



住宅熱傳送值的摘要匯表

RTTV Summary Sheet

請在適當的方格內填上『√』號。
please tick in box as appropriate.

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.

註:

ER = 外部反射率
SC = 遮光係數
VLT = 可見光透光率
應以發展項目中使用比例最高的窗戶和天窗的資料為準。

PNAP
APP-156
附錄
Appendix A

電郵地址

E-mail Address



作認收電郵之用 (電子呈交適用)

For acknowledgement email (e-submission)

地址 Address:	D.D.121 LOT 2168, TONG YAN SAN TSUEN, YUEN LONG (BLOCK A)		屋宇署檔號 BD Ref. No.	2/9028/18
建築物類型: Building Type:	住宅 Residential			
住宅熱傳送值計算者 RTTV calculated by	<input type="checkbox"/> 1. 註冊專業工程師 1. Registered Professional Engineers			
	<input type="checkbox"/> 2. 建築師 2. Architect			
	<input checked="" type="checkbox"/> 3. 其他，請註明： 3. Others, please specify: AUTHORISED PERSON			
層數 (住宅單位) No. of Storeys (Residential Units)	3			

表 1 Table 1

當作符合牆壁住宅熱傳送值					Deemed to Satisfy RTTV _{Wall}				
外牆朝向方位 Facade Orientation Facing	NORTH WEST	SOUTH EAST	SOUTH WEST	NORTH EAST					
平均吸收率值 Average Absorptivity	0.00	0.30	0.00	0.00					
窗戶與牆壁的平均比例 Average Window to Wall Ratio	0.00	0.51	0.45	0.30					
玻璃遮光係數 Shading Coefficient of Glazing	/	0.43/0.45	0.43/0.45	0.43/0.45					
外牆的平均遮光係數 Average Shading Coefficient of Facade									
可見光透光率 Visible Light Transmittance	/ %	50/52 %	50/52 %	50/52 %	%	%	%	%	%
外部反射率 External Reflectance	/ %	6/11 %	6/11 %	6/11 %	%	%	%	%	%



表 2 Table 2

牆壁住宅熱傳送值 RTTV _{Wall}																	
外牆朝向方位 Facade Orientation Facing		NORTH WEST				SOUTH EAST				SOUTH WEST				NORTH EAST			
牆壁方位系數 Wall Orientation Factor		0.965				1.051				1.092				0.924			
外牆總面積 (住宅單位) Total External Wall Area (Residential Units)		67.13 平方米 m²		窗戶與牆壁的比例 Window to Wall Ratio = 0.00		87.09 平方米 m²		窗戶與牆壁的比例 Window to Wall Ratio = 0.51		117.68 平方米 m²		窗戶與牆壁的比例 Window to Wall Ratio = 0.45		38.09 平方米 m²		窗戶與牆壁的比例 Window to Wall Ratio = 0.30	
窗戶總面積 Total Window Area		0.00 m²				44.82 m²				53.37 m²				11.29 m²			
熱傳導 Heat Conduction	不透光牆 Opaque Wall	6.06 瓦特/平方米 W/m²				3.20 瓦特/平方米 W/m²				1.56 瓦特/平方米 W/m²				4.24 瓦特/平方米 W/m²			
	窗戶 Window	0.00 瓦特/平方米 W/m²				1.18 瓦特/平方米 W/m²				1.23 瓦特/平方米 W/m²				0.51 瓦特/平方米 W/m²			
窗戶 Window	玻璃類型 Glass Type	<input type="checkbox"/> 反射性 Reflective	面積 Area= 平方米 m²	SC= %	VLT= ER= %	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 平方米 m²	SC= 0.43/ 0.45	VLT= 50/52 % ER= 6/11 %	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 平方米 m²	SC= 0.43/ 0.45	VLT= 50/52 % ER= 6/11 %	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 平方米 m²	SC= 0.43/ 0.45	VLT= 50/52 % ER= 6/11 %
		<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m²	SC= %	VLT= ER= %	<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m²	SC= %	VLT= ER= %	<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m²	SC= %	VLT= ER= %	<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m²	SC= %	VLT= ER= %
		<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m²	SC= %	VLT= ER= %	<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m²	SC= %	VLT= ER= %	<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m²	SC= %	VLT= ER= %	<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m²	SC= %	VLT= ER= %
	雙層玻璃 Double Glazing	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No			
	外遮光物 External Shading	外懸伸建物 Overhang <input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				外懸伸建物 Overhang <input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				外懸伸建物 Overhang <input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				外懸伸建物 Overhang <input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No			
		側簷伸建物 Sidefin <input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				側簷伸建物 Sidefin <input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				側簷伸建物 Sidefin <input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				側簷伸建物 Sidefin <input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No			
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		0.00 瓦特/平方米 W/m²				7.90 瓦特/平方米 W/m²				8.06 瓦特/平方米 W/m²				4.94 瓦特/平方米 W/m²			
平均吸熱率值 Average Absorptivity		0.00				0.30				0.00				0.00			
各幅外牆的 牆壁住宅熱傳送值 RTTV _{Wall} at each facade		6.06 瓦特/平方米 W/m²				12.28 瓦特/平方米 W/m²				10.84 瓦特/平方米 W/m²				9.69 瓦特/平方米 W/m²			
總牆壁住宅熱傳送值 Overall RTTV _{Wall} 10.07 瓦特/平方米 W/m²																	

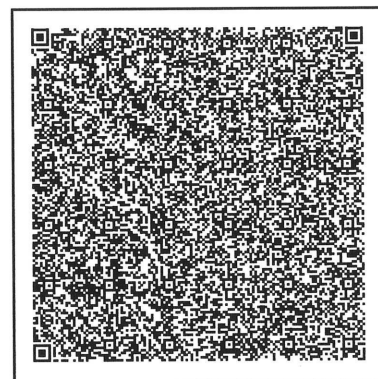



表 3 Table 3

屋頂住宅熱傳送值 RTTV _{Roof}							
屋頂方位系數 Roof Orientation Factor		2.16					
屋頂總面積 (住宅單位) Total Roof Area (Residential Units)		71.94 平方米 m ²					
天窗總面積 Total Skylight Area		0.00 平方米 m ²					
熱傳導 Heat Conduction	屋頂 Roof	1.72 瓦特/平方米 W/m ²					
	天窗 Skylight	0.00 瓦特/平方米 W/m ²					
天窗 Skylight	玻璃類型 Glass Type	<input type="checkbox"/> 反射性 Reflective	面積= 平方米 Area= m ²	SC=	VLT= %	ER= %	
		<input type="checkbox"/> 有色 Tinted	面積= 平方米 Area= m ²	SC=	VLT= %	ER= %	
		<input type="checkbox"/> 透明 Clear	面積= 平方米 Area= m ²	SC=	VLT= %	ER= %	
	雙層玻璃 Double Glazing	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No					
	外遮光物 External Shading	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No					
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		0.00 瓦特/平方米 W/m ²					
平均吸熱率值 (屋頂) Average Absorptivity (roof)		0.3					
總屋頂住宅熱傳送值 Overall RTTV _{Roof}		1.72 瓦特/平方米 W/m ²					

簽署*
Signature*


任何失實核證或聲明可引致法律行動。##
Any false certification or declaration
may be subject to legal action.##

日期 Date

2	1	0	1	2	0	2	2
---	---	---	---	---	---	---	---

日 dd 月 mm 年 yyyy





住宅熱傳送值的摘要匯表

RTTV Summary Sheet

請在適當的方格內填上『√』號。
please tick in box as appropriate.

