

Notes: ER = External Reflectance SC = Shading Coefficient VLT = Visible Light Transmittance Window and skylight data should represent the major proportion of its use in the development.



Address: F	Redevelo	opment of	Tai Po	Town Lo	No.233	3, Nos	.2, 4	and 6, W	Vai Yi	Street,	Tai F	Po, N.T.	BD F	Ref. No. E	3D2/9	046/18
Building Typ	be:	Residential														
RTTV calcul	lated by	1. Registere	d Professi	onal Engineer	S											
	•	2. Architect														
		3. Others, p	lease spec	ify:												
No. of Store (Residential	eys Units)	10														
Table 1	· ·													-		
						Deeme	d to Sat	tisfy RTTV _W	all							
Facade Orie	entation Facil	ng														
Average Abs	sorptivity															
Average Wi	ndow to Wall	Ratio														
Shading Co	efficient of G	lazing														
Average Sha	ading Coeffic	cient of Facade														
Visible Light	t Transmittan	се		%	%		%	6	%		%		%	0	%	%
External Re	flectance			%	%		%	6	%		%		%	9	%	%
Table 2																
		-			-		RTT\	/ _{Wall}								
Facade Orie Facing	entation		Е			1	N			W				S		
Wall Orienta	ation Factor	1.	072			0.7	9			1.13	81			0.975	5	
Total Extern (Residential	al Wall Area Units)	357.24	m² Win Rati	dow to Wall o	381.6	2 m²	Windo Ratio	w to Wall	3	59.76 _{m²}	Windo Ratio	ow to Wall	376	∂.61 m²	Windo Ratio	w to Wall
Total Windo	w area	4.03	m² =	0.01	289.7	2 m²	= 0.7	76		0 m²	= 0		14	.08 m²	= 0.	04
Heat Conduction	Opaque Wall		9	9.30 W/m	2		0	.64 W/m²			;	3.83 W/m²			3.	18 W/m²
	Window			0.03 W/m	2		1	.50 W/m²				0 W/m²			C).09 W/m²
Window	Glass Type	Are	a= SC=	VLT=		Area=	SC=	VLT= %		Area=	SC=	VLT=		Area=	SC=	VLT= %
		Reflective	m²	ER= °	Reflective	m²		ER= %	Reflective	e m²		ER= %	Reflective	m²		ER= %
		Are	a= SC=	VLT=		Area=	SC=	VLT= %		Area=	SC=	VET= %		Area=	SC=	VLT= %
			m²			Mroo=	sc-	ER= %	linted	Mroo=	-	ER= %	linted	m²	sc-	ER= %
			$m^2 0.69$	FR= 11		Area $-$	0.69	FR= 11 %	Cloar	Area-	γ^{-}	FR= %		Area-	0.69	FR= 11 %
	Double					59.72 III			Cieai				Clear	14.08 111		
	Glazing		Yes 🖌	√ No		Yes		No		Yes	;	No		Yes		No
	External	Overhang	Yes	No	Overhang		Yes	V No	Overbar	ng	Yes	No	Overhan	g [Yes	√No
	Chading	Sidefin	Yes	No	Sidefin		Yes	VN0	Sidefin		Yes	No	Sidefin		Yes	√No
Solar Radia Glazing	tion through			0.35 W/m	2		17	7.28 _{W/m²}				0 W/m²			1.	.05 W/m²
Average Abs	sorptivity		0.78			0.6	61			0.7	78			C	.9	
RTTV _{Wall} at	each facade			9.67 W/m	2		2	0.09 W/m²			9	9.97 W/m²			1	0.69 W/m²
Overall RTT	V _{Wall}							1	2.70 w	//m²						
Table 3																

				RTTV	Roof									
Roof Orientat	tion Factor			2.16										
Total Roof Ar	ea (Residential Units)					86.41 m²								
Total Skylight	Area					0 m²								
Heat	Roof	3.48 W/m²												
Conduction	Skylight					0 W/m²								
Skylight	Glass Type	Reflective	Area=	m²	SC=		VLT=	%	ER=	%				
		Tinted	Area=	m²	SC=		VLT=	%	ER=	%				
		Clear	Area=	m²	SC=		VLT=	%	ER=	%				
	Double Glazing					Yes No								
	External Shading					Yes No								
Solar Radiati	on through Glazing					0 W/m²								
Average Abso	orptivity (roof)			C	.9									
Overall RTTV	/ _{Roof}					3.48 W/m ²								

Gross Wall Area (Opaque walls + Glazing Areas) Calculation

Sheet no.	1
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01000 114117							Storey heights	s (R	esic	lent	ial U	nits)	:	
							2/F - 12/F					=	2.80 m (10 st	oreys)
							R/F to UR/F					=	5.75 m (1 st	orey)
							TR/F					=	0.00 m (1 st	orey)
E Elevations	Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys													
2/F - 12/F	(11.28)x	2.80	Х	10	=	11.28 >	х	2.80	х	10	=	315.84 m ²	
R/F to UR/F TR/F	(7.20)х	5.75	Х	1	=	7.20	x	5.75	х	1	=	41.40 m ²	
												-	Gross Wall Areas	357.24 m ²
N Elevations	Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys													
2/F - 12/F	(12.13)x	2.80	х	10	=	12.13	x	2.80	х	10	=	339.64 m ²	
R/F to UR/F TR/F	(7.30)x	5.75	х	1	=	7.30 >	x	5.75	х	1	=	41.98 m ²	
												-	Gross Wall Areas	381.62 m ²
W Elevations	Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys													
2/F - 12/F	(11.37)x	2.80	Х	10	=	11.37 >	x	2.80	х	10	=	318.36 m ²	
R/F to UR/F TR/F	(7.20)x	5.75	Х	1	=	7.20 >	x	5.75	х	1	=	41.40 m ²	
												-	Gross Wall Areas	359.76 m ²
S Elevations	Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys													
2/F - 12/F	(12.14)х	2.80	Х	10	=	12.14	x	2.80	х	10	=	339.92 m ²	
R/F to UR/F TR/F	(6.38)х	5.75	х	1	=	6.38 >	x	5.75	Х	1	=	36.69 m ²	

Gross Wall Areas 376.61 m²

Total Gross Wall Areas 1475.22 m²

Total Glazing Area (Window + Balcony) Calculation

Sheet no. 2

							Glazin	g he	ights	(Re	side	ntia	l Uni	ts) :
							2/F - 12/	F (Wir	ndow 8)				=	1.15 m (10.00 storeys)
							2/F- 12/F	(Win	dow 4)				=	2.15 m (10.00 storeys)
							2/F- 12/F	(Win	dow 7)				=	2.10 m (10.00 storeys)
							2/F-12/F	(Win	dow 4a)			=	1.15 m (10.00 storeys)
							2/F-12/F	(Win	dow 5)				=	1.00 m (10.00 storeys)
							2/F- 12/F	(Win	dow 6)				=	1.80 m (10.00 storeys)
							2/F- 12/F	(Win	dow 9)				=	0.85 m (10.00 storeys)
							2/F- 12/F	Win	dow 10)			=	0.65 m (10.00 storeys)
							2/F- 12/F	Win	dow 2)				=	1.00 m (10.00 storeys)
							R/F to T	R/F					=	5.75 m (1.00 storey)
E Elevations	Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys													
2/F - 12/F (Window 8)	(0.35)х	1.15	бX	10	=	0.3	5 х	1.1	15	Х	10	=	4.03 m ²
R/F to TR/F	(0.00)x	5.75	бх	1	=	0.0) х	5.	75	Х	1	=	0.00 m ²
													-	
														Gross Glazing Areas 4.03 m ²
N Elevations	Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys					_					_		_	
2/F-12/F (Window 4)	(2.40)х	2.15	5 х	10	=	2.4) х	2.1	15	Х	10	=	51.60 m ²
2/F-12/F (Window 7)	(2.65)х	2.10) х	10	=	2.6	5 X	2.7	0	Х	10	=	55.65 m ²
2/F-12/F (Window 4a)	(0.65)х	1.15	бX	10	=	0.6	5 X	1.1	15	Х	10	=	7.48 m ²
2/F-12/F (Window 5)	(0.80)х	1.00) х	10	=	0.8) х	1.(00	Х	10	=	8.00 m ²
2/F-12/F (Window 6)	(1.25)х	1.80) х	10	=	1.2	ō X	1.8	30	Х	10	=	22.50 m ²
R/F to TR/F	(0.00)х	5.75	бХ	1	=	0.0) х	5.	75	Х	1	=	0.00 m ²
														Gross Glazing Areas 289.72 m ²
W Elevations	Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys													
2/F - 12/F (Window 8)	(0.00)x	1.15	5 х	10	=	0.0) x	1.1	15	Х	10	=	0.00 m ²
R/F to TR/F)x	5.75	5 X	1	=	0.0) x	0.0	00	X	1	=	0.00 m ²
														Gross Glazing Areas 0.00 m ²
S Elevations	Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storevs													
2/F- 12/F (Window 9)		١v	በ) x	10	=	0 R	ā v	0.4	30	x	10	=	2 55 m²
2/F- 12/F (Window 10)	(0.65)v	0.50 0 85	, v	10	=	0.0. 0 Al	5 X	0.	35	x	10	=	5.53 m ²
2/F- 12/F (Window 70)	(0.60)x	1.00) x	10	=	0.6) x	1 ()0	x	10	=	6.00 m ²
P/E to TP/E	(0.00		5.75		1	_	0.0	- ^ - v	Б. Г	75	v	1	_	0.00 m ²
IVI W IN/F	(0.00	JX	0.70	, x	I	=	0.00	J X	5.	5	٨	I	=	$\frac{14.09}{10} \text{ m}^2$
														GIUSS GIAZING ALEAS 14.00 III2

