1.00	1.40	494.97
W3	Panels Walls 5/F-14/F	162.00	2.32	0.58	3.60	784.75
W4	Panels Walls 16/F-26/F	305.14	0.41	1.00	5.01	626.79
W8	Stair Walls 16/F-26/F	2.86	0.63	1.00	1.40	2.52
Subtotals		929.12	(A)	Heat Gain		2,122.37 (C)

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
F1	5/F - 14/F unshaded	259.20	0.70		191	34,655.04
F2	16/F - 26/F unshaded	285.12	0.40		191	21,783.17
F3	16/F - 26/F shaded	93.28	0.70	0.70	191	8,730.08
Subtotals		637.60	(B)	Heat Gain		65,168.29 (D)

Gross Heat Gain (C + D) 67,290.66

Gross Area (A + B) 1,566.72

$$\text{OTTV} = \frac{C + D}{A + B} = \underline{42.95} \text{ W/m}^2$$

* Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 4

Summary of OTTV of Building Envelope

Sheet No. D _____

BD Ref. 2/___/___/___

Building address Typical Commercial Building

Total Envelope Heat Gain (*Tower/Podium)

Facade Orientation	Gross Area from Form OTTV 3	Gross Heat Gain from Form OTTV 3
a. East	1,968.96	81,921.03
b. North	1,566.72	34,143.39
c. West	1,968.96	62,662.27
d. South	1,566.72	67,290.66
e.		
f.		
Subtotal	7,071.36 (E)	246,017.35 (G)
Roof		
a.	391.80	13,185.05
b.		
Subtotal	(F)	(H)

$$\text{Tower/Podium Walls OTTV} = \frac{G}{E} = \underline{34.79} \text{ W/m}^2$$

$$\text{Tower/Podium Roofs OTTV} = \frac{H}{F} = \underline{33.65} \text{ W/m}^2$$

$$\text{Tower/Podium OTTV} = \frac{G + H}{E + F} = \underline{34.73} \text{ W/m}^2$$

* Delete as appropriate

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Accountable Roof AreasRoof

$$\text{Gross Area} = 6.0 \times 6.6 + 9.6 \times 8.0 + 6 \times 10.3 + 9.0 \times 3.0 + 18.6 \times 8.0 + (6.3 \times 3.0 \times 2) = 391.80 \text{ m}^2$$

$$\text{Glazed area} = 8.4 \times 8.0 = 67.20 \text{ m}^2$$

$$\text{Beam area} = [(15.6 \times 2) + (6.0 \times 2) + 18.6 + (6.3 \times 2) + (5.4 \times 9) + 1.4 + (4.1 \times 2) + (1.7 \times 2) + (2.4 \times 2 \times 0.5) + (3.6 \times 0.5)] \times 0.6 = 84.12 \text{ m}^2$$

$$\text{Lift Lobby walls} = 0.3 (9+2.7) = 3.51 \text{ m}^2$$

$$\text{Panel area} = 391.80 - 67.2 - 84.12 - 3.51 = 236.97 \text{ m}^2$$

15/F

$$\text{Gross Area} = 6.6 \times 5.4 + 2.4 \times 1.4 = 39.00 \text{ m}^2$$

$$\text{Glazed area} = \text{Nil}$$

$$\text{Beam area} = 0.6 (5.4 \times 2) = 6.48 \text{ m}^2$$

$$\text{Panel area} = 39.00 - 6.48 = 32.52 \text{ m}^2$$

Podium Roof

Carpark under non-accountable Nil

'U' value of composite roof beams (and panels) :-

15/F and Roof

R ₁ (R ₂) for beams (panels)	r	Weight
External surface film	R _o = 0.055	
25 mm concrete tiles	$\frac{0.025}{1.10} = 0.023$	0.025 x 2100 = 52.50
20 mm asphalt	$\frac{0.02}{1.15} = 0.017$	0.02 x 2350 = 47.00
50 mm cement/sand screed	$\frac{0.05}{0.72} = 0.069$	0.05 x 1860 = 93.00
50 mm polystyrene insulation	$\frac{0.05}{0.034} = 1.471$	0.05 x 25 = 1.25
600 mm r. concrete	= 0.278	0.6 x 2400 = 1440.00
10 mm gypsum plaster	= 0.026	0.01 x 1120 = 11.20
Internal surface film	R _i = 0.801	
Totals	2.740	1644.95 kg/m

$$U_R = \frac{1}{2.740} = 0.37 \text{ W/m}^2\text{°C}$$

for 150 mm slab 'U' value is 0.40 W/m²°C and weight = 564.95 kg/m

for lift lobby walls say 3.0 m deep for ease of calculation,
'U' value is 0.33 W/m²°C and weight = 7,393.75 kg/m