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.

註:

ER = 外部反射率
SC = 遮光系數
VLT = 可見光透光率
應以發展項目中使用比例最高的窗戶和天窗的資料為準。



電郵地址 E-mail Address	<input type="checkbox"/> 作認收電郵之用 (電子呈交適用) For acknowledgement email (e-submission)
<div></div>	

地址 Address: D.D. 121 LOT 2168, TONG YAN SAN TSUEN (BLOCK B & C)		屋宇署檔號 BD Ref. No. 2/9028118
建築物類型: Building Type:	住宅 Residential	
住宅熱傳送值計算者 RTTV calculated by	<input type="checkbox"/> 1. 註冊專業工程師 1. Registered Professional Engineers	
	<input type="checkbox"/> 2. 建築師 2. Architect	
	<input checked="" type="checkbox"/> 3. 其他，請註明： 3. Others, please specify: AUTHORISED PERSON	
層數 (住宅單位) No. of Storeys (Residential Units) 3		

表 1 Table 1

當作符合牆壁住宅熱傳送值					Deemed to Satisfy RTTV _{Wall}			
外牆朝向方位 Facade Orientation Facing	NORTH WEST	SOUTH EAST	SOUTH WEST	NORTH EAST				
平均吸收率值 Average Absorptivity	0.30	0.30	0.30	0.00				
窗戶與牆壁的平均比例 Average Window to Wall Ratio	0.00	0.00	0.49	0.35				
玻璃遮光系數 Shading Coefficient of Glazing	1	0.45	0.45	0.45				
外牆的平均遮光系數 Average Shading Coefficient of Facade								
可見光透光率 Visible Light Transmittance	1 %	52 %	52 %	52 %	%	%	%	%
外部反射率 External Reflectance	1 %	6 %	6 %	6 %	%	%	%	%

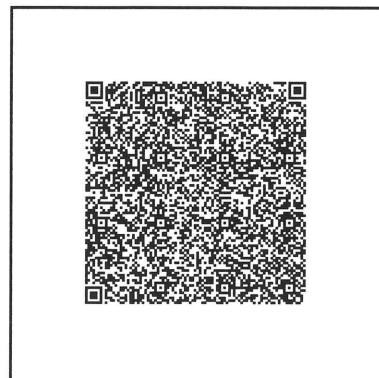


表 2 Table 2

牆壁住宅熱傳送值 RTTV _{Wall}																		
外牆朝向方位 Facade Orientation Facing		NORTH WEST				SOUTH EAST				SOUTH WEST				NORTH EAST				
牆壁方位系數 Wall Orientation Factor		0.965				1.057				1.092				0.924				
外牆總面積 (住宅單位) Total External Wall Area (Residential Units)		48.30 平方米 m ²		窗戶與牆壁的比例 Window to Wall Ratio = 0.00		48.30 平方米 m ²		窗戶與牆壁的比例 Window to Wall Ratio = 0.00		167.79 平方米 m ²		窗戶與牆壁的比例 Window to Wall Ratio = 0.49		18.38 平方米 m ²		窗戶與牆壁的比例 Window to Wall Ratio = 0.35		
窗戶總面積 Total Window Area		0.00 m ²				0.00 m ²				82.48 m ²				6.44 m ²				
熱傳導 Heat Conduction	不透光牆 Opaque Wall	3.64 瓦特/平方米 W/m ²				3.96 瓦特/平方米 W/m ²				2.09 瓦特/平方米 W/m ²				0.63 瓦特/平方米 W/m ²				
	窗戶 Window	0.00 瓦特/平方米 W/m ²				0.00 瓦特/平方米 W/m ²				1.80 瓦特/平方米 W/m ²				1.09 瓦特/平方米 W/m ²				
窗戶 Window	玻璃類型 Glass Type	<input type="checkbox"/> 反射性 Reflective	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 平方米 m ²	SC=	VLT= ER=	
		<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m ²	SC=	VLT= ER=	
		<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m ²	SC=	VLT= ER=	
	雙層玻璃 Double Glazing	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				
	外遮光物 External Shading	外懸伸建物 Overhang	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No			
		側簷伸建物 Sidefin	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No			
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		0.00 瓦特/平方米 W/m ²				0.00 瓦特/平方米 W/m ²				9.15 瓦特/平方米 W/m ²				6.08 瓦特/平方米 W/m ²				
平均吸熱率 Average Absorptivity		0.30				0.30				0.30				0.00				
各幅外牆的 牆壁住宅熱傳送值 RTTV _{Wall} at each facade		3.64 瓦特/平方米 W/m ²				3.96 瓦特/平方米 W/m ²				13.05 瓦特/平方米 W/m ²				7.79 瓦特/平方米 W/m ²				
總牆壁住宅熱傳送值 Overall RTTV _{Wall}		9.55 瓦特/平方米 W/m ²																

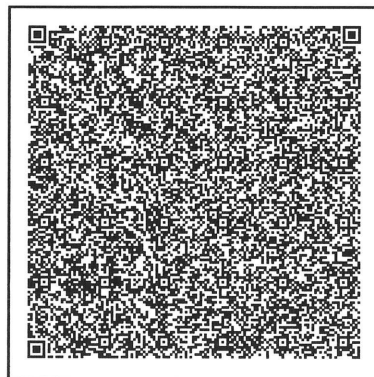



表 3 Table 3

屋頂住宅熱傳送值 RTTV _{Roof}							
屋頂方位系數 Roof Orientation Factor		2.16					
屋頂總面積 (住宅單位) Total Roof Area (Residential Units)		99.59 平方米 m ²					
天窗總面積 Total Skylight Area		0.00 平方米 m ²					
熱傳導 Heat Conduction	屋頂 Roof	1.73 瓦特/平方米 W/m ²					
	天窗 Skylight	0.00 瓦特/平方米 W/m ²					
天窗 Skylight	玻璃類型 Glass Type	<input type="checkbox"/> 反射性 Reflective	面積= 平方米 Area= m ²	SC=	VLT= %	ER= %	
		<input type="checkbox"/> 有色 Tinted	面積= 平方米 Area= m ²	SC=	VLT= %	ER= %	
		<input type="checkbox"/> 透明 Clear	面積= 平方米 Area= m ²	SC=	VLT= %	ER= %	
	雙層玻璃 Double Glazing	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No					
	外遮光物 External Shading	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No					
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		0.00 瓦特/平方米 W/m ²					
平均吸熱率值 (屋頂) Average Absorptivity (roof)		0.3					
總屋頂住宅熱傳送值 Overall RTTV _{Roof}		1.73 瓦特/平方米 W/m ²					

簽署*
Signature*


任何失實核證或聲明可引致法律行動。##
Any false certification or declaration
may be subject to legal action.##

日期 Date

2	1	0	1	2	0	2	2
---	---	---	---	---	---	---	---

日 dd 月 mm 年 yyyy





住宅熱傳送值的摘要匯表

RTTV Summary Sheet

請在適當的方格內填上『√』號。
please tick in box as appropriate.