Total Gross Glazing Areas 307.82 m²

E Elevations

Gross Wall Areas (Opaque Walls +	s Glazing Areas) (Ao) at E Elevations		= 357.24 m ²	Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at N Elevations	
Glazing Areas at	E Elevations		= 4.03 m ²	Glazing Areas at N Elevations	
Proakdown of Cl	azing Aroas			Proskdown of Clazing Arose	
Glazing Areas	Unshaded	(E-F)	= 4.03 m ²	Glazing Areas Unshaded (N-F)
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Left) Glazing Area = Length of Glazing x Glazing Height x No. of Storevs	(E)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Left) (Glazing Area = Length of Glazing x Glazing Height x No. of Storevs	N)
2/F - 12/F (Window 8	8) (0.00)x 0.00 x 10	= 0.00 m ²		2/F - 12/F (Window 8) (0.00)x 0.00 x 10 =	0.00 m ²
	OPF = 0.00 / 1.15 = 0.00 ESC1	=		OPF = 0.00 / 2.50 = 0.00 ESC1 =	
	SPF = 0.00 /(0.40 +)= 0.00 ESC2 ECS = 0.000 x 0.000	= = 0.000		SPF = 0.00 /(3.20 +)= 0.00 ESC2 = ESC = 0.000 x 0.000 =	0.000
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Left)	(E)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Left) (N)
	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys			Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	
2/F - 12/F (Window 8	8) (0.00) x 0.00 x 10	= 0.00 m ²		2/F - 12/F (Window 8) (0.00)x 0.00 x 10 =	0.00 m ²
	OPF = 0.00 / 1.15 = 0.00 ESC1	=		OPF = 0.00 / 2.50 = 0.00 ESC1 =	
	SPF = 0.00 /(0.40 +)= 0.00 ESC2	=		SPF = 0.00 / (3.20 +) = 0.00 ESC2 =	0.000
	ECS = 0.000 X 0.000	= 0.000		ESC = 0.000 X 0.000 =	0.000
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left)	(E)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (N)
2/E 12/E (Mindow 9	Glazing Area = Lengin of Glazing X Glazing Height X No. of Storeys (0.00) (0.00 x 10	- 0.00 m ²		Glazing Area = Lengin of Glazing X Glazing Height X No. of Storeys 2/E = 12/E (Mindow Q) (0.00 x 10 -	0.00 m²
	OPF = 0.00 / 1.15 = 0.00 FSC1	- 0.00 III*		OPF = 0.00 / 250 = 0.00 FSC1 -	0.00 111
	SPF R = $0.00 / (0.40 +) = 0.00$ ECS R	=		SPF R = $0.00 / (3.20 +) = 0.00$ ESC R =	
	SPF_L = 0.00 /(0.40 +)= 0.00 ESC_L	=		SPF_L = 0.00 /(3.20 +)= 0.00 ESC_L =	
	ESC2 = 1.00 - [(1- ECS_R) +(1- ESC_L)]		ESC2 = 1.00 - [(1- ESC_R) +(1- ESC_L)]	
	= 1.00 - [(1-) +(1- 0)] = -1		= 1.00 - [(1- 0) +(1- 0)]	= -1
	ESC = 0.000 x -1.000	= 0.000		ESC = 0.000 x -1.000 =	0.000
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left)	(E)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (N)
	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	0.00		Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	0.00
2/F - 12/F (Window 8	8) (0.00)X 0.00 X 10	= 0.00 m ²		2/F - I2/F (WINDOW 8) (0.00)X 0.00 X 10 =	0.00 m²
	SPE R = 0.00 /(0.40 +)= 0.00 ESC R	=		SPE R = $0.00 / 2.50 = 0.00$ ESC R =	
	SPE = 0.00 / (0.40 +) = 0.00 ESC	-		SPE = 0.00 / (-3.20 + -) = 0.00 ESC = =	
	ESC2 = 1.00 - [(1 - ESCR) + (1 - ESCR)])]		$ESC_2 = 1.00 - [(1 - FSC_R) + (1 - FSC_L)]$	
	= 1.00 - [(1-)) +(1- 0)] = -1		= 1.00 - [(1 - 0.000) + (1 - 0)]	= -1
	$ESC = 0.000 \times -1.000$	= 0.000		ESC = 0.000 x -1.000 =	0.000
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right)	(E)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right) (N)
	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys			Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	
2/F - 12/F (Window 8	8) (0.00)x 0.00 x 10	= 0.00 m ²		2/F - 12/F (Window 8) (0.00)x 0.00 x 10 =	0.00 m ²
	OPF = 0.00 / 1.15 = 0.00 ESC1	=		OPF = 0.00 / 2.50 = 0.00 ESC1 =	
	SPF = 0.00 /(0.40 +)= 0.00 ESC2	=		SPF = 0.00 /(3.20 +)= 0.00 ESC2 =	0.000
	ESC = 0.000 X 0.000	= 0.000		ESC = 0.000 X 0.000 =	0.000
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right)	(E)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right) (N)
2/E 12/E (Mindow (Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	0.00 m ²		Glazing Area = Length of Glazing x Glazing Height x No. of Storeys 2/(-12)/(-0.00) (0.00) (0.00) (0.00) (0.00)	0.00 m ²
	OPE - 0.00 / 115 - 0.00 ESC1	= 0.00 III-		2/F - 12/F (Willdow 6) (0.00 / 2.50 - 0.00 / FSC1 -	0.00 111-
	SPF = 0.00 / (0.40 +) = 0.00 FSC2	=		SPF = 0.00 / (3.20 +) = 0.00 FSC2 =	
	$ESC = 0.000 \times 0.000$	= 0.000		$ESC = 0.000 \times 0.000 =$	0.000
		(-)			
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left)	(E)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (N)
2/E 12/E (Mindow 9	Glazing Area = Lengin of Glazing X Glazing Height X No. of Storeys (0.00) (0.00 x 10	- 0.00 m ²		Glazing Area = Lengin of Glazing X Glazing Height X No. of Storeys 2/E = 12/E (Mindow Q) (0.00 x 10 -	0.00 m²
2/F - 12/F (WINDOW C	0) (0.00) x 0.00 x 10 OPE - 0.00 / 1.15 - 0.00 ECS1	= 0.00 III-		2/F - 12/F (Willdow 6) (0.00 / 2.50 - 0.00 / FSC1 -	0.00 111-
	SPE R = $0.00 / (0.40 +) = 0.00 ECS R$	-		SPE R = 0.00 / 2.50 = 0.00 ESC R =	
	SPE = 0.00 / (0.40 +) = 0.00 ECS	-		SPE = 0.00 / (3.20 +) = 0.00 ESC =	
	ECS2 = 1.00 - [(1 - ESC R) + (1 - ECS L]))]		ESC2 = 1.00 - [(1 - ESC R) + (1 - ESC L)]	
	= 1.00 - [(1- 0) +(1- 0)] = -1		= 1.00 - [(1- 0) +(1- 0)]	= -1
	$ECS = 0.000 \times -1.000$	= 0.000		ESC = 0.000 x -1.000 =	0.000
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left)	(E)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (N)
	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys			Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	
2/F - 12/F (Window 8	8) (0.00))x 0.00 x 10	= 0.00 m ²		2/F - 12/F (Window 8) (0.00)x 0.00 x 10 =	0.00 m ²
	OPF = 0.00 / 1.15 = 0.00 ESC1	=		OPF = 0.00 / 2.50 = 0.00 ESC1 =	
	SPF_R = 0.00 /(0.40 +)= 0.00 ESC_R	=		SPF_R = 0.00 /(3.20 +)= 0.00 ESC_R =	
	$SPF_L = 0.00 / (0.40 +) = 0.00 ESC_L$	=		$SPF_L = 0.00 / (3.20 +) = 0.00 ESC_L =$	
	$ESUZ = 1.00 - [(1 - ESU_R) + (1 - ESU_L) - 1.00 - [(1 - 0) - (1 - 0.00)$	//)] _ 1		$ESUZ = 1.00 - [(1 - ESU_K) + (1 - ESU_L)]$ - 100 [(1 0.000) . (1 0)]	_ 1
	= 1.00 - [(I- 0) +(I- 0.00	/j = -1		= 1.00 - [(I- 0.000) +(I- 0)]	= -
	$E_{30} = 0.000 \chi = 1.000$	- 0.000		ESC = 0.000 X -1.000 =	0.000