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 5

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing Roof (Tower)Solar Factor (SF) is 264

*Wall/Roof Code No.	*W ₁ /R ₁	*W ₂ /R ₂	*W ₃ /R ₃
Location of Wall/Roof	Tower Roof Beam	Tower Roof Panels	Tower Roof Lift Walls
External Finish Material	concrete tiles	concrete tiles	concrete tiles
Conductivity W/m°C	1.10	1.10	1.10
Density kg/m ³	2100	2100	2100
Thickness m	0.025	0.025	0.025
Absorptivity (α)	0.65	0.65	0.65
Intermediate component	asphalt	asphalt	asphalt
Conductivity W/m°C	1.15	1.15	1.15
Density kg/m ³	2350	2350	2350
Thickness m	0.02	0.02	0.02
Intermediate component	cement/sand screed		
Conductivity W/m°C	0.72	0.72	0.72
Density kg/m ³	1860	1860	1860
Thickness m	0.05	0.05	0.05
Intermediate component	expanded polystyrene		
Conductivity W/m°C	0.034	0.034	0.034
Density kg/m ³	25	25	25
Thickness m	0.05	0.05	0.05
Intermediate component	r. concrete	r. concrete	r. concrete
Conductivity W/m°C	2.16	2.16	2.16
Density kg/m ³	2400	2400	2400
Thickness m	0.60	0.15	3.00
Internal Finish Material	white semi gloss paint on gypsum plaster		
Conductivity W/m°C	0.38	0.38	
Density kg/m ³	1120	1120	
Thickness m	0.01	0.01	
Absorptivity α	0.30	0.30	
'U' value of composite *Wall/Roof	0.37	0.40	0.33
Area of *Wall/Roof m ²	84.12	236.97	3.51
Density of composite *Wall/Roof kg/m ²	1645	565	7394
Equivalent temperature difference (TD _{EQ})	7.90	9.75	7.90

*Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 2

Window/Rooflight Schedule

Sheet No. B 5BD Ref 2/ / / Building address Typical Commercial Building

Physical data on *window/rooflight

Facade Orientation facing Roof (Tower)Solar Factor (SF) is 264

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight	Roof			
Glazing type	tinted			
Thickness m	0.008			
Shading Coefficient (SC)	0.70			
Type of shading device	-			
External Shading Multiplier (ESM)				
Area of glazing m ²	67.20			

Physical data on *window/rooflight

Facade Orientation facing Solar Factor is

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight				
Glazing type				
Thickness m				
Shading Coefficient (SC)				
Type of shading device				
External Shading Multiplier (ESM)				
Area of glazing m ²				

* Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 5

BD Ref 2/___/___/___

Building address Typical Commercial Building

Facade Orientation facing Roof (Tower).

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
R ₁	Tower Roof Beams	84.12	0.37	0.65	7.90	159.82
R ₂	Tower Roof Panels	236.97	0.40	0.65	9.75	600.72
R ₃	Tower Roof Stair & Lift Walls	3.51	0.33	0.65	7.90	5.95
Subtotals		324.60	(A)	Heat Gain		766.49 (C)

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
RL ₁	Rooflight	67.20	0.70	-	264	12,418.56
Subtotals		67.20	(B)	Heat Gain		12,418.56 (D)

Gross Heat Gain (C + D) 13,185.05

Gross Area (A + B) 391.80

$$\text{OTTV} = \frac{C + D}{A + B} = \frac{13,185.05}{391.80} = 33.65 \text{ W/m}^2$$

* Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 5(A)

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing Roof (15/F)Solar Factor (SF) is 264