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.

註:

ER = 外部反射率
SC = 遮光係數
VLT = 可見光透光率
應以發展項目中使用比例最高的窗戶和天窗的資料為準。

PNAP
APP-156
附錄
Appendix A

電郵地址

E-mail Address



作認收電郵之用 (電子呈交適用)

For acknowledgement email (e-submission)

地址 Address: D.D.121 LOT 2168, TONG YAN SAN TSUEN, YUEN LONG (BLOCK D)		屋宇署檔號 BD Ref. No. 219028118
建築物類型: Building Type:	住宅 Residential	
住宅熱傳送值計算者 RTTV calculated by	<input type="checkbox"/> 1. 註冊專業工程師 1. Registered Professional Engineers	
	<input type="checkbox"/> 2. 建築師 2. Architect	
	<input checked="" type="checkbox"/> 3. 其他, 請註明: 3. Others, please specify: AUTHORIZED PERSON	
層數 (住宅單位) No. of Storeys (Residential Units) 3		

表 1 Table 1

	當作符合牆壁住宅熱傳送值				Deemed to Satisfy RTTV _{Wall}			
	NORTH WEST	SOUTH EAST	SOUTH WEST	NORTH EAST				
外牆朝向方位 Facade Orientation Facing								
平均吸收率值 Average Absorptivity	0.30	0.30	0.30	0.30				
窗戶與牆壁的平均比例 Average Window to Wall Ratio	0.04	0.11	0.53	0.32				
玻璃遮光係數 Shading Coefficient of Glazing	0.45	0.45	0.45	0.45				
外牆的平均遮光係數 Average Shading Coefficient of Facade								
可見光透光率 Visible Light Transmittance	52 %	52 %	52 %	52 %	%	%	%	%
外部反射率 External Reflectance	6 %	6 %	6 %	6 %	%	%	%	%



表 2 Table 2

牆壁住宅熱傳送值 RTTV _{Wall}																		
外牆朝向方位 Facade Orientation Facing		NORTH WEST				SOUTH EAST				SOUTH WEST				NORTH EAST				
牆壁方位系數 Wall Orientation Factor		0.965				1.051				1.092				0.924				
外牆總面積 (住宅單位) Total External Wall Area (Residential Units)		50.23 平方米 m ²		窗戶與牆壁的比例 Window to Wall Ratio = 0.04		71.07 平方米 m ²		窗戶與牆壁的比例 Window to Wall Ratio = 0.11		90.27 平方米 m ²		窗戶與牆壁的比例 Window to Wall Ratio = 0.53		46.90 平方米 m ²		窗戶與牆壁的比例 Window to Wall Ratio = 0.22		
窗戶總面積 Total Window Area		2.07 m ²				7.59 m ²				48.22 m ²				10.41 m ²				
熱傳導 Heat Conduction	不透光牆 Opaque Wall	3.49 瓦特/平方米 W/m ²				3.30 瓦特/平方米 W/m ²				1.53 瓦特/平方米 W/m ²				2.71 瓦特/平方米 W/m ²				
	窗戶 Window	0.17 瓦特/平方米 W/m ²				0.38 瓦特/平方米 W/m ²				1.96 瓦特/平方米 W/m ²				0.69 瓦特/平方米 W/m ²				
窗戶 Window	玻璃類型 Glass Type	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 2.07 平方米 m ²	SC= 0.45	VLT= 52 ER= 6 %	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 7.59 平方米 m ²	SC= 0.45	VLT= 52 ER= 6 %	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 48.22 平方米 m ²	SC= 0.45	VLT= 52 ER= 6 %	<input checked="" type="checkbox"/> 反射性 Reflective	面積 Area= 10.41 平方米 m ²	SC= 0.45	VLT= 52 ER= 6 %	
		<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 有色 Tinted	面積 Area= 平方米 m ²	SC=	VLT= ER=	
		<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m ²	SC=	VLT= ER=	<input type="checkbox"/> 透明 Clear	面積 Area= 平方米 m ²	SC=	VLT= ER=	
	雙層玻璃 Double Glazing	<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				
	外遮光物 External Shading	外懸伸建物 Overhang	<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No			
		側簷伸建物 Sidefin	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No				<input checked="" type="checkbox"/> 有 Yes <input type="checkbox"/> 無 No				<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No			
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		0.83 瓦特/平方米 W/m ²				2.11 瓦特/平方米 W/m ²				9.51 瓦特/平方米 W/m ²				3.73 瓦特/平方米 W/m ²				
平均吸熱率值 Average Absorptivity		0.30				0.30				0.30				0.30				
各幅外牆的 牆壁住宅熱傳送值 RTTV _{Wall} at each facade		4.49 瓦特/平方米 W/m ²				5.78 瓦特/平方米 W/m ²				13.00 瓦特/平方米 W/m ²				7.13 瓦特/平方米 W/m ²				
總牆壁住宅熱傳送值 Overall RTTV _{Wall}		8.30 瓦特/平方米 W/m ²																

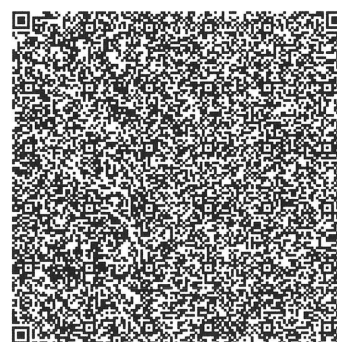



表 3 Table 3

屋頂住宅熱傳送值 RTTV _{Roof}							
屋頂方位系數 Roof Orientation Factor		2.16					
屋頂總面積 (住宅單位) Total Roof Area (Residential Units)		65.80 平方米 m ²					
天窗總面積 Total Skylight Area		0.00 平方米 m ²					
熱傳導 Heat Conduction	屋頂 Roof	1.73 瓦特/平方米 W/m ²					
	天窗 Skylight	0.00 瓦特/平方米 W/m ²					
天窗 Skylight	玻璃類型 Glass Type	<input type="checkbox"/> 反射性 Reflective	面積= 平方米 Area= m ²	SC=	VLT= %	ER= %	
		<input type="checkbox"/> 有色 Tinted	面積= 平方米 Area= m ²	SC=	VLT= %	ER= %	
		<input type="checkbox"/> 透明 Clear	面積= 平方米 Area= m ²	SC=	VLT= %	ER= %	
	雙層玻璃 Double Glazing	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No					
	外遮光物 External Shading	<input type="checkbox"/> 有 Yes <input checked="" type="checkbox"/> 無 No					
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		0.00 瓦特/平方米 W/m ²					
平均吸熱率值 (屋頂) Average Absorptivity (roof)		0.30					
總屋頂住宅熱傳送值 Overall RTTV _{Roof}		1.73 瓦特/平方米 W/m ²					