Gross Wall Areas (Opaque Walls +	s Glazing Areas) (Ao) at N Elevations	=	381.62 m ²
Glazing Areas at	N Elevations	=	289.72 m ²
Breakdown of Gla	azing Areas		
Glazing Areas	Unshaded (N-F)	=	289.72 m ²
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Left) (N) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	=	0.00 m ²
2/F - 12/F (Window 8	$3) \qquad (0.00 \qquad)x \ 0.00 \ x \ 10 = 0.00 \ m^2$		
	OPF = 0.00 / 2.50 = 0.00 ESC1 =		
	SPF = 0.00 /(3.20 +)= 0.00 ESC2 =		
	$ESC = 0.000 \times 0.000 = 0.000$		
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Left) (N)	=	0.00 m
2/E 12/E (Window 9	Glazing Area = Length of Glazing X Glazing Height X No. of Storeys (0.00) (0.00) (0.00) (0.00 (0.00)) (0.00) (0.00 (0.00)		
2/1 - 12/1 (Willdow c	OPE = 0.00 / 2.50 = 0.00 $FSC1 = 0.00$		
	SPF = 0.00 /(3.20 +) = 0.00 FSC2 =		
	$FSC = 0.000 \times 0.000 = 0.000$		
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (N)	=	0.00 m
2/F - 12/F (Window 8	$(0.00) x 0.00 x 10 = 0.00 m^2$		
	OPF = 0.00 / 2.50 = 0.00 FSC1 =		
	SPF R = 0.00 /(3.20 +)= 0.00 FSC R =		
	SPF L = $0.00 / (3.20 +) = 0.00$ FSC L =		
	FSC2 = 1.00 + (1 - FSC R) + (1 - FSC L)		
	= 1.00 - [(1 - 0) + (1 - 0)] = -1		
	$FSC = 0.000 \times -1.000 = 0.000$		
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (N) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	=	0.00 m
2/F - 12/F (Window 8	$(0.00) x 0.00 x 10 = 0.00 m^{2}$		
· ·	OPF = 0.00 / 2.50 = 0.00 ESC1 =		
	SPF_R = 0.00 /(3.20 +)= 0.00 ESC_R =		
	SPF_L = 0.00 /(3.20 +)= 0.00 ESC_L =		
	ESC2 = 1.00 - [(1- ESC_R) +(1- ESC_L)]		
	= 1.00 - [(1- 0.000) +(1- 0)] = -1		
	$ESC = 0.000 \times -1.000 = 0.000$		
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right) (N)	=	0.00 m
	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys		
2/F - 12/F (Window 8	$(0.00) x 0.00 x 10 = 0.00 m^2$		
	OPF = 0.00 / 2.50 = 0.00 ESC1 =		
	SPF = 0.00 /(3.20 +)= 0.00 ESC2 =		
	$ESC = 0.000 \times 0.000 = 0.000$		
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right) (N)	=	0.00 m
	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys		
2/F - 12/F (Window 8	$(0.00) x 0.00 x 10 = 0.00 m^2$		
	OPF = 0.00 / 2.50 = 0.00 ESC1 =		
	SPF = $0.00 / (3.20 +) = 0.00$ ESC2 = ESC = 0.000×0.000 = 0.000		
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (N)	=	0.00 m
2/F - 12/F (Window 8	$(0.00) x 0.00 x 10 = 0.00 m^2$		
	OPF = 0.00 / 2.50 = 0.00 FSC1 =		
	SPF R = 0.00 /(3.20 +)= 0.00 FSC R =		
	SPF_L = 0.00 /(3.20 +)= 0.00 ESC L =		
	ESC2 = 1.00 - [(1- ESC_R) +(1- ESC L)]		
	= 1.00 - [(1- 0)) +(1- 0)] = -1		
	ESC = 0.000 x -1.000 = 0.000		
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (N)	=	0.00 m
5	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys		2.00 .11
2/F - 12/F (Window 8	$3) \qquad (0.00 \qquad)x \ 0.00 \ x \ 10 = 0.00 \ m^2$		
	OPF = 0.00 / 2.50 = 0.00 ESC1 =		
	SPF_R = 0.00 /(3.20 +)= 0.00 ESC R =		
	SPF_L = 0.00 /(3.20 +)= 0.00 ESC_L =		
	ESC2 = 1.00 - [(1- ESC_R) +(1- ESC L)]		

Sheet no. 3

N Elevations

	ESC =	0.000	Х	-1.000	=	0.000		ES	C = 0.000) X -1.0	00	= 0.000		
Window to Wall Ratio (WWR)	=		4.03	1	357.24	=	0.01	Window to Wall Ratio (WWR)	=	289.72	I	381.62	=	0.76
Deemed to Satisfy RTTVw Compliance Check	all													

W Elevations			S Elevations	Sheet no. 4
Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at W Elevations		= 359.76 m ²	Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at S Elevations	= 376.61 m ²
Glazing Areas at W Elevations		= 0.00 m ²	Glazing Areas at S Elevations	= 14.08 m ²
Breakdown of Glazing Areas Glazing Areas Unshaded	(W-F)	= 0.00 m ²	Breakdown of Glazing Areas Glazing Areas Unshaded (S-F)	= 14.08 m ²
Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys 2/F - 12/F (Window 8) (0.00 x 100 =	(W) 0.00 m ²	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right) (S) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys 2/F - 12/F (Window 8) (0.00))x 0.00 x 10 = 0.00 m ²	= 0.00 m ²
OPF = 0.00 / 1.15 = 0.00 ESC1 = SPF = 0.00 /(0.40 +)= 0.00 ESC2 = ESC = 0.000 x 0.000 = =	0.000		$OPF = 0.00 / 1.15 = 0.00$ $ESC1 =$ $SPF = 0.00 / (0.40 +) = 0.00$ $ESC2 =$ $ESC = 0.000 \times 0.000$ $ESC2 =$	
Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys 2/F - 12/F (Window 8) (0.00)	(W)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right) (S) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys 2/F - 12/F (Window 8) (0.00))x 0.00 x 10 = 0.00 m ²	= 0.00 m ²
OPF = 0.00 / 1.15 = 0.00 ESC1 = SPF = 0.00 /(0.40 +)= 0.00 ESC2 = ESC = 0.000 x 0.000 =	0.000		$OPF = 0.00 / 1.15 = 0.00$ $ECS1 =$ $SPF = 0.00 / (0.40 +) = 0.00$ $ECS2 =$ $ECS = 0.000 \times 0.000$ $= 0.000$	
Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	(W)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (S) S) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys S </td <td>= 0.00 m²</td>	= 0.00 m ²
	0.00 m ²		$2/F - 12/F (Window 8) (0.00) x 10 = 0.00 m^{2}$ $OPF = 0.00 / 1.15 = 0.00 ESC1 = SPF_R = 0.00 / (0.40 +) = 0.00 ESC_R = SPF_L = 0.00 / (0.40 #) = 0.00 ESC_L = ESC2 = 1.00 - [(1 - ESC_R) + (1 - ESC_L)]$	
= 1.00 - [(1- 0) + (1- 0)] ESC = 0.000 x -1.000 =	= -1 0.000		= 1.00 - [(1 - 0)) + (1 - 0)] = -1 ESC = 0.000 x -1.000 = 0.000	
Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	(W)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (S) S) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys S </td <td>= 0.00 m²</td>	= 0.00 m ²
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.00 m ² = -1 0.000		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Left) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	(W)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Left) (S) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	= 0.00 m ²
$2/F - 12/F (Window 8) \qquad (0.00 \qquad)x \ 0.00 \ x \ 10 = 0.00 \ (0.00 \ - 1.15 = 0.00 \ - 1.15 = 0.00 \ ESC1 = 0.00 \ ESC1 = 0.00 \ - 1.15 = 0.00 \ ESC2 = 0.00 \ - 1.15 = 0.00 $	0.00 m ²		$2/F - 12/F$ (Window 8) (0.00)x $0.00 \times 10 = 0.00 \text{ m}^2$ $OPF = 0.00 / 1.15 = 0.00$ ESC1 = $SPF = 0.00 / (0.40 +) = 0.00$ ECS2 = ESC = 0.000 x 0.000 = 0.000	
Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Left) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	(W)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Left) (S) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	= 0.00 m ²
$2/F - 12/F (Window 8) \qquad (0.00 \qquad)x \ 0.00 \ x \ 10 = 0.00 \ (0.00 \)x \ 0.00 \ x \ 10 = 0.00 \ ESC1 = 0.00 \ (0.40 \ + 0.00 \ ESC2 = 0.000 \ x \ 0.000 \) = 0.00 \ ESC2 = 0.000 \ x \ 0.000 \) = 0.000 \ ESC2 = 0.000 \ x \ 0.000 \) = 0.000 \ = 0.0000 \ = 0.0000 \ = 0.000 \ = 0.00000 \ = 0.00000 \ = 0.0000 \ = 0.00000 \ = 0.00000 \ = 0.00000 \ = 0.00000 \ = 0.00000 \ = 0.00000 \ = 0.00000 \ = 0.000000 \ = 0.000000 \ = 0.000000 \ = 0.0000000 \ = 0.000000 \ = 0.000000 \ = 0.0000000000$	0.00 m ²		2/F - 12/F (Window 8) (0.00) x 0.00 x 10 = 0.00 m ² OPF = 0.00 / 1.15 = 0.00 ESC1 = SPF = 0.00 /(0.40 +)= 0.00 ESC2 = ESC = 0.000 x 0.000 = 0.000	
Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left)	(W)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (S)	= 0.00 m ²
Glazing Area = Length of Glazing x Glazing Height x No. of Storeys 2/F - 12/F (Window 8) (0.00)x 0.00 x 10 = OPF = 0.00 / 1.15 = 0.00 ESC1 = SPF_R = 0.00 /(0.40 +)= 0.00 ESC_R =	0.00 m ²		Glazing Area = Length of Glazing x Glazing Height x No. of Storeys 2/F - 12/F (Window 8) (0.00) x 0.00 x 10 = 0.00 m ² OPF = 0.00 / 1.15 = 0.00 ESC1 = SPF_R = 0.00 /(0.40 +)= 0.00 ESC_R =	
$SPF_L = 0.00 /(0.40 +) = 0.00 ESC_L = ESC2 = 1.00 - [(1- ESC_R) +(1- ESC_L)] = 1.00 - [(1- 0) +(1- 0)] ESC = 0.000 x -1.000 = $	= -1 0.000		$SPF_L = 0.00 /(0.40 +) = 0.00 ESC_L = \\ESC2 = 1.00 - [(1- ESC_R) +(1- ESC_L)] \\= 1.00 - [(1- 0) +(1- 0)] = -1\\ESC = 0.000 x -1.000 = 0.000$	
Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys 2/F - 12/F (Window 8) (0.00) x 0.00 x 10 =	(W)	= 0.00 m ²	Glazing Areas Shaded by Overhang Fin & Built-Fin (Projection on Right & Left) (S) Glazing Area = Length of Glazing x Glazing Height x No. of Storeys 2/F - 12/F (Window 8) (0.00))x 0.00 x 10 = 0.00 m ²	= 0.00 m ²
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	= -1		$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	
ESC = 0.000 x -1.000 =	0.000		$ESC = 0.000 \times -1.000 = 0.000$	

Window to Wall Ratio (WWR)	=	0.00	1	359.76	=	0.00	Window to Wall Ratio (WWR)	=	14.08	1	376.61	=	0.04
Deemed to Satisfy RTTVwall													
Compliance Check													