*Wall/Roof Code No.		*W ₁ /R ₁	*W ₂ /R ₂
Location of Wall/Roof		15/F Beams	15/F Panels
External Finish Material		concrete tiles	concrete tiles
Conductivity	W/m°C	1.10	1.10
Density	kg/m ³	2100	2100
Thickness	m	0.025	0.025
Absorptivity	(α)	0.65	0.65
Intermediate component		asphalt	asphalt
Conductivity	W/m°C	1.15	1.15
Density	kg/m ³	2350	2350
Thickness	m	0.02	0.02
Intermediate component		cement/sand screed	
Conductivity	W/m°C	0.72	0.72
Density	kg/m ³	1860	1860
Thickness	m	0.05	0.05
Intermediate component		expanded polystyrene	
Conductivity	W/m°C	0.034	0.034
Density	kg/m ³	25	25
Thickness	m	0.05	0.05
Intermediate component		r. concrete	r. concrete
Conductivity	W/m°C	2.16	2.16
Density	kg/m ³	2400	2400
Thickness	m	0.60	0.15
Internal Finish Material		white semi gloss paint on gypsum plaster	
Conductivity	W/m°C	0.38	0.38
Density	kg/m ³	1120	1120
Thickness	m	0.01	0.01
Absorptivity	α	0.30	0.30
'U' value of composite *Wall/Roof		0.37	0.40
Area of *Wall/Roof	m ²	6.48	32.52
Density of composite *Wall/Roof	kg/m ²	1645	565
Equivalent temperature difference (TD _{EQ})		7.90	9.75

*Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 5(A)

BD Ref 2/___/___/___

Building address Typical Commercial BuildingFacade Orientation facing Roof (15/F).

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
R ₃	15/F Beams	6.48	0.37	0.65	7.90	12.31
R ₄	15/F Panels	32.52	0.40	0.65	9.75	82.44
Subtotals		39.00	(A)	Heat Gain		94.75 (C)

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
Subtotals			(B)	Heat Gain		(D)

Gross Heat Gain (C + D) 94.75Gross Area (A + B) 39.00

$$\text{OTTV} = \frac{C + D}{A + B} = \frac{94.75}{39.00} = 2.43 \text{ W/m}^2$$

* Delete as appropriate

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East Elevation (Podium) Gross Wall Area 344.00 m²

Wall Composite Areas

Beam and Column Areas

G/F	$0.6 \times 40.0 + 0.6 (3.4 \times 6 + 3.4 \times 0.5^*)$	=	37.26 m ²	
1/F	$0.6 \times 40.0 + 0.6 (3.4 \times 8)$	=	40.32 m ²	
1/F (Ramp)	$0.6 \times 23.0 + 0.6 (3.4 \times 5 \times 0.5)$	=	18.90 m ²	
2/F - 4/F	Nil	=	-	96.48 m ²

Glazing Areas

G/F	87.38 m ²	=	87.38 m ²	
1/F	119.68 m ²	=	119.68 m ²	
2/F - 4/F	Nil	=	-	207.06 m ²

300 mm Retaining Wall

G/F	$138.00 - (37.26 + 87.38)$	=	13.36 m ²
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300 mm Ramp Wall

1/F	$23 \times 4 \times 0.5 - 18.90$	=	27.1 m ²
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* Only half column considered to contribute

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 6

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing East (Podium)Solar Factor (SF) is 168

*Wall/Roof Code No.		*W ₁ /R ₁	*W ₅ /R ₅	*W _{5A} /R _{5A}	*W /R
Location of Wall/Roof		Beams & Cols G/F & 1/F	Retaining Wall G/F	Ramp Wall 1/F	
External Finish Material		white mosaic tiles			
Conductivity	W/m°C	1.50	1.50	2.16	
Density	kg/m ³	2500	2500	2400	
Thickness	m	0.005	0.005	0.30	
Absorptivity	(α)	0.58	0.58	0.65	
Intermediate component		cement render			
Conductivity	W/m°C	0.72	0.72		
Density	kg/m ³	1860	1860		
Thickness	m	0.01	0.01		
Intermediate component		Reinforced concrete			
Conductivity	W/m°C	2.16	2.16		
Density	kg/m ³	2400	2400		
Thickness	m	0.60	0.30		
Intermediate component					
Conductivity	W/m°C				
Density	kg/m ³				
Thickness	m				
Intermediate component					
Conductivity	W/m°C				
Density	kg/m ³				
Thickness	m				
Internal Finish Material		white semi gloss paint			
Internal Finish Material		on gypsum plaster			
Conductivity	W/m°C	0.38	0.38	0.38	
Density	kg/m ³	1120	1120	1120	
Thickness	m	0.01	0.01	0.01	
Absorptivity	α	0.30	0.30	0.30	
'U' value of composite *Wall/Roof		1.51	1.91	1.97	
Area of *Wall/Roof	m ²	96.48	13.36	27.1	
Density of composite *Wall/Roof	kg/m ²	1482	762	731	
Equivalent temperature difference (TD _{EQ})		2.40	2.40	2.40	

*Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 2

Window/Rooflight Schedule

Sheet No. B 6

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data on *window/rooflight

Facade Orientation facing East (Podium)Solar Factor (SF) is 168

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight	G/F&l/F unshaded			
Glazing type	plain			
Thickness m	0.012			
Shading Coefficient (SC)	0.90			
Type of shading device	-			
External Shading Multiplier (ESM)	-			
Area of glazing m ²	207.06			

Physical data on *window/rooflight

Facade Orientation facing _____

Solar Factor is _____

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight				
Glazing type				
Thickness m				
Shading Coefficient (SC)				
Type of shading device				
External Shading Multiplier (ESM)				
Area of glazing m ²				

* Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 6

BD Ref 2/___/___/___

Building address Typical Commercial BuildingFacade Orientation facing East (Podium).

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
W1	Beams & Col. G/F&1/F	96.48	1.51	0.58	2.40	202.79
W5	Panels G/F&1/F	13.36	1.91	0.58	2.40	35.52
W5	Ramp Wall 1/F	27.10	1.97	0.65	2.40	83.28
Subtotals		136.94	(A)	Heat Gain		321.59 (C)

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
F1	G/F & 1/F	207.06	0.90	-	168	31,307.47
Subtotals		207.06	(B)	Heat Gain		31,307.47 (D)

Gross Heat Gain (C + D) 31,629.06Gross Area (A + B) 344.00

$$\text{OTTV} = \frac{C + D}{A + B} = \underline{91.95} \text{ W/m}^2$$

* Delete as appropriate

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North Elevation (Podium)

Gross Wall Area

320.00 m²Wall Composite AreasBeam and Column Areas

G/F	$0.6 \times 40 + 0.6 \times 3.4 \times 8$	=	40.32 m ²	
1/F	$0.6 \times 40 + 0.6 \times 3.4 \times 8$	=	40.32 m ²	80.64 m ²
			<hr/>	

100 mm Stair Wall

G/F Stair Wall	0.1×3.4	=	0.34 m ²
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Glazing Areas

G/F	119.34	=	119.34 m ²	
1/F	119.68	=	119.68 m ²	239.02 m ²
			<hr/>	

Panel Areas

G/F	$160.00 - (40.32 + 119.34 + 0.34)$	=	0	
1/F	$160.00 - (40.32 + 119.68)$	=	0	0
			<hr/>	

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 7

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing North (Podium)Solar Factor (SF) is 104

*Wall/Roof Code No.		*W ₁ /R ₁	*W ₇ /R ₇	*W ₃ /R ₃	*W ₄ /R ₄
Location of Wall/Roof		Beams & Cols G/F & 1/F	Stair Wall G/F		
External Finish Material		white mosaic tiles			
Conductivity	W/m°C	1.50	1.50		
Density	kg/m ³	2500	2500		
Thickness	m	0.005	0.005		
Absorptivity	(α)	0.58	0.58		
Intermediate component		cement render			
Conductivity	W/m°C	0.72	0.72		
Density	kg/m ³	1860	1860		
Thickness	m	0.01	0.01		
Intermediate component		Reinforced concrete			
Conductivity	W/m°C	2.16	2.16		
Density	kg/m ³	2400	2400		
Thickness	m	0.60	3.00		
Intermediate component					
Conductivity	W/m°C				
Density	kg/m ³				
Thickness	m				
Intermediate component					
Conductivity	W/m°C				
Density	kg/m ³				
Thickness	m	white semi gloss paint			
Internal Finish Material		on gypsum plaster			
Conductivity	W/m°C	0.38			
Density	kg/m ³	1120			
Thickness	m	0.01			
Absorptivity	α	0.30			
'U' value of composite *Wall/Roof		1.51	0.69		
Area of *Wall/Roof	m ²	80.64	0.34		
Density of composite *Wall/Roof	kg/m ²	1482	7231		
Equivalent temperature difference (T _{EQ})		1.70	1.70		

*Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 2

Window/Rooflight Schedule

Sheet No. B 7

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data on *window/rooflight

Facade Orientation facing North (Podium) Solar Factor (SF) is 104

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight	G/F&l/F unshaded			
Glazing type	plain			
Thickness m	0.012			
Shading Coefficient (SC)	0.90			
Type of shading device	-			
External Shading Multiplier (ESM)	-			
Area of glazing m ²	239.02			

Physical data on *window/rooflight

Facade Orientation facing _____ Solar Factor is _____

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight				
Glazing type				
Thickness m				
Shading Coefficient (SC)				
Type of shading device				
External Shading Multiplier (ESM)				
Area of glazing m ²				

* Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 7

BD Ref 2/___/___/___

Building address Typical Commercial Building

Facade Orientation facing North (Podium).

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
W1	Beams & Cols. G/F&l/F	80.64	1.51	0.58	1.70	120.06
W7	Stair Wall G/F	0.34	0.69	0.58	1.70	0.23
Subtotals		80.98	(A)	Heat Gain		120.29 (C)

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
F1	G/F & l/F	239.02	0.90	-	104	22,372.27
Subtotals		239.02	(B)	Heat Gain		22,372.27 (D)

Gross Heat Gain (C + D) 22,492.56

Gross Area (A + B) 320.00

$$OTTV = \frac{C + D}{A + B} = \frac{22,492.56}{320.00} = 70.29 \text{ W/m}^2$$

* Delete as appropriate

<u>West Elevation (Podium)</u>	Gross Wall Area		366.00 m ²
		(With tiles = 112 m ²)	
		(Party wall = 208 m ²)	

Wall Composite AreasBeam and Column Areas (with tiles)

G/F	0.6 x 14 + 0.6 (3.4 x 3)	=	14.52 m ²	
1/F	0.6 x 14 + 0.6 (3.4 x 3)	=	14.52 m ²	29.04 m ²

300 mm Ramp Wall

1/F	23 x 4 x 0.5 - 18.9	=	27.1 m ²
-----	---------------------	---	---------------------

Glazing Areas

G/F	41.48	=	41.48 m ²	
1/F	41.48	=	41.48 m ²	82.96 m ²

Beam and Column Areas (Party Wall and Ramp)

G/F	0.6 x 26 + 0.6 (3.4 x 5)	=	25.80 m ²	
1/F	0.6 x 26 + 0.6 (3.4 x 5)	=	25.80 m ²	
1/F Ramp	0.6 x 23 + 0.6 (3.4 x 5 x 0.5)	=	18.90 m ²	70.50 m ²

Panel Areas (with tiles)

G/F and 1/F	112.00 - (29.04 + 82.96)	=	-
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Panel Areas in Party Wall

G/F and 1/F	208 - 51.60	=	156.40 m ²	156.40 m ²
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Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 8

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing West (Podium)Solar Factor (SF) is 175

*Wall/Roof Code No.	*W ₁ /R ₁	*W _{1A} /R _{1A}	*W ₃ /R ₃	*W ₅ /R ₅
Location of Wall/Roof	Beams & Cols G/F & 1/F	Beams & Cols G/F & 1/F	Panels G/F & 1/F	Ramp Wall 1/F
External Finish Material	white mosaic tiles	Reinforced	Concrete	Reinforced Concrete
Conductivity W/m°C	1.50	2.16	2.16	2.16
Density kg/m ³	2500	2400	2400	2400
Thickness m	0.005	0.60	0.10	0.30
Absorptivity (α)	0.58	0.65	0.65	0.65
Intermediate component	cement render			
Conductivity W/m°C	0.72			
Density kg/m ³	1860			
Thickness m	0.01			
Intermediate component	Reinforced concrete			
Conductivity W/m°C	2.16			
Density kg/m ³	2400			
Thickness m	0.60			
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Internal Finish Material	white semi gloss paint			
Internal Finish Material	on gypsum plaster			
Conductivity W/m°C	0.38	0.38	0.38	0.38
Density kg/m ³	1120	1120	1120	1120
Thickness m	0.01	0.01	0.01	0.01
Absorptivity α	0.30	0.30	0.30	0.30
'U' value of composite *Wall/Roof	1.51	1.55	2.41	1.97
Area of *Wall/Roof m ²	29.04	70.50	156.40	27.1
Density of composite *Wall/Roof kg/m ²	1482	1451	250	731
Equivalent temperature difference (TD _{EQ})	2.10	2.10	4.35	2.10