簽署*
Signature*


任何失實核證或聲明可引致法律行動。##
Any false certification or declaration
may be subject to legal action.##

日期 Date

2	1	0	1	2	0	2	2
---	---	---	---	---	---	---	---

日 dd 月 mm 年 yyyy



Sheet no. 1

1/F	=	4.100 m	(1 storey)
2/F	=	3.300 m	(1 storey)
3/F	=	3.500 m	(1 storey)
R/F(Staircase Hood)	=	2.800 m	(1 storey)

$$\text{Gross Wall Area} = \text{Total Length of Opaque Walls \& Glazing} \times \text{Storey Height} \times \text{No. of Storeys}$$

)x 4.10 x 1 =	4.90 x 4.10 x 1 =	20.09 m ²
)x 3.30 x 1 =	4.90 x 3.30 x 1 =	16.17 m ²
)x 3.50 x 1 =	4.90 x 3.50 x 1 =	17.15 m ²
)x 2.80 x 1 =	4.90 x 2.80 x 1 =	13.72 m ²

$$\text{Gross Wall Area} = \text{Total Length of Opaque Walls \& Glazing} \times \text{Storey Height} \times \text{No. of Storeys}$$

)x 4.10 x 1 =	5.75 x 4.10 x 1 =	23.58 m ²
)x 3.30 x 1 =	8.73 x 3.30 x 1 =	28.79 m ²
)x 3.50 x 1 =	8.65 x 3.50 x 1 =	30.28 m ²
)x 2.80 x 1 =	1.59 x 2.80 x 1 =	4.45 m ²

$$\text{Gross Wall Area} = \text{Total Length of Opaque Walls \& Glazing} \times \text{Storey Height} \times \text{No. of Storeys}$$

)x 4.10 x 1 =	11.79	x 4.10 x 1 =	48.34 m ²
)x 3.30 x 1 =	9.10	x 3.30 x 1 =	30.01 m ²
)x 3.50 x 1 =	8.90	x 3.50 x 1 =	31.13 m ²
)x 2.80 x 1 =	2.93	x 2.80 x 1 =	8.19 m ²

$$\text{Gross Wall Area} = \text{Total Length of Opaque Walls \& Glazing} \times \text{Storey Height} \times \text{No. of Storeys}$$

)x 4.10 x 1 =	1.80 x 4.10 x 1 =	7.38 m ²
)x 3.30 x 1 =	4.85 x 3.30 x 1 =	16.01 m ²
)x 3.50 x 1 =	4.20 x 3.50 x 1 =	14.70 m ²

Total Glazing Area (Window + Balcony) Calculation

Sheet no. 2

Glazing heights (Residential Units) :

Face NW:	No window located at this side								
Face SE:	1/F (Living and Dining)	SD03	=	2.935 m	(	1 storey)			
	2/F (Bedroom 1)	SD10	=	2.555 m	(	1 storey)			
	2/F (Bedroom 2)	SD10	=	2.555 m	(	1 storey)			
	2/F (Family Room)	SD04	=	2.485 m	(	1 storey)			
	3/F (Master Bedroom)	SD05	=	2.795 m	(	1 storey)			
Face SW:	1-R/F(Staircase)	SW-W1	=	2.400 m	(	4 storeys)			
	1/F (Living and Dining)	SD02	=	2.935 m	(	1 storey)			
	1/F (Living and Dining)	SD03	=	2.935 m	(	1 storey)			
	2/F (Family Room Unshaded Window)	W21	=	2.279 m	(	1 storey)			
	2/F (Family Room Shaded Window)	W21	=	2.279 m	(	1 storey)			
	3/F (Master Bedroom Unshaded Window)	W21A	=	2.545 m	(	1 storey)			
	3/F (Master Bedroom Shaded Window)	W21A	=	2.545 m	(	1 storey)			
Face NE:	1/F (Utility Room)	W08	=	1.650 m	(	1 storey)			
	2/F (Bedroom 2)	W10	=	2.325 m	(	1 storey)			
	1/F (Master Bedroom)	W10A	=	2.524 m	(	1 storey)			

North West Elevations

No window located at this side

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

(0.00

)x 0.00 x 0 = 0.00 x 0.00 x 0 = 0.00 m²

Gross Glazing Areas 0.00 m²

South East Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

(4.20
(1.77
(1.77
(2.21
(6.43

)x 2.94 x 1 = 4.20 x 2.94 x 1 = 12.33 m²
)x 2.56 x 1 = 1.77 x 2.56 x 1 = 4.52 m²
)x 2.56 x 1 = 1.77 x 2.56 x 1 = 4.52 m²
)x 2.49 x 1 = 2.21 x 2.49 x 1 = 5.48 m²
)x 2.80 x 1 = 6.43 x 2.80 x 1 = 17.97 m²

Gross Glazing Areas 44.82 m²

South West Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

(1.10
(5.15
(1.37
(0.73
(4.18
(0.73
(4.18

)x 2.40 x 4 = 1.10 x 2.40 x 4 = 10.56 m²
)x 2.94 x 1 = 5.15 x 2.94 x 1 = 15.10 m²
)x 2.94 x 1 = 1.37 x 2.94 x 1 = 4.02 m²
)x 2.28 x 1 = 0.73 x 2.28 x 1 = 1.66 m²
)x 2.28 x 1 = 4.18 x 2.28 x 1 = 9.53 m²
)x 2.55 x 1 = 0.73 x 2.55 x 1 = 1.86 m²
)x 2.55 x 1 = 4.18 x 2.55 x 1 = 10.64 m²

Gross Glazing Areas 53.37 m²

North East Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

(0.60
(2.13
(2.13

)x 1.65 x 1 = 0.60 x 1.65 x 1 = 0.99 m²
)x 2.33 x 1 = 2.13 x 2.33 x 1 = 4.94 m²
)x 2.52 x 1 = 2.13 x 2.52 x 1 = 5.36 m²