E Elevations

E Elevations						Sheet no.
Gross Wall Areas (Opaque Walls + Glaz	ing Areas) (Ao) at Elevations		= 357.24 m ²	Wall Orientation Factor	Gw = 1.072	(Refer to Table 9)
Glazing Areas at	E Elevations		= 4.03 m ²	Average Absorptivity (α) of the External	l Opaque Wall at E	Elevations
Breakdown of Glazing	Areas			External Wall Material (Colour/Finish)	% of wall/roof area	α Absorptivity (Refer to Table 5)
Glazing Areas	Unshaded	(E-F)	= 4.03 m ²	Tile (matt) Dark grey Aluminium	69% 31%	0.9
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Left)	(E)	= 0.00 m ²			
2/F - 12/F (Window 8)	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys (0.00)x 0.00 x 10 = 0.00 m ²			Average Absorptivity =	0.78
	OPF = 0.00 / 1.15 = 0.00	ESC1 =		'U' value of Opaque Wall Areas		
	$SPF = 0.00 / (0.40 + ESC = 0.000 \times 0.000$)= 0.00 ESC2 = = 0.000		$U = 1/(R_1 + x_1/K_1 + x_2/K_2 + \dots + x_n/K_n + Ra + R0)$	Ro Surface film re	sistance of internal surface (Refer to Table 2) sistance of external surface (Refer to Table 2)
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Left)	(E)	= 0.00 m ²		Ra Air space resis x Thickness of b	tance (Refer to Table 3) uilding materials
2/F - 12/F (Window 8)	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys (0.00	;)x 0.00 x 10 = 0.00 m ²			K Thermal condu	ctivity of building materials (Refer to Table 1)
	OPF = 0.00 / 1.15 = 0.00	ESC1 =		E-C	Description: RC Wall Ar	reas
	$SPF = 0.000 / (0.40 + 0.000)$ $ESC = 0.000 \times 0.000$)= 0.00 ESC2 = = 0.000		External surface film resistance	Ro	= 0.044
Glazing Areas	Shaded by Overhang Ein & Built-Ein (Drojection on Pight & Left)	(F)	= 0.00 m ²	Air space resistanace	Ra	= 0
Giazing Areas	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	(L)	- 0.00 m	Concrete	0.15 / 2.16	= 0.069
2/F - 12/F (Window 8)	(0.00 OPE = 0.00 / 115 = 0.00)x 0.00 x 10 = 0.00 m ²		Gyneum nlastar	/ 0.38	= 0.000
	SPF_R = 0.00 /(0.40 +)= 0.00 ESC_R =		Internal surface film resistance	0.025 / 0.30 Ri	= 0.000
	SPF_L = 0.00 /(0.40 +)= 0.00 ESC_L =		Total		0.316
	$ESC2 = 1.00 - [(1 - ESC_R)]$ = 1.00 - [(1 - 0)]) +(1- ESC_L)]) +(1- 0)] = -1			$Uc1 = \frac{1}{0.316}$	= 3.17
	$ECS = 0.000 ext{ x} -1.000$	= 0.000				
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left)	(E)	= 0.00 m ²	E-C	Description: (E-W12,E-V	W14,E-W3,E-W6)
	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	3		Wall Material		
2/F - 12/F (Window 8)	(0.00 OPE - 0.00 / 1.15 - 0.00	$)x 0.00 x 10 = 0.00 m^2$		external surface film	Ro	= 0.044
	SPF_R = 0.00 /(0.40 +)= 0.00 ESC_R =		All space resistanace	0 / 1.5	= 0.000
	SPF_L = 0.00 /(0.40 +)= 0.00 ESC_L =			0 / 2.16	= 0.000
	$ESC2 = 1.00 - [(1 - ESC_R)]$ = 1.00 - [(1 - 0.000]) +(1- ESC_L)]) +(1- 0)] = -1			0 / 0.38	= 0.000
	$ESC = 0.000 \times -1.000$	= 0.000		Internal surface film resistance	Ri	= 0.12
Glazing Areas	Shaded by Overhang Ein & Built-Ein (Projection on Pight)	(F)	= 0.00 m ²	Total		0.164
Chaing Proto	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	(-)	0.00 m		$ _{c2} = \frac{1}{1}$	= 610
2/F - 12/F (Window 8)	(0.00	$)x 0.00 x 10 = 0.00 m^2$			0.164	- 0.10
	SPF = 0.00 / 1.15 = 0.00 SPF = 0.00 / (0.40 + 1.15))= 0.00 ESC2 =				
	ESC = 0.000 x 0.000	= 0.000		E-C	Description: (E-W1,E-W	(2,E-W4,E-W5)
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right)	(E)	= 0.00 m ²	Wall Material external surface film	Ro	= 0.044
5	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	÷ , , , , , , , , , , , , , , , , , , ,		Air space resistanace	Ra	= 0
2/F - 12/F (Window 8)	(0.00 OPE = 0.00 / 1.15 = 0.00	$)x 0.00 x 10 = 0.00 m^2$			0 / 1.5	= 0.000
	SPF = 0.00 /(0.40 +)= 0.00 ESC2 =			0 / 0.38	= 0.000
	ESC = 0.000 x 0.000	= 0.000			0 / 0.38	= 0.000
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left)	(E)	= 0.00 m ²	Internal surface film resistance Total	Ri	= 0.12 0.164
·	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys	; ;			L	
2/F - 12/F (Window 8)	(0.00 OPE = 0.00 / 1.15 = 0.00)x 0.00 x 10 = 0.00 m ² FSC1 =			$Uc2 = \frac{1}{0.164}$	= 6.10
	SPF_R = 0.00 /(0.40 +)= 0.00 ESC_R =			0.104	
	SPF_L = 0.00 /(0.40 +)= 0.00 ESC_L =				
	ESC2 = 1.00 - [(1- ESC_R = 1.00 - [(1- 0) +(1- ESC_L)]) +(1- 0)] = -1				
	$ESC = 0.000 ext{ x} -1.000$	= 0.000				
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projection on Right & Left)	(E)	= 0.00 m ²			
2/F - 12/F (Window 8)	(0.00)x 0.00 x 10 = 0.00 m^2				
	OPF = 0.00 / 1.15 = 0.00	ESC1 =				
	SPF_R = 0.00 /(0.40 + SPF L = 0.00 /(0.40 +)= 0.00 ESC_R =)= 0.00 ESC_L =				
	ESC2 = 1.00 - [(1- ESC_R) +(1- ESC_L)]				
	= 1.00 - [(1- 0.000 ECS = 0.000 x -1.000) +(1- 0)] = -1 = 0.000				
		0.000				
Opaque Wall Areas at	E Elevations		= 353.22 m ²			
Breakdown of Opaque W RC Wall Areas	/all Areas	(E-C)	= 353.22 m ²			
RC Column Areas 2/F - 12/F	0	(E-W12,E-W14,E-W3,E-W6) (E-C) x 2.80 x 10 = 0.00 m ²	= 0.00 m ²			
2/E 12/E			- 0.00 m ²			

Sheet no. 5

W/m²K

W/m²K

W/m²K

0.78

2/F - 12/F		(E·	-W1,E-W2	2,E-W4,	E-W5)	(E-C	;)	=	0.00 m²		
			0	x	2.80	x	10	=	0.0	0 m²		
Window to Wall Ratio (WWR)	=	4.03	1				357.	.24			=	0.01

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014 Form RTTV (Wall) 1 - Calculation of RTTVwall of E Facade

Sheet No.	6	BD Ref No. BD 2/9046/18							
Building Address	REDEVELOPI STREET, TAI	MENT OF TAI PO TC PO, N.T.	WN LOT NO.233, NOS.	2,4 AND 6 WAI YI					
Facade Orientation Facing	E		Gross Wall Area (Ao) =	357.24					
Window to Wall Ratio (WWR)	0.01	Wall Or	ientation Factor (Gw) =	1.072					
Part 1 - Calculation of Heat Con	duction through Op	aque Walls							
Components / Details			Code No.						
Description	Units	E-C	E-C	E-C					
External Finish Material		External tiles	0	0					
Conductivity	W/mK	1.50	1.50	1.50					
Thickness	m	0.025	0.000	0.000					
Average Absorptivity	(α)	0.78	0.78	0.78					
Intermediate component		Concrete	0.00	0.00					
Conductivity	W/mK	2.16	2.16	2.16					
Thickness	m	0.15	0.00	0.00					
Intermediate component									
Conductivity	W/mK								
Thickness	m								
Intermediate component									
Conductivity	W/mK								
Thickness	m								
Intermediate component									
Conductivity	W/mK								
Thickness	m								
Internal Finish Material		Gypsum plaster	0.00	0.00					
Conductivity	W/mK	0.38	0.38	0.38					
Thickness	m	0.03	0.00	0.00					
U-value of Opaque Area (Uwi)	W/m²K	3.17	6.10	6.10					
Opaque Wall Area (Awi)	m²	353.22	0.00	0.00					
Heat Conduction = 3.57(Awi/Ao)	Uwi awi Gw	9.30	0.00	0.00					

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi awi Gw where i= 1, 2, ..., n =

9.30 W/m²

Part 2 - Calculation of Heat Conduction	art 2 - Calculation of Heat Conduction through Glazing														
Components / Details						Code No.									
Description	Units	E-F	E-W	E-W	E-W	E-W	E-W	E-W	E-W	E-W					
Glazing Type		Clear glass													
Thickness	m	0.006													
Glazing Area (Afi)	m²	4.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
U-value of Glazing (Ufi)	W/m²K	3.9													
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n = 0.03 W/m²

Part 3 - Calculation of Solar Radiation	through Gla	zing								
Components / Details						Code No.				
Description	Units	E-F	E-W	E-W	E-W	E-W	E-W	E-W	E-W	E-W
Glazing Type		Clear glass								
Thickness	m	0.006								
Glazing Area (Afi)	m²	4.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shading Coefficient of Glazing (SCf)		0.69								
Visible Light Transmittance (VLT)	%	71								
External Reflectance (ER)	%	9								
External Shading Miltiplier (ESC)		1.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(E	SCwi)Gw	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= 0.35 W/m²