*Delete as appropriate

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**Building (Energy Efficiency) Regulation
Form OTTV 2**

Window/Rooflight Schedule

Sheet No. B 8

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data on *window/rooflight

Facade Orientation facing West (Podium) Solar Factor (SF) is 175

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight	G/F&l/F unshaded			
Glazing type	plain			
Thickness m	0.012			
Shading Coefficient (SC)	0.90			
Type of shading device	-			
External Shading Multiplier (ESM)	-			
Area of glazing m ²	82.96			

Physical data on *window/rooflight

Facade Orientation facing _____ Solar Factor is _____

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight				
Glazing type				
Thickness m				
Shading Coefficient (SC)				
Type of shading device				
External Shading Multiplier (ESM)				
Area of glazing m ²				

* Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 8

BD Ref 2/___/___/___

Building address Typical Commercial Building

Facade Orientation facing West (Podium).

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
W1	Beams & Cols. G/F&l/F	29.04	1.51	0.58	2.10	53.41
W1A	Beams & Cols. G/F&l/F	70.50	1.55	0.65	2.10	149.16
W3	Panels G/F&l/F	156.40	2.41	0.65	4.35	1,065.75
W5	Ramp Wall l/F	27.10	1.97	0.65	2.10	72.87
Subtotals		283.04	(A)	Heat Gain		1,341.19 (C)

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
F1	G/F & l/F	82.96	0.90	-	175	13,066.20
Subtotals		82.96	(B)	Heat Gain		13,066.20 (D)

Gross Heat Gain (C + D) 14,407.39

Gross Area (A + B) 366.00

$$\text{OTTV} = \frac{C + D}{A + B} = \frac{14,407.39}{366.00} = 39.36 \text{ W/m}^2$$

* Delete as appropriate

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South Elevation (Podium)

Gross Wall Area

264.49 m²Wall Composite AreasBeam and Column Areas

G/F	-	=	-	
1/F	$0.6 \times 34.6 + 0.6 (3.4 \times 8)$	=	37.08 m ²	37.08 m ²
1/F Stair Wall	0.1×3.4	=	0.34 m ²	0.34 m ²

Glazing Areas

G/F	-	=	-	
1/F	100.98	=	100.98 m ²	100.98 m ²

Ramp

1/F	5.4×23.35	=	126.09 m ²	126.09 m ²
External wall at ramp omitted	5.4×40	=	21.60 m ²	