Gross Glazing Areas 11.29 m²

Total Gross Glazing Areas 109.48 m²

North West Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at North West Elevations = 67.13 m²

Glazing Areas at North West Elevations = 0.00 m²

Breakdown of Glazing Areas

Glazing Areas No window located at this side (0) = 0.00 m²

Opaque Wall Areas at North West Elevations = 67.13 m²

Breakdown of Opaque Wall Areas

Tile (NW-WA1) = 67.13 m²

Window to Wall Ratio (WWR) = 0.00 / 67.13 = 0.00

Wall Orientation Factor Gw = 0.965 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at North West Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)

Average Absorptivity = 0.00

White granite	0.5
---------------	-----

'U' value of Opaque Wall Areas

U = 1/(Ri+x₁/k₁+x₂/k₂+...+x_n/k_n+Ra+Ro) where

- Ri Surface film resistance of internal surface (Refer to Table 2)
- Ro Surface film resistance of external surface (Refer to Table 2)
- Ra Air space resistance (Refer to Table 3)
- x Thickness of building materials
- k Thermal conductivity of building materials (Refer to Table 1)

NW-WA1	Description:	Tile
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to Table 3)	Ra	= 0
10mm ceramic external tiles	0.01 / 1.5	= 0.0067
25mm external rendering and tile adhesive	0.025 / 0.72	= 0.035
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		0.284

Uw1 = $\frac{1}{0.284}$ = 3.52 W/m²K

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

Sheet No. 4 BD Ref No. _____
Building Address TYST 121 Block A

Facade Orientation Facing North West Gross Wall Area (Ao) = 67.13
Window to Wall Ratio (WWR) 0.00 Wall Orientation Factor (Gw) = 0.965

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		Code No.		
Description	Units	NW-WA1		
External Finish Material		10mm ceramic external tiles		
Conductivity	W/mK	1.50		
Thickness	m	0.010		
Average Absorptivity	(α)	0.50		
Intermediate component		25mm external rendering and tile adhesive		
Conductivity	W/mK	0.72		
Thickness	m	0.025		
Intermediate component		125mm concrete wall		
Conductivity		2.16		
Thickness		0.125		
Intermediate component				
Conductivity				
Thickness				
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		15mm internal plaster		
Conductivity	W/mK	0.72		
Thickness	m	0.015		
U-value of Opaque Area (Uwi)	W/m²K	3.52		
Opaque Wall Area (Aw)	m²	67.13		
Heat Conduction = 3.57(Aw/Ao) Uwi awi Gw		6.06		

Heat Conduction through Opaque Walls = 3.57(Aw/Ao) Uwi awi Gw where i= 1, 2, ..., n
= 6.06 W/m²

Part 2 - Calculation of Heat Conduction through Glazing			
Components / Details		Code No.	
Description	Units		
Glazing Type			
Thickness	m		
Glazing Area (Afi)	m²		
U-value of Glazing (Ufi)	W/m²K		
Heat Conduction = 0.64 (Afi/Ao) Uf Gw			

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 Glazing			
Components / Details		Code No.	
Description	Units		
Glazing Type			
Thickness	m		
Glazing Area (Afi)	m²		
Shading Coefficient of Glazing (SCf)			
Visible Light Transmittance (VLT)	%		
External Reflectance (ER)	%		
External Shading Multiplier (ESC)			
Solar Radiation = 41.75 (Afi/Ao)(SCf)(ESCwi)Gw			

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

Summary of RTTV at North West Elevations
= 6.06 + 0.00 + 0.00
= 6.06 W/m²

South East Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at		South East Elevations	=	87.09 m²
Glazing Areas at		South East Elevations	=	44.82 m²
Breakdown of Glazing Areas				
Glazing Areas	Shaded by Canopy	(	SD03	) = 12.33 m²
1/F		Glazing Area = Length of Glazing x Glazing Height x No. of Storeys		
		(4.20)x 2.94 x 1 =		
		OPF = 0.50 / 3.90 = 0.13		
		ESC =		
		12.33 m²		
		0.901		
Glazing Areas	Shaded by Balcony	(	SD10	) = 9.04 m²
2/F		Glazing Area = Length of Glazing x Glazing Height x No. of Storeys		
		(1.77 x 2.00)x 2.56 x 1 =		
		OPF = 0.95 / 3.10 = 0.31		
		ESC =		
		9.04 m²		
		0.751		
Glazing Areas	Shaded by Balcony	(	SD04	) = 5.48 m²
2/F		Glazing Area = Length of Glazing x Glazing Height x No. of Storeys		
		(2.21)x 2.49 x 1 =		
		OPF = 0.95 / 3.10 = 0.31		
		ESC =		
		5.48 m²		
		0.751		
Glazing Areas	Shaded by Balcony & Side Fin (Left)	(	SD05	) = 17.97 m²
3/F		Glazing Area = Length of Glazing x Glazing Height x No. of Storeys		
		(6.43)x 2.80 x 1 =		
		OPF = 0.94 / 3.30 = 0.28		
		SPF = 0.85 / 6.80 = 0.13		
		ESC = 0.798 x 0.973		
		ESC1 =		
		ESC2 =		
		17.97 m²		
		0.798		
		0.973		
		0.776		
		Total = 44.82 m²		
Opaque Wall Areas at		Gross Wall Areas	=	42.27 m²
Breakdown of Opaque Wall Areas				
Tiles		(	SE-WA1	) = 42.27 m²
Window to Wall Ratio (WWR) = 44.82 / 87.09 = 0.51				

Wall Orientation Factor Gw = 1.051 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at South East Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity
Gross white matt tiles	100%	0.3

Average Absorptivity = 0.30

White granite	0.5
Aluminium Alloy	0.5

'U' value of Opaque Wall Areas
 $U = 1/(R_i + x_1/k_1 + x_2/k_2 + \dots + x_n/k_n + R_a + R_o)$ where R_i Surface film resistance of internal surface (Refer to Table 2)
 R_o Surface film resistance of external surface (Refer to Table 2)
 R_a Air space resistance (Refer to Table 3)
 x Thickness of building materials
 k Thermal conductivity of building materials (Refer to Table 1)

SE-WA1	Description:	Tiles
Wall Material		
External surface film resistance	R_o	= 0.044
Air space resistance (Refer to Table 3)	R_a	= 0
10mm ceramic external tiles	0.01 / 1.5	= 0.0067
25mm external rendering and tile adhesive	0.025 / 0.72	= 0.035
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	R_i	= 0.12
Total		0.284

$Uw1 = \frac{1}{0.284} = 3.52$

W/m²K

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

Sheet No. 6 BD Ref No. _____
Building Address TYST 121 Block A

Facade Orientation Facing South East Gross Wall Area (Ao) = 87.09
Window to Wall Ratio (WWR) 0.51 Wall Orientation Factor (Gw) = 1.051