Summary of RTTV at E Elevations

= 9.30 0.03 0.35 + +

= 9.67 W/m²

N Elevations

<u>N Elevations</u>												Sheet no	p. 7
Gross Wall Areas (Opaque Walls + Glazin	ng Areas) (Ao) at	N Elevations					=	381.62 m ²	Wall Orientation Factor	Gw = 0.79	(F	Refer to Table 9	9)
Glazing Areas at	N Elevations						=	289.72 m²	Average Absorptivity (α) of the External	Opaque Wall at	N Elevations		
Breakdown of Glazing	Areas_				(N.F	- ,		000 70?	External Wall Material (Colour/Finish)	% of wall/roof area	(Refer to T	able 5)	
Glazing Areas	Unsnaded				(N-F	-)	=	289.72 m*	Aluminium	72%	0.9		
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project	ion on Left)			(N)	=	0.00 m²		A			
2/F - 12/F (Window 8)	Glazing Area = Length of Glazing X Glazing (0.00	Height X No. of Storeys)x	0.00	x 10	=	0.00 m²				Average Absorptivity -	0.01		
	OPF = 0.00 /	2.50 = 0.00		ESC1	=				'U' value of Opaque Wall Areas				
	SPF = 0.00 /(ESC = 0.000	x 0.000	0.00	E302	= = 0.00	0			$U = 1/(K_1 + x_1/K_1 + x_2/K_2 + \dots + x_n/K_n + K_d + K_0)$	Ro Surface film	resistance of internal surfact resistance of external surfact	e (Refer to Table 2) ce (Refer to Table 2)
Glazing Areas	Shadad by Overhang Ein & Built Ein (Dreiest	ion on Loff)			(N	,	_	0.00 m²		Ra Air space res	istance (Refer to Table 3)		
Glazing Aleas	Glazing Area = Length of Glazing x Glazing	Height x No. of Storeys			(1)	-	0.00 m		k Thermal con	ductivity of building material	is (Refer to Table 1)	
2/F - 12/F (Window 8)	(0.00 OPE = 0.00 /)x	0.00	x 10 FSC1	=	0.00 m²			N-C	Description: RC Wall A	leas		
	SPF = 0.00 /(3.20 +)=	0.00	ESC2	=				Wall Material		1000		
	ESC = 0.000	x 0.000			= 0.00	0			External surface film resistance	Ro	=	0.044	
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project	ion on Right & Left)			(N)	=	0.00 m ²	External tiles	0.025 / 1.5	=	0.017	
2/F - 12/F (Window 8)	(0.00)x	0.00	x 10	=	0.00 m²			Concrete	/ 0.38	=	0.000	
	OPF = 0.00 /	2.50 = 0.00	0.00	ESC1	=				Gypsum plaster	0.025 / 0.38	=	0.066	
	SPF_R = 0.00 /(SPF L = 0.00 /(3.20 +)= 3.20 +)=	0.00	ESC_R ESC_L	=				Internal surface film resistance Total	Ri	=	0.12	-
	ESC2 = 1.00 -	[(1- ESC_R)	+(1- ESC_L)]					Uc1 =1	-	3.17	W/m²K
	= 1.00 -	[(1- 0) x -1.000	+(1- 0)] =	-	1			0.316		•	
		X 1.000			- 0.00								
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project	ion on Right & Left)			(N)	=	0.00 m ²	N-C	Description: 0			
2/F - 12/F (Window 8)	Glazing Area = Lengtri of Glazing X Glazing (0.00	neight x ino. of Storeys)x	0.00	x 10	=	0.00 m²			external surface film	Ro	=	0.044	-
	OPF = 0.00 /	2.50 = 0.00		ESC1	=				Air space resistanace	Ra	=	0	
	SPF_R = 0.00 /(3.20 +)=	0.00	ESC_R	=					0 / 1.5	=	0.000	
	ESC2 = 1.00 -	[(1- ESC_R)	+(1- ESC_L)]					0 / 0.38	=	0.000	
	= 1.00 -	[(1- 0.000)	+(1- 0)] =	-	1			0 / 0.38	=	0.000	
	ECS = 0.000	x -1.000			= 0.00	0			Internal surface film resistamce Total	Ri	=	0.12 0.164	
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project Glazing Area = Length of Glazing x Glazing	ion on Right) Height x No. of Storeys			(N)	=	0.00 m ²		u ₋₀ 1	_	0.40	
2/F - 12/F (Window 8)	(0.00)х	0.00	x 10	=	0.00 m²				0.164	=	6.10	W/m ² K
	OPF = 0.00 / SPE = 0.00 //	2.50 = 0.00 3.20 +)=	0.00	ESC1 ESC2	=								
	ESC = 0.000	x 0.000	0.00	2002	= 0.00	0			N-C	Description: 0			_
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project	ion on Right)			(N)	=	0.00 m²	Wall Material external surface film	Ro	=	0.044	
2/F - 12/F (Window 8)	Glazing Area = Length of Glazing x Glazing (0.00	Height x No. of Storeys	0.00	x 10	=	0.00 m²			Air space resistanace	Ra 0 / 1.5	=	0 0.000	
, , , , , , , , , , , , , , , , , , ,	OPF = 0.00 /	2.50 = 0.00		ESC1	=					0 / 2.16	=	0.000	
	SPF = 0.00 /(3.20 +)=	0.00	ESC2	= 0.00	10				0 / 0.38	=	0.000	
	E 3C - 0.000	x 0.000			- 0.00	10			Internal surface film resistance	0 / 0.38 Ri	=	0.000	
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project	ion on Right & Left)			(N)	=	m²	Total			0.164	
2/F - 12/F (Window 8)	Giazing Area = Lengtri of Giazing X Giazing (0.00	neight x No. of Storeys)x	0.00	x 10	=	0.00 m²				1	_	6.40	W//21
	OPF = 0.00 /	2.50 = 0.00		ESC1	=					0.164	=	6.10	W/m ² K
	SPF_R = 0.00 /(SPF L = 0.00 //	3.20 +)= 3.20 +)=	0.00	ESC_R ESC_I	=								
	ESC2 = 1.00 -	[(1- ESC_R)	+(1- ESC_L)]								
	= 1.00 -	[(1- 0)	+(1- 0)] =	-	1						
	200 - 0.000	X 1.000			- 0.00								
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project Glazing Area = Length of Glazing x Glazing	ion on Right & Left) Height x No. of Storeys			(N)	=	M²					
2/F - 12/F (Window 8)	(0.00)x	0.00	x 10	=	0.00 m²							
	OPF = 0.00 / SPF_R = 0.00 /(2.50 = 0.00 3.20 +)=	0.00	ESC1 ESC_R	=								
	SPF_L = 0.00 /(3.20 +)=	0.00	ESC_L	=								
	ESC2 = 1.00 - = 1.00 -	[(1- ESC_R) [(1- 0.000)	+(+(1- ESC_L 1- 0)] =		1						
	ESC = 0.000	x -1.000	.(. U	= 0.00	0	•						
Opaque Wall Areas at	N Elevations						=	91.90 m²					
Breakdown of Opaque Wa RC Wall Areas	all Areas				(N-C	C)	=	91.90 m²					
PC Column Area					(, ,	_	0.002					
2/F - 12/F		0 x	2.80	x 10	(N-C	,) 0.00 m ²	-	0.00 m-					

2/F - 12/F			0	x	2.80	x	10	= (N-C) 0.00 m²	=	0.00 m ²	
Window to Wall Ratio (WWR)	=	289.72	1				381	.62		=	0.76	

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014 Form RTTV (Wall) 1 - Calculation of RTTVwall of N Facade

Sheet No.	8		BD Ref No.	BD 2/9046/18
Building Address	REDEVELOPI STREET, TAI	MENT OF TAI PO TO PO, N.T.	WN LOT NO.233, NOS	. 2,4 AND 6 WAI YI
Facade Orientation Facing	Ν	(Gross Wall Area (Ao) =	381.62
Window to Wall Ratio (WWR)	0.76	Wall Ori	ientation Factor (Gw) =	0.79
Part 1 - Calculation of Heat Con	duction through Op	aque Walls		
Components / Details			Code No.	
Description	Units	N-C	N-C	N-C
External Finish Material		External tiles	0	0
Conductivity	W/mK	1.50	1.50	1.50
Thickness	m	0.025	0.000	0.000
Average Absorptivity	(α)	0.61	0.61	0.61
Intermediate component		Concrete	0.00	0.00
Conductivity	W/mK	2.16	2.16	2.16
Thickness	m	0.15	0.00	0.00
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		Gypsum plaster	0.00	0.00
Conductivity	W/mK	0.38	0.38	0.38
Thickness	m	0.03	0.00	0.00
U-value of Opaque Area (Uwi)	W/m²K	3.17	6.10	6.10
Opaque Wall Area (Awi)	m²	91.90	0.00	0.00
Heat Conduction = 3.57(Awi/Ao)	Uwi awi Gw	1.32	0.00	0.00

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi awi Gw where i= 1, 2, ..., n

= 1.32 W/m²

Part 2 - Calculation of Heat Conduction through Glazing													
	r till ough of	azing											
Components / Details						Code No.							
Description	Units	N-F1	N-W1	N-W2	N-W3	N-W4	N-W9	N-W10	N-W11	N-W12			
Glazing Type		Clear glass											
Thickness	m	0.006											
Glazing Area (Afi)	m²	289.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
U-value of Glazing (Ufi)	W/m²K	3.9											
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n = 1.50 W/m²