Panel Areas

G/F	-	=	-	
1/F	$160.00 - (37.08 + 0.34 + 100.98 + 21.60)$	=	-	-

Building (Energy Efficiency) Regulation
Form OTTV 1

Calculation of 'U' Value of Composite Wall/Roof
and Details of Other Values

Sheet No. A 9BD Ref 2/ / / Building address Typical Commercial Building

Physical data of Opaque *Wall/Roof

Facade Orientation facing South (Podium)Solar Factor (SF) is 191

*Wall/Roof Code No.	*W ₁ /R ₁	*W ₅ /R ₅	*W ₇ /R ₇	*W /R
Location of Wall/Roof	Beams & Cols 1/F	Ramp 1/F	Stair Wall 1/F	
External Finish Material	white mosaic tiles	r. concrete	white mosaic tiles	
Conductivity W/m°C	1.50	2.16	1.50	
Density kg/m ³	2500	2400	2500	
Thickness m	0.005	0.30	0.005	
Absorptivity (α)	0.58	0.65	0.58	
Intermediate component	cement render		cement render	
Conductivity W/m°C	0.72		0.72	
Density kg/m ³	1860		1860	
Thickness m	0.01		0.01	
Intermediate component	Reinforced Concrete		Reinforced Concrete	
Conductivity W/m°C	2.16		2.16	
Density kg/m ³	2400		2400	
Thickness m	0.60		3.00	
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Intermediate component				
Conductivity W/m°C				
Density kg/m ³				
Thickness m				
Internal Finish Material	white semi gloss paint			
Internal Finish Material	on gypsum plaster			
Conductivity W/m°C	0.38	0.38		
Density kg/m ³	1120	1120		
Thickness m	0.01	0.01		
Absorptivity α	0.30	0.30		
'U' value of composite *Wall/Roof	1.51	1.97	0.69	
Area of *Wall/Roof m ²	37.08	126.09	0.34	
Density of composite *Wall/Roof kg/m ²	1482	731	7231	
Equivalent temperature difference (TD _{EQ})	1.40	4.10	1.40	

*Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 2

Window/Rooflight Schedule

Sheet No. B 9

BD Ref 2/___/___/___

Building address Typical Commercial Building

Physical data on *window/rooflight

Facade Orientation facing South (Podium)Solar Factor (SF) is 191

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight	l/F unshaded			
Glazing type	plain			
Thickness m	0.012			
Shading Coefficient (SC)	0.90			
Type of shading device	-			
External Shading Multiplier (ESM)	-			
Area of glazing m ²	100.98			

Physical data on *window/rooflight

Facade Orientation facing _____

Solar Factor is _____

Window/Rooflight Code No.	*F ₁ /RL ₁	*F ₂ /RL ₂	*F ₃ /RL ₃	*F ₄ /RL ₄
Location of *Window/ Rooflight				
Glazing type				
Thickness m				
Shading Coefficient (SC)				
Type of shading device				
External Shading Multiplier (ESM)				
Area of glazing m ²				

* Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 3

Calculation of OTTV of Individual Facade in Building Envelope

Sheet No. C 9

BD Ref 2/___/___/___

Building address Typical Commercial BuildingFacade Orientation facing South (Podium).

Opaque *Walls/Roofs

Code No.	Description	*A _w /A _r	U	α	TD _{EQ}	Sum
W1	Beams and Cols G/F&1/F	37.08	1.51	0.58	1.40	45.46
W2	Stair Wall 1/F	0.34	0.69	0.58	1.40	0.19
W3	Ramp 1/F	126.09	1.97	0.65	4.10*	611.98
Subtotals		163.51	(A)	Heat Gain		657.63 (C)

* Value interpolated from vert. and horizontal components.

Fenestration

Code No.	Description	*Af _w /Af _r	SC	ESM	SF	Sum
F1	1/F	100.98	0.90	-	191	17,358.46
Subtotals		100.98	(B)	Heat Gain		17,358.46 (D)

Gross Heat Gain (C + D) 18,016.09Gross Area (A + B) 264.49

$$\text{OTTV} = \frac{C + D}{A + B} = \frac{18,016.09}{264.49} = 68.12 \text{ W/m}^2$$

* Delete as appropriate

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Building (Energy Efficiency) Regulation
Form OTTV 4

Summary of OTTV of Building Envelope

Sheet No. D 1

BD Ref. 2/___/___/___

Building address Typical Commercial BuildingTotal Envelope Heat Gain (*Tower/Podium)

Facade Orientation	Gross Area from Form OTTV3	Gross Heat Gain from Form OTTV3
a. East	344.00	31,629.06
b. North	320.00	22,492.56
c. West	366.00	14,407.39
d. South	264.49	18,016.09
e.		
f.		
Subtotal	1,294.49 (E)	86,545.10 (G)
Roof	Carpark under - non accountable	
a. Main		
b. 15/F		
Subtotal	(F)	(H)

$$\text{*Tower/Podium Walls OTTV} = \frac{G}{E} = \underline{66.86} \text{ W/m}^2$$

$$\text{*Tower/Podium Roofs OTTV} = \frac{H}{F} = \underline{\quad\quad\quad} \text{ W/m}^2$$

$$\text{*Tower/Podium OTTV} = \frac{G + H}{E + F} = \underline{\quad\quad\quad} \text{ W/m}^2$$

* Delete as appropriate