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		Code No.		
Description	Units	SE-WA1		
External Finish Material		10mm ceramic external		
Conductivity	W/mK	1.50		
Thickness	m	0.010		
Average Absorptivity	(α)	0.50		
Intermediate component		25mm external rendering and tile adhesive		
Conductivity	W/mK	0.72		
Thickness	m	0.025		
Intermediate component		125mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.125		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		15mm internal plaster		
Conductivity	W/mK	0.72		
Thickness	m	0.015		
U-value of Opaque Area (Uwi)	W/m²K	3.52		
Opaque Wall Area (Aw)	m²	42.27		
Heat Conduction = 3.57(Aw/Ao) Uwi αwi Gw		3.20		

Heat Conduction through Opaque Walls = 3.57(Aw/Ao) Uwi αwi Gw where i= 1, 2, ..., n
= 3.20 W/m²

Part 2 - Calculation of Heat Conduction through Glazing					
Components / Details		Code No.			
Description	Units	SD03	SD10	SD04	SD05
Glazing Type		GL-01	GL-02	GL-02	GL-02
Thickness	m	0.012	0.02152	0.02152	0.02152
Glazing Area (Afi)	m²	12.33	9.04	5.48	17.97
U-value of Glazing (Ufi)	W/m²K	5.24	2.71	2.71	2.71
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		0.50	0.19	0.11	0.38

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi G where i= 1, 2, ..., n
= 1.18

Part 3 - Calculation of Solar Radiation through Glazing					
Components / Details		Code No.			
Description	Units	SD03	SD10	SD04	SD05
Glazing Type		GL-01	GL-02	GL-02	GL-02
Thickness	m	0.012	0.02152	0.02152	0.02152
Glazing Area (Afi)	m²	12.33	9.04	5.48	17.97
Shading Coefficient of Glazing (SCf)		0.45	0.43	0.43	0.43
Visible Light Transmittance (VLT)	%	52	50	50	50
External Reflectance (ER)	%	6	11	11	11
External Shading Multiplier (ESC)		0.901	0.751	0.751	0.776
Solar Radiation = 41.75 (Afi/Ao)(SCf)(ESCwi)Gw		2.52	1.47	0.89	3.02

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCf)(ESCwi)Gw where i= 1, 2, ..., n
= 7.90

Summary of RTTV at South East Elevations
= 3.20 + 1.18 + 7.90
= 12.28 W/m²

South West Elevations

Gross Wall Areas
(Opaque Walls + Glazing Areas) (Ao) at South West Elevations = 117.68 m²

Glazing Areas at South West Elevations = 53.37 m²

Breakdown of Glazing Areas

Glazing Areas Unshaded (SW-W1) = 10.56 m²

Glazing Areas Shaded by Canopy (SD02) = 15.10 m²

1/F
Glazing Area = Length of Glazing x Glazing Height x No. of Storeys
(5.15) x 2.94 x 1 = 15.10 m²
OPF = 0.50 / 3.90 = 0.13 ESC = 0.901

Glazing Areas Shaded by Canopy (SD03) = 4.02 m²

Glazing Area = Length of Glazing x Glazing Height x No. of Storeys
(1.37) x 2.94 x 1 = 4.02 m²
OPF = 0.50 / 3.90 = 0.13 ESC = 0.901

Glazing Areas Unshaded (W21) = 1.66 m²

Glazing Areas Shaded by Canopy (W21) = 9.53 m²

2/F
Glazing Area = Length of Glazing x Glazing Height x No. of Storeys
(4.18) x 2.28 x 1 = 9.53 m²
OPF = 0.50 / 3.10 = 0.16 ESC = 0.927

Glazing Areas Shaded by Side Fin (Left) (W21A) = 1.86 m²

3/F
Glazing Area = Length of Glazing x Glazing Height x No. of Storeys
(0.73) x 2.55 x 1 = 1.86 m²
SPF = 0.50 / 0.87 = 0.57 ESC = 0.948

Glazing Areas Shaded by Side Fin (Right) & Balcony (W21A) = 10.64 m²

3/F
Glazing Area = Length of Glazing x Glazing Height x No. of Storeys
(4.18) x 2.55 x 1 = 10.64 m²
OPF = 0.50 / 3.30 = 0.15 ESC1 = 0.879
SPF = 0.50 / 4.34 = 0.12 ESC2 = 0.970
ESC = 0.879 x 0.970 = 0.853

Total = 53.37 m²

Opaque Wall Areas at South West Elevations = 64.31 m²

Breakdown of Opaque Wall Areas

Tile (SW-WA1) = 19.20 m²

Aluminium Cladding (SW-WA2) = 45.11 m²

Window to Wall Ratio (WWR) = 53.37 / 117.68 = 0.45

Sheet no. 7

Wall Orientation Factor Gw = 1.092 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at South West Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)
Average Absorptivity =		0.00

White granite	0.5
Aluminium Alloy	0.5

'U' value of Opaque Wall Areas

U = 1/(Ri+x₁/k₁+x₂/k₂+...+x_n/k_n+Ra+Ro)

where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

SW-WA1	Description:	Tile
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to Table 3)	Ra	= 0
10mm ceramic external tiles	0.01 / 1.5	= 0.0067
25mm external rendering and tile adhesive	0.025 / 0.72	= 0.035
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		0.284

Uw1 = $\frac{1}{0.284}$ = 3.52 W/m²K

SW-WA2	Description:	Aluminium Cladding
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to Table 3)	Ra	= 0
15mm aluminium cladding	0.015 / 160	= 0.000
50mm insulation board	0.05 / 0.034	= 1.471
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		1.713

Uw2 = $\frac{1}{1.713}$ = 0.58 W/m²K

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

Sheet No. 8 BD Ref No. _____
Building Address TYST 121 Block A

Facade Orientation Facing South West Gross Wall Area (Ao) = 117.68
Window to Wall Ratio (WWR) 0.45 Wall Orientation Factor (Gw) = 1.092

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		Code No.		
Description	Units	SW-WA1	SW-WA2	
External Finish Material		10mm ceramic external tiles	15mm aluminium cladding	
Conductivity	W/mK	1.50	160.00	
Thickness	m	0.010	0.015	
Average Absorptivity (α)		0.50	0.50	
Intermediate component		25mm external rendering and tile adhesive	50mm insulation board	
Conductivity	W/mK	0.72	0.034	
Thickness	m	0.025	0.050	
Intermediate component		125mm concrete wall	125mm concrete wall	
Conductivity	W/mK	2.16	2.16	
Thickness	m	0.125	0.125	
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		15mm internal plaster	15mm internal plaster	
Conductivity	W/mK	0.72	0.72	
Thickness	m	0.015	0.015	
U-value of Opaque Area (U _{wi})	W/m²K	3.52	0.58	
Opaque Wall Area (Aw _i)	m²	19.20	45.11	
Heat Conduction = 3.57(Aw _i /Ao) U _{wi} q _{wi} Gw		1.12	0.44	