Part 3 - Calculation of Solar Radiation	n through Gla	azing								
Components / Details						Code No.				
Description	Units	N-F1	N-W1	N-W2	N-W3	N-W4	N-W9	N-W10	N-W11	N-W12
Glazing Type		Clear glass								
Thickness	m	0.006								
Glazing Area (Afi)	m²	289.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shading Coefficient of Glazing (SCf)		0.69								
Visible Light Transmittance (VLT)	%	71								
External Reflectance (ER)	%	9								
External Shading Miltiplier (ESC)		1.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw	17.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= 17.<u>28</u> W/m²

Summary of RTTV at North Elevations

= 1.32 + 1.50 + 17.28 = 20.09 W/m²

W Elevations

W Elevations								Sheet no.
Gross Wall Areas (Opaque Walls + Glazi	ing Areas) (Ao) at	W Elevations		=	359.76 m ²	Wall Orientation Factor	Gw = 1.131	(Refer to Table 9)
Glazing Areas at	W Elevations			=	0.00 m ²	Average Absorptivity (α) of the External	Opaque Wall at	N Elevations
Breakdown of Glazing Glazing Areas	<u>a Areas</u> Unshaded			(W-F) =	0.00 m ²	External Wall Material (Colour/Finish) Tile (matt) Dark grey	% of wall/roof area 70%	a Absorptivity (Refer to Table 5) 0.9
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projec	ction on Right)		(W) =	0.00 m ²	Aluminium	30%	0.5
2/E 12/E (Window 8)	Glazing Area = Length of Glazing x Glazing	g Height x No. of Storeys	100 × 10	- 0.00 m²			Average Absorptivity =	0.78
2/1 - 12/1 (Wildow 0)	OPF = 0.00 /	1.15 = 0.00	ESC1	= 0.00 m		'U' value of Opaque Wall Areas		
	SPF = 0.00 /(ESC = 0.000	0.40 +)= 0.0 x 0.000	00 ESC2	= = 0.000		$U = 1/(Ri+x_1/k_1+x_2/k_2++x_n/k_n+Ra+Ro)$	where Ri Surface film re Ro Surface film re	sistance of internal surface (Refer to Table 2) esistance of external surface (Refer to Table 2)
				/ .	0.00		Ra Air space resis	stance (Refer to Table 3)
Glazing Areas	Glazing Area = Length of Glazing x Glazing	ction on Right) g Height x No. of Storeys		(w) =	U.UU m²		k Thermal condi	uilding materials uctivity of building materials (Refer to Table 1)
2/F - 12/F (Window 8)	(0.00 OPE - 0.00 /)x 0	0.00 x 10	= 0.00 m ²		W-C	Description: PC Wall A	r025
	SPF = 0.00 /(0.40 +)= 0.0	00 ESC2	=		Wall Material		645
	ESC = 0.000	x 0.000		= 0.000		External surface film resistance	Ro	= 0.044
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project	ction on Right & Left)		(W) =	0.00 m ²	External tiles	0.025 / 1.5	= 0.017
2/F - 12/F (Window 8)	Glazing Area = Length of Glazing x Glazing (0.00	g Height x No. of Storeys)x 0	0.00 x 10	= 0.00 m ²		Concrete	0.15 / 2.16 / 0.38	= 0.069 = 0.000
, , , , , , , , , , , , , , , , , , ,	OPF = 0.00 /	1.15 = 0.00	ESC1	=		Gypsum plaster	0.025 / 0.38	= 0.066
	SPF_R = 0.00 /(SPF L = 0.00 //	0.40 +)= 0.0	00 ESC_R	=		Internal surface film resistance	Ri	= 0.12
	ESC2 = 1.00 -	[(1- ESC_R) +	(1- ESC_L)]		Total	llo1 - 1	- 2 17 W/m²V
	= 1.00 -	[(1- 0) +	-(1- 0)] = -1			0.316	- 3.17 Will ⁻ K
	L 30 - 0.000	Χ -1.000		- 0.000				
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project	ction on Right & Left)		(W) =	0.00 m ²	W-C Wall Material	Description: 0	
2/F - 12/F (Window 8)	(0.00)x 0).00 x 10	= 0.00 m ²		external surface film	Ro	= 0.044
	OPF = 0.00 /	1.15 = 0.00	ESC1	=		Air space resistanace	Ra	= 0
	SPF_R = 0.00 /(SPF L = 0.00 /(0.40 +)= 0.0	DU ESC_R DO ESC L	=			0 / 1.5	= 0.000
	ESC2 = 1.00 -	[(1- ESC_R) +	(1- ESC_L)]			0 / 0.38	= 0.000
	= 1.00 -	[(1- 0.000) +	-(1- 0)] = -1		lateral suffers flux as islands	0 / 0.38	= 0.000
	ESC = 0.000	X -1.000		= 0.000		Internal surface film resistance Total	Ri	= 0.12 0.164
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projec Glazing Area = Length of Glazing x Glazing	ction on Left) g Height x No. of Storeys	000 × 10	$(W) = 0.00 m^2$	0.00 m ²		$Uc2 = \frac{1}{0.164}$	= 6.10 W/m²K
	OPF = 0.00 /	1.15 = 0.00	ESC1	= 0.00 m			0.104	
	SPF = 0.00 /(0.40 +)= 0.0	00 ESC2	=				
	ESC = 0.000	X 0.000		= 0.000		Wall Material	Description: 0	
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Projec	ction on Left)		(W) =	0.00 m ²	external surface film	Ro	= 0.044
2/F - 12/F (Window 8)	Glazing Area = Lengtri or Glazing x Glazing	g meight x No. of Storeys)x 0	0.00 x 10	= 0.00 m ²		All space resistanace	ка 0 / 1.5	= 0.000
	OPF = 0.00 /	1.15 = 0.00	ESC1	=			0 / 2.16	= 0.000
	SPF = 0.00 /(ESC = 0.000	0.40 +)= 0.0 x 0.000	00 ESC2	= = 0.000			0 / 0.38 0 / 0.38	= 0.000 = 0.000
.				,		Internal surface film resistamce	Ri	= 0.12
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project Glazing Area = Length of Glazing x Glazing	ction on Right & Left) a Height x No. of Storeys		(W) =	0.00 m ²	Total		0.164
2/F - 12/F (Window 8)	(0.00)x 0	0.00 x 10	= 0.00 m ²			Uc2 =1	= 6.10 W/m²K
	OPF = 0.00 /	1.15 = 0.00	ESC1	=			0.164	0.10 W/III-K
	SPF_R = 0.00 /(SPF L = 0.00 /(0.40 +)= 0.0	DU ESC_R DO ESC L	=				
	ESC2 = 1.00 -	[(1- ESC_R) +	(1- ESC_L)]				
	= 1.00 - ESC = 0.000	[(1- 0) + x -1 000	-(1- 0)] = -1 = 0.000				
Glazing Areas	Shaded by Overhang Fin & Built-Fin (Project	ction on Right & Left)		(W) =	0.00 m ²			
2/F - 12/F (Window 8)	Glazing Area = Length of Glazing x Glazing (0.00	g Height x No. of Storeys)x 0	0.00 x 10	= 0.00 m ²				
, , , , , , , , , , , , , , , , , , ,	OPF = 0.00 /	1.15 = 0.00	ESC1	=				
	SPF_R = 0.00 /(0.40 +)= 0.0	00 ESC_R	=				
	ESC2 = 1.00 -	[(1- ESC_R) +	(1- ESC_L	=)]				
	= 1.00 -	[(1- 0.000) +	-(1- 0)] = -1				
	ESC = 0.000	x -1.000		= 0.000				
Opaque Wall Areas at	W Elevations			=	359.76 m ²			
<u>Breakdown of Opaque W</u> RC Wall Areas	Vall Areas			(W-C) =	359.76 m ²			
RC Column Areas 2/F - 12/F		0 x 2	2.80 x 10	(W-C) = = 0.00 m ²	0.00 m²			
2/F - 12/F				(W-C) =	0.00 m ²			

Sheet no. 9

0.78

2/F - 12/F			0	x	2.80	x	10	= (W-C) 0.00 m ²	=	0.00 m ²
Window to Wall Ratio (WWR)	=	0.00	/				359	9.76		=	0.00

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014 Form RTTV (Wall) 1 - Calculation of RTTV_{wall} of W Facade

Sheet No.	10		BD Ref No.	BD 2/9046/18
Building Address	REDEVELOPI STREET, TAI	MENT OF TAI PO TO PO, N.T.	OWN LOT NO.233, NOS	5. 2,4 AND 6 WAI YI
Facade Orientation Facing	W	_	Gross Wall Area (Ao) =	359.76
Window to Wall Ratio (WWR)	0.00	Wall O	rientation Factor (Gw) =	1.131
Part 1 - Calculation of Heat Cond	duction through Op	aque Walls		
Components / Details			Code No.	
Description	Units	W-C	W-C	W-C
External Finish Material		External tiles	0	0
Conductivity	W/mK	1.50	1.50	1.50
Thickness	m	0.025	0.000	0.000
Average Absorptivity	(α)	0.78	0.78	0.78
Intermediate component		Concrete	0.00	0.00
Conductivity	W/mK	2.16	2.16	2.16
Thickness	m	0.15	0.00	0.00
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		Gypsum plaster	0.00	0.00
Conductivity	W/mK	0.38	0.38	0.38
Thickness	m	0.03	0.00	0.00
U-value of Opaque Area (Uwi)	W/m²K	3.17	6.10	6.10
Opaque Wall Area (Awi)	m²	359.76	0.00	0.00
Heat Conduction = 3.57(Awi/Ao)	Uwi awi Gw	9.97	0.00	0.00

Part 2 - Calculation of Heat Conduction through Glazing Code No. Components / Details W-F1 W-W5 W-W6 W-W7 W-W8 W-W15 Units Description Glazing Type Clear glass 0.006 Thickness m Glazing Area (Afi) m² 0.00 0.00 0.00 0.00 0.00 0.00 3.9 U-value of Glazing (Ufi) W/m²K 0.00 Heat Conduction = 0.64 (Afi/Ao) Uf Gw 0.00 0.00 0.00 0.00 0.00

> Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n = 0.00 W/m²

Part 3 - Calculation of Solar Radiation	through Gla	zing								
Components / Details						Code No.				
Description	Units	W-F1	W-W5	W-W6	W-W7	W-W8	W-W15	W-W16	W-W17	W-W18
Glazing Type		Clear glass								
Thickness	m	0.006								
Glazing Area (Afi)	m²	0.00								
Shading Coefficient of Glazing (SCf)		0.69								
Visible Light Transmittance (VLT)	%	71								
External Reflectance (ER)	%	9								
External Shading Miltiplier (ESC)		1.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(I	ESCwi)Gw	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n = 0.00 W/m²

Summary of RTTV at W Elevations

= 9.97 + 0.00 + 0.00 $= 9.97 W/m^2$

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi awi Gw where i= 1, 2, ..., n

=

9.97 W/m²

W-W16	W-W17	W-W18
0.00	0.00	0.00
0.00	0.00	0.00

S Elevations

Gross Wall Areas (Opaque Walls + Glazi	ng Areas) (Ao) at				:	S EI	evations								=	376.61 m ²
Glazing Areas at	S Elevations														=	14.08 m²
<u>Breakdown of Glazing</u> Glazing Areas	<u>Areas</u> Unshaded											(S-F)	=	14.08 m ²
Glazing Areas	Shaded by Overhang Fi	n & B	uilt-Fin (Project	tion on Ri	ight)						(s)	=	0.00 m ²
	Glazing Area = Length o	Gla	zing x (Glazing	Height x	No.	of Storeys									
2/F - 12/F (Window 8)	OPE	(0.00	,	1 15	_	0.00)x	0.00	х	10 ESC1	=	0.00	m²		
	SPF	-	0.00	//	0.40	+	0.00)=	0.00		ESC2	-				
	ESC	=	0.000) Ì	x		0.000	,				=	0.000			
													_			
Glazing Areas	Shaded by Overhang Fil	N&B	uilt-Fin (Project	tion on Ri	ight)	of Storovs					(S)	=	0.00 m²
2/F - 12/F (Window 8)	Glazing Alea - Lenguro	(0.00	Jiazing	rieigiit x	INU.	UI SIUIEYS)x	0.00	x	10	=	0.00	m²		
	OPF	=	0.00	1	1.15	=	0.00				ESC1	=				
	SPF	=	0.00	/(0.40	+)=	0.00		ESC2	=				
	ESC	=	0.000)	х		0.000					=	0.000			
Glazing Areas	Shaded by Overhang Fi	n & B	uilt-Fin (Project	tion on Ri	ight	& Left)					(s)	=	0.00 m²
-	Glazing Area = Length o	Gla	zing x (Glazing	Height x	No.	, of Storeys					`				
2/F - 12/F (Window 8)		(0.00				-)x	0.00	х	10	=	0.00	m²		
	OPF	=	0.00	 /	1.15	=	0.00	۱	0.00		ESC1	=				
	SPF_R SPF I	-	0.00	/(/(0.40	+)=)=	0.00		ESC I	=				
	ESC2	=	1.00	-	[(1-	ESC_R)	+(1-	ESC_L)]				
		=	1.00	-	[(1-	0)	+(1-	0)]	=	-1		
	ESC	=	0.000)	х		1.000					=	0.000			
Glazing Areas	Shaded by Overhang Fin	& B	uilt-Fin (Project Blazing	tion on Ri Height x	ight No	& Left)					(s)	=	0.00 m²
2/F - 12/F (Window 8)	Glazing Area - Lengaro	(0.00	Jiazing	noight x	110.	or otoreys)x	0.00	x	10	=	0.00	m²		
() ,	OPF	=	0.00	1	1.15	=	0.00	,			ESC1	=				
	SPF_R	=	0.00	/(0.40	+)=	0.00		ESC_R	=				
	SPF_L	=	0.00	/(0.40	+	500 D)=	0.00	4	ESC_L	=				
	E302	=	1.00	2	L([(1-	ESC_R 0.000)	+(+(1-	ESC_L)])]	=	-1		
	ESC	=	0.000)	x		-1.000	,	.(•		=	0.000	·		
Glazing Areas	Shaded by Overhang Fin	1 & B	uilt-Fin (Project	tion on Le	eft)	10					(S)	=	0.00 m²
2/F - 12/F (Window 8)	Giazing Area = Length o	Gla:	Zing X 0 0.00	Jazing	Height x	INO.	of Storeys)x	0.00	x	10	=	0.00	m²		
2.1 12.1 (11.100110)	OPF	=	0.00	1	1.15	=	0.00	<i>j</i> x	0.00	A	ESC1	=	0.00			
	SPF	=	0.00	/(0.40	+)=	0.00		ESC2	=				
	ESC	=	0.000)	х		0.000					=	0.000			
Glazing Areas	Shaded by Overhang Fi	1 & B	uilt-Fin (Project	tion on Le	əft)						(s)	=	0.00 m ²
Cluzing Areas	Glazing Area = Length o	Gla	zing x (Glazing	Height x	No.	of Storeys					(U	,		0.00 m
2/F - 12/F (Window 8)		(0.00)x	0.00	х	10	=	0.00	m²		
	OPF	=	0.00	1	1.15	=	0.00	,			ESC1	=				
	SPF	-	0.00)	0.40 x	+	0 000)=	0.00		ESC2	-	0 000			
					A											
Glazing Areas	Shaded by Overhang Fir	1 & B	uilt-Fin (Project	tion on Ri	ight	& Left)					(S)	=	0.00 m ²
2/F _ 12/F (Mindow 9)	Glazing Area = Length o	Gla:	zing x (Jazing	Height x	No.	of Storeys	١.	0.00	v	10	-	0.00	m ²		
211 - 1211 (WIIIUUW O)	OPF	=	0.00	1	1.15	=	0.00	<i>)</i> ^	0.00	^	ESC1	=	0.00			
	SPF_R	=	0.00	/(0.40	+)=	0.00		ESC_R	=				
	SPF_L	=	0.00	/(0.40	+)=	0.00		ESC_L	=				
	ESC2	=	1.00	-	[(1-	ESC_R)	+(1-	ESC_L)]	_	4		
	ESC	-	0.000	-	L(X	1-	-1.000)	+(1-	U)] =	- 0.000	-1		
Glazing Areas	Shaded by Overhang Fin	n & B	uilt-Fin (Project	tion on R	ight	& Left)					(S)	=	0.00 m ²
2/F - 12/F (Window 8)	Gazing Area = Length o	Gla:	zing x (ດູດດ	Jazing	Height x	NO.	of Storeys)x	0.00	¥	10	=	0.00	m²		
(****dow 0)	OPF	=	0.00	1	1.15	=	0.00	/^	0.00	^	ESC1	=	0.00			
	SPF_R	=	0.00	/(0.40	+)=	0.00		ESC_R	=				
	SPF_L	=	0.00	/(0.40	+)=	0.00		ESC_L	=				
	ESC2	=	1.00	-	[(1-	ESC_R)	+(1-	ESC_L)]	_	1		
	ECS	=	0.000)	ι\ X		-1.000	,	-ر	1-	U	/J =	- 0.000	-1		
Onaque Wall Areas of			vationa												-	362 522
Spaque Wall Areas at		J ⊂I6	valions												-	302.33 III"
Breakdown of Opaque W	all Areas															
RC Wall Areas												(S-C)	=	362.53 m ²
RC Column Areas												(S-C)	=	0.00 m²
2/F - 12/F							0	x	2.80	х	10	=	0.00	m²		

Nall Orientation Factor	Gw =	0.975		(Refer to Table 9)
Average Absorptivity (α) of the Externa	al Opaque Wall at		S Elevations		
	0/		a Abs	sorptivity	т
External Wall Material (Colour/Finish)	% of wall/roo	of area	(Refer t	Table 5)	-
ile (matt) Dark grey	100%			1.9	
	Average Ab	sorptivity =	(0.90	Ţ
U' value of Opaque Wall Areas					
$U = 1/(Ri + x_1/k_1 + x_2/k_2 + \dots + x_n/k_n + Ra + Ro)$	where Ri	Surface film r	esistance of internal si	urface (Refer to Table 2)	
	Ro	Surface film r	esistance of external s	urface (Refer to Table 2)	
	Ra	Air space resi	istance (Refer to Table	e 3)	
	x k	Thickness of Thermal cond	building materials luctivity of building ma	terials (Refer to Table 1)	
2.0	Description:	RC Wall A	1035		
Vall Material	Description.	NO Wait A	1003		T
External surface film resistance	1	Ro	=	0.044	1
Air space resistanace		Ra	=	0	1
External tiles	0.025 /	1.5	=	0.017	
Concrete	0.15 /	2.16	=	0.069	1
	1	0.38	=	0.000	
Gypsum plaster	0.025 /	0.38	=	0.066	
nternal surface film resistance		Ri	=	0.12	
Tota				0.316	
		1			4
S-C	Description:	0			7
		Pa		0.044	-
		RU Po	-	0.044	
ai space resistanace	0 /	15	-	0 000	
	0 /	2.16	-	0.000	
	0 /	0.38	-	0.000	
	0 /	0.38	-	0.000	
nternal surface film resistance	0,	Ri	-	0.12	
Tota		14		0.164	
		1			1
	Uc2	=	=	6.10	W/m²ł
S-C	Description:	0			
Vall Material					I
external surface film		Ro	=	0.044	1
Air space resistanace		Ra	=	0	1
	0 /	1.5	=	0.000	1
	0 /	2.16	=	0.000	1
	0 /	0.38	=	0.000	1
	0 /	0.38	=	0.000	1
	1	Di	=	0.12	I
nternal surface film resistamce		INI.			
nternal surface film resistamce Tota		N		0.164	1