Heat Conduction through Opaque Walls = 3.57(Aw_i/Ao) U_{wi} q_{wi} Gw where i= 1, 2, ..., n
= 1.56 W/m²

Part 2 - Calculation of Heat Conduction through Glazing								
Components / Details		Code No.						
Description	Units	SW-W1	SD02	SD03	W21	W21	W21A	W21A
Glazing Type		GL-01	GL-01	GL-01	GL-02	GL-02	GL-02	GL-02
Thickness	m	0.012	0.012	0.012	0.02152	0.02152	0.02152	0.02152
Glazing Area (A _{fi})	m²	10.56	15.10	1.66	1.66	9.53	1.86	10.64
U-value of Glazing (U _{fi})	W/m²K	5.24	5.24	5.24	2.71	2.71	2.71	2.71
Heat Conduction = 0.64 (A _{fi} /Ao) U _{fi} Gw		0.33	0.47	0.05	0.03	0.15	0.03	0.17

Heat Conduction through Glazing = 0.64 (A_{fi}/Ao) U_{fi} Gw where i= 1, 2, ..., n
= 1.23 W/m²

Part 3 - Calculation of Solar Radiation through Glazing								
Components / Details		Code No.						
Description	Units	SW-W1	SD02	SD03	W21	W21	W21A	W21A
Glazing Type		GL-01	GL-01	GL-01	GL-02	GL-02	GL-02	GL-02
Thickness	m	0.012	0.012	0.012	0.02152	0.02152	0.02152	0.02152
Glazing Area (A _{fi})	m²	10.56	15.10	1.66	1.66	9.53	1.86	10.64
Shading Coefficient of Glazing (SC _{fi})		0.45	0.45	0.45	0.43	0.43	0.43	0.43
Visible Light Transmittance (VLT)	%	52	52	52	50	50	50	50
External Reflectance (ER)	%	6	6	6	11	11	11	11
External Shading Multiplier (ESC)		1.00	0.901	1.00	1.000	0.927	0.948	0.853
Solar Radiation = 41.75 (A _{fi} /Ao)(SC _{fi})(ESC _{wi})Gw		1.84	2.37	0.29	0.28	1.47	0.29	1.51

Solar Radiation through Glazing = 41.75 (A_{fi}/Ao)(SC_{fi})(ESC_{wi})Gw where i= 1, 2, ..., n
= 8.06 W/m²

Summary of RTTV at South West Elevations
= 1.56 + 1.23 + 8.06
= 10.84 W/m²

North East Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at	North East Elevations	=	38.09	m²
Glazing Areas at	North East Elevations	=	11.29	m²
Breakdown of Glazing Areas				
Glazing Areas	Unshaded	(	W08	) = 0.99 m²
		(	W10	) = 4.94 m²
		(	W10A	) = 5.36 m²
Total		=	11.29	m²
Opaque Wall Areas at	Gross Wall Areas	=	26.79	m²
Breakdown of Opaque Wall Areas				
Tile	(	NE-WA1	)	= 31.97 m²
Aluminium Cladding	(	NE-WA2	)	= 6.12 m²
Window to Wall Ratio (WWR)	=	11.29	/	38.09 = 0.30

Wall Orientation Factor Gw = 0.924 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at North East Elevations

External Wall Material	% of wall/roof area	α Absorptivity (Refer to Table 5)
Average Absorptivity =		0.00
White granite		0.5
Aluminium Alloy		0.5

'U' value of Opaque Wall Areas
 $U = 1/(R_i + x_1/k_1 + x_2/k_2 + \dots + x_n/k_n + R_a + I)$ where R_i Surface film resistance of internal surface (Refer to Table 2)
 R_o Surface film resistance of external surface (Refer to Table 2)
 R_a Air space resistance (Refer to Table 3)
 x Thickness of building materials
 k Thermal conductivity of building materials (Refer to Table 1)

NE-WA1	Description:	Tile
Wall Material		
External surface film resistance	R_o	= 0.044
Air space resistance (Refer to	R_a	= 0
10mm ceramic external tiles	0.01 / 1.5	= 0.0067
25mm external rendering and tile	0.025 / 0.72	= 0.035
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	R_i	= 0.12
Total		0.284
$Uw1 = \frac{1}{0.284}$		= 3.52 W/m²K

NE-WA2	Description:	Aluminium Cladding
Wall Material		
External surface film resistance	R_o	= 0.044
Air space resistance (Refer to	R_a	= 0
15mm aluminium cladding	0.015 / 160	= 0.000
50mm insulation board	0.05 / 0.034	= 1.471
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	R_i	= 0.12
Total		1.713
$Uw2 = \frac{1}{1.713}$		= 0.58 W/m²K

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

Sheet No. 10 BD Ref No. _____
Building Address TYST 121 Block A

Facade Orientation Facing North East Gross Wall Area (Ao) = 38.09
Window to Wall Ratio (WWR) 0.30 Wall Orientation Factor (Gw) = 0.924

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		Code No.		
Description	Units	NE-WA1	NE-WA2	
External Finish Material		10mm ceramic external	15mm aluminium cladding	
Conductivity	W/mK	1.50	160.00	
Thickness	m	0.010	0.015	
Average Absorptivity	(α)	0.50	0.50	
Intermediate component		25mm external rendering and tile adhesives	50mm insulation board	
Conductivity	W/mK	0.72	0.034	
Thickness	m	0.025	0.050	
Intermediate component		125mm concrete wall	125mm concrete wall	
Conductivity	W/mK	2.16	2.16	
Thickness	m	0.125	0.125	
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		15mm internal plaster	15mm internal plaster	
Conductivity	W/mK	0.72	0.72	
Thickness	m	0.015	0.015	
U-value of Opaque Area (Uwi)	W/m²K	3.52	0.58	
Opaque Wall Area (Aw)	m²	26.79	6.12	
Heat Conduction = 3.57(Awi/Ao) Uwi awi Gw		4.08	0.15	

$$\text{Heat Conduction through Opaque Walls} = 3.57(Awi/Ao) Uwi awi Gw \text{ where } i=1, 2, \dots, n$$

$$= \frac{4.24}{4.24} \text{ W/m}^2$$

Part 2 - Calculation of Heat Conduction through Glazing				
Components / Details		Code No.		
Description	Units	W08	W10	W10A
Glazing Type		GL-01	GL-02	GL-02
Thickness	m	0.012	0.02152	0.02152
Glazing Area (Afi)	m²	0.99	4.94	5.36
U-value of Glazing (Ufi)	W/m²K	5.24	2.71	2.71
Heat Conduction = 0.64 (Afi/Ao) Ufi Gw		0.08	0.21	0.23