Sheet no. 11

2/F - 12/F			0	x	2.80	x	10	= (S-C) 0.00 m ²	=	0.00 m²
Window to Wall Ratio (WWR)	=	14.08	1				376	.61		=	0.04

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014 Form RTTV (Wall) 1 - Calculation of RTTVwall of S Facade

Sheet No.	12		BD Ref No.	BD 2/9046/18
Building Address	REDEVELOPI STREET, TAI	MENT OF TAI PO TO PO, N.T.	WN LOT NO.233, NOS.	2,4 AND 6 WAI YI
Facade Orientation Facing	S	(Gross Wall Area (Ao) =	376.61
Window to Wall Ratio (WWR)	0.04	Wall Ori	entation Factor (Gw) =	0.975
Part 1 - Calculation of Heat Con	duction through Op	aque Walls		
Components / Details			Code No.	
Description	Units	S-C	S-C	S-C
External Finish Material		External tiles	0	0
Conductivity	W/mK	1.50	1.50	1.50
Thickness	m	0.025	0.000	0.000
Average Absorptivity	(α)	0.90	0.90	0.90
Intermediate component		Concrete	0.00	0.00
Conductivity	W/mK	2.16	2.16	2.16
Thickness	m	0.15	0.00	0.00
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		Gypsum plaster	0.00	0.00
Conductivity	W/mK	0.38	0.38	0.38
Thickness	m	0.03	0.00	0.00
U-value of Opaque Area (Uwi)	W/m²K	3.17	6.10	6.10
Opaque Wall Area (Awi)	m²	362.53	0.00	0.00
Heat Conduction = 3.57(Awi/Ao)	Uwi awi Gw	9.55	0.00	0.00

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi awi Gw where i= 1, 2, ..., n 9.55 W/m² =

Part 2 - Calculation of Heat Conduction through Glazing												
Components / Details		Code No.										
Description	Units	S-F1	S-W7	S-W8	S-W9	S-W10	S-W15	S-W16	S-W17	S-W18		
Glazing Type		Clear Glas										
Thickness	m	0.006										
Glazing Area (Afi)	m²	14.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
U-value of Glazing (Ufi)	W/m²K	3.9										
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n = 0.09 W/m²

Part 3 - Calculation of Solar Radiation	1 through Gla	zing										
Components / Details		Code No.										
Description	Units	S-F1	S-W7	S-W8	S-W9	S-W10	S-W15	S-W16	S-W17	S-W18		
Glazing Type		Clear Glas										
Thickness	m	0.006										
Glazing Area (Afi)	m²	14.08										
Shading Coefficient of Glazing (SCf)		0.69										
Visible Light Transmittance (VLT)	%	71										
External Reflectance (ER)	%	9										
External Shading Miltiplier (ESC)		1.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw	1.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= 1.05 W/m²

Summary of RTTV at S Elevations

= 9.55 + 0.09 + 1.05

= 10.69 W/m²

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014 Form RTTV (Wall) 2 - Summary of Overall RTTV_{wall} of Building

 Sheet No.
 13
 BD Ref No.
 BD 2/9046/18

 Building Address
 REDEVELOPMENT OF TAI PO TOWN LOT NO.233, NOS. 2,4 AND 6 WAI YI STREET, TAI PO, N.T.
 BD 2/9046/18

Overall Gross Wall Area [a]

1475.22 m²

Facade Orientation	Gross Wall Area	Heat Conduction through Opaque Walls	Heat Conduction through Glazing	Solar Radiation through Glazing	RTTVwall at Each Facade	Area-weighted RTTVwall
Facing	(m²)	(W/m²)	(W/m²)	(W/m²)	(W/m²)	(W/m²)
	[b]	[C]	[d]	[e]	[f]=[c]+[d]+[e]	[g]=[f]x[b]/[a]
East	357.24	9.30	0.03	0.35	9.67	2.34
North	381.62	1.32	1.50	17.28	20.09	5.20
West	359.76	9.97	0.00	0.00	9.97	2.43
South	376.61	9.55	0.09	1.05	10.69	2.73

Overall RTTVwall = 12.70 W/m²

< 14 W/m² ok.

Roof

Gross Roof Areas (Opaque Walls + Skylight Areas) (Aro) at	Roof	=	86.41 m²	Roof Orientation Factor	Gs =	2.16	(R	efer to Table 9)	
Skylight Areas at Roof		=	0.00 m²	Average Absorptivity (α) of the External Opa	aque Wall at	Roof			
Breakdown of Skylight Areas				External Roof Material (Colour/Finish)	% of roof are	а	α A (Refe	bsorptivity r to Table 5)	
Skylight Areas Unshaded	(0)	=	0.00 m ²	Tile (matt) Dark grey	100%			0.9	
					Average Abs	orptivity =	0.	9	
				'U' value of Opaque Roof Areas					
				$U = 1/(Ri+x_1/k_1+x_2/k_2++x_n/k_n+Ra+Ro)$	where Ri	Surface film resis	tance of internal surfa	ace (Refer to Table 2)	
					R0 Ra	Air space resista	tance of external surf	ace (Refer to Table 2)	
					x	Thickness of buil	ding materials	,	
					k	Thermal conduct	ivity of building materi	als (Refer to Table 1)	
				R1	Description:	Roof Area			
				Roof Material					
				External surface film resistance		Ro	=	0.055	
				Air space resistanace		Ra	=	0	
				10mm concrete tiles	0.01 /	1.1	=	0.009	
				15mm asphalt	0.015 /	1.15	=	0.013	
OpaqueAreas at Roof		=	86.41 m²	75mm cement/sand screed	0.075 /	0.72	=	0.104	
				50mm polystyrene insulation	0.05 /	0.034	=	1.471	
Breakdown of Opaque Roof Areas				150mm concrete	0.15 /	2.16	=	0.069	
RC Roof Areas	(87.41)	=	86.41 m²	20mm gypsum plaster	0.02 /	0.38	=	0.053	
Roof (43.38)= 43.38	m²		Internal surface film resistance		Ri	=	0.162	
Upper Roof (43.03)= 43.03	m²		Tot	tal		=	1.936	W/m²K
				Ur1	=	1	=	0.517	
						1.936			

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014 Form RTTV (Roof) 1 - Calculation of RTTV_{roof}

Sheet No.	15	E	D Ref No.	BD 2/9046/18
Ruilding Address	REDEVELOR	PMENT OF TAI PO TOWN LO	DT NO.233	, NOS. 2,4
Dunding Address	AND 6 WAI	/I STREET, TAI PO, N.T.		
Roof Orientation Facing	Flat	Gross Roof Ar	rea (Aro) =	86.41
Skylight to Roof Ratio (SRR) =	0	Roof Orientation Fac	ctor (Gs) =	2.16
		_	-	
Part 1 - Calculation of Heat Co	onduction throug	h Opaque Roof		
Components / Details	0	Code	No.	
Description	Unite	D1		
Description	UTIILS	RI		
External Finish Material		10mm concrete tiles		
Conductivity	W/mK	1.10		
Thickness	m	0.010		
Average Absorptivity	(α)	0.9		
Intermediate component		15mm asphalt		
Conductivity	W/mK	1.15		
Thickness	m	0.015		
Intermediate component		75mm cement/sand screed		
Conductivity	W/mK	0.720		
Thickness	m	0.08		
Intermediate component		50mm polystyrene insulation		
Conductivity	W/mK	0.03		
Thickness	m	0.05		
Internal Finish Material		20mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.02		
U-value of the Roof (Uri)	W/m²K	0.52		
Opaque Roof Area (Ari)	m²	86.41		
Heat Conduction = 3 47(Ari/Ar	o) Uri ari Gs	3 48		

Part 2 - Calculation of Hea	t Conduction through Skyli	ght							
Components / Details		Code No.							
Description	Units	S1							
Skylight Glazing Type		-							
Thickness	m	-							
Skylight Area (Asi)	m²	0.00							
U-value of Skylight Glazing (Usi)	W/m²K	-							
Heat Conduction = 0.40 (A	si/Aro) Usi Gs	0.00							

Heat Conduction through Skylight = 0.40 (Asi/Aro) Usi Gs where i= 1, 2, ..., n = 0.00 W/m²

Part 3 - Calculation of Sola	ar Radiation through Sky	light							
Components / Details		Code No.							
Description	Units	S1							
Skylight Glazing Type		-							
Thickness	m	-							
Skylight Area (Asi)	m²	0.00							
Shading Coefficient of Skyli	ght Glazing (SCr)	-							
Visible Light Transmittance (VLT)		-							
External Reflectance (ER)		-							
Solar Radiation = 41.10 (As	si/Aro) (SCri) Gs	0.00							

Heat Conduction through Opaque Roof = 3.47(Ari/Aro) Uri ari Gs

= 3.48

where i= 1, 2, ..., n

W/m²

Solar Radiation through Skylight = 41.10 (Asi/Aro) (SCri) Gs where i= 1, 2, ..., n = 0.00 W/m²

Summary of RTTV at Roof



Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014 Form RTTV (Roof) 2 - Summary of RTTV_{roof} of Building Envelopes

Sheet No.

Building Address

16

REDEVELOPMENT OF TAI PO TOWN LOT NO.233, NOS. 2,4 AND 6 WAI YI STREET, TAI PO, N.T.

BD Ref No. BD 2/9046/18

Overall Roof Area [a]

86.41 m²

Roof	Gross Roof Area (m ²)	Heat Conduction through Opaque Roof (W/m ²)	Heat Conduction through Skylight (W/m ²)	Solar Radiation through Skylight (W/m ²)	RTTVroof at Each Type of Roof (W/m ²)	Area-weighted RTTVroof (W/m ²)
	[b]	[C]	[d]	[e]	[f]=[c]+[d]+[e]	[g]=[f]x[b]/[a]
Flat Roof	86.41	3.48	0.00	0.00	3.48	3.48

Overall RTTVroof = 3.48 W/m²

< 4 W/m² ok.