$$\text{Heat Conduction through Glazing} = 0.64 (Afi/Ao) Ufi C \text{ where } i=1, 2, \dots, n$$

$$= \frac{0.51}{0.51}$$

Part 3 - Calculation of Solar Radiation through Glazing				
Components / Details		Code No.		
Description	Units	W08	W10	W10A
Glazing Type		GL-01	GL-02	GL-02
Thickness	m	0.012	0.02152	0.02152
Glazing Area (Afi)	m²	0.99	4.94	5.36
Shading Coefficient of Glazing (SCf)		0.45	0.43	0.43
Visible Light Transmittance (VLT)	%	52	50	50
External Reflectance (ER)	%	6	11	11
External Shading Multiplier (ESC)		1.00	1.00	1.00
Solar Radiation = 41.75 (Afi/Ao)(SCf)(ESCw)Gw		0.45	2.15	2.34

$$\text{Solar Radiation through Glazing} = 41.75 (Afi/Ao)(SCf)(ESCw)Gw \text{ where } i=1, 2, \dots, n$$

$$= \frac{4.94}{4.94}$$

$$\text{Summary of RTTV at North East Elevations}$$

$$= \frac{4.24}{9.69} + \frac{0.51}{4.94} + \frac{4.94}{4.94}$$

$$= \frac{9.69}{9.69} \text{ W/m}^2$$

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

Tower 1

Sheet No.

11

BD Ref No.

Building Address

TYST 121 Block A

Overall Gross Wall Area [a]

309.98 m²

Facade Orientation Facing	Gross Wall Area (m ²)	Heat Conduction through Opaque Walls (W/m ²)	Heat Conduction through Glazing (W/m ²)	Solar Radiation through Glazing (W/m ²)	RTTVwall at Each Facade (W/m ²)	Area-weighted RTTVwall (W/m ²)
	[b]	[c]	[d]	[e]	[f]=[c]+[d]+[e]	[g]=[f]x[b]/[a]
North West	67.13	6.06	0.00	0.00	6.06	1.31
South East	87.09	3.20	1.18	7.90	12.28	3.45
South West	117.68	1.56	1.23	8.06	10.84	4.12
North East	38.09	4.24	0.51	4.94	9.69	1.19

Overall RTTVwall = 10.07 W/m²

Result:

<14W/m², Fulfill the Requirement

Roof

Sheet no. 12

Gross Roof Areas
(Opaque Walls + Skylight Areas) (Aro) at Roof = 71.94 m²

Skylight Areas at Roof = 0.00 m²

Breakdown of Skylight Areas
() = 0.00 m²

Opaque Areas at Roof = 71.94 m²

Breakdown of Opaque Roof Areas

RC Roof Areas (R1) = 19.92 m²
2/F Obtained from floor plan 19.922 m²

RC Roof Areas (R2) = 52.02 m²
R/F Obtained from floor plan 37.33 m²
Top Roof Obtained from floor plan 14.692 m²

Roof Orientation Factor Gs = 2.16 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at Roof

External Roof Material (Colour/Finish)	% of roof area	α Absorptivity
Gross white matt tiles	100%	0.3

Average Absorptivity = 0.3

'U' value of Opaque Roof Areas

$$U = 1/(R_i + x_1/k_1 + x_2/k_2 + \dots + x_n/k_n + R_o + R_a)$$

where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

R1 Description: 2/F Roof Area

Roof Material			
External surface film resistance	Ro	=	0.055
Air space resistance	Ra	=	0
30mm tiles	0.03 / 1.5	=	0.020
50mm mortar	0.05 / 0.72	=	0.069
30mm insulation board	0.03 / 0.034	=	0.882
200mm concrete slab	0.2 / 2.16	=	0.093
15mm internal plaster	0.015 / 0.38	=	0.039
Internal surface film resistance	Ri	=	0.162
Total			1.321

$$U_{w1} = \frac{1}{1.321} = 0.76 \text{ W/m}^2\text{K}$$

R2 Description: R/F Roof Area

Roof Material			
External surface film resistance	Ro	=	0.055
Air space resistance	Ra	=	0
30mm tiles	0.03 / 1.5	=	0.020
50mm mortar	0.05 / 0.72	=	0.069
30mm insulation board	0.03 / 0.034	=	0.882
150mm concrete slab	0.15 / 2.16	=	0.069
15mm internal plaster	0.015 / 0.38	=	0.039
Internal surface film resistance	Ri	=	0.162
Total			1.298

$$U_{w1} = \frac{1}{1.298} = 0.77 \text{ W/m}^2\text{K}$$

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

Sheet No. 13 BD Ref No. _____
 Building Address TYST 121 Block A

Roof Orientation Facing Flat Gross Roof Area (Aro) = 71.94
 Skylight to Roof Ratio (SRR) = 0 Roof Orientation Factor (Gs) = 2.16

Part 1 - Calculation of Heat Conduction through Opaque Roof				
Components / Details		Code No.		
Description	Units	R1	R2	
External Finish Material		30mm tiles	30mm tiles	
Conductivity	W/mK	1.50	1.50	
Thickness	m	0.030	0.030	
Average Absorptivity	(α)	0.3	0.3	
Intermediate component		50mm mortar	50mm mortar	
Conductivity	W/mK	0.72	0.72	
Thickness	m	0.050	0.050	
Intermediate component		30mm insulation board	30mm insulation board	
Conductivity	W/mK	0.034	0.034	
Thickness	m	0.030	0.030	
Intermediate component		200mm concrete slab	150mm concrete slab	
Conductivity	W/mK	2.16	2.16	
Thickness	m	0.20	0.15	
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		15mm internal plaster	15mm internal plaster	
Conductivity	W/mK	0.38	0.38	
Thickness	m	0.015	0.015	
U-value of the Roof (Uri)	W/m²K	0.76	0.77	
Opaque Roof Area (Ari)	m²	19.92	52.02	
Heat Conduction = 3.47(Ari/Aro) Uri ari Gs		0.47	1.25	

$$\text{Heat Conduction through Opaque Roof} = \frac{3.47(\text{Ari}/\text{Aro}) \text{ Uri ari Gs}}{1.72} \text{ W/m}^2 \quad \text{where } i = 1, 2, \dots, n$$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014

Form RTTV (Roof) 2 - Summary of RTTVroof of Building Envelopes

Tower 1

Sheet No.

14

BD Ref No. _____

Building Address

TYST 121 Block A

Overall Roof Area [a]

71.94 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	71.94	1.72	0.00	0.00	1.72	1.72

Overall RTTVroof = 1.72 W/m²

Result:

<4W/m², Fulfill the Requirement

Gross Wall Area (Opaque walls + Glazing Areas) Calculation

Sheet no. 1

Storey heights (Residential Units) :

1/F	=	3.500 m	(1 storey)
2/F	=	3.500 m	(1 storey)
3/F	=	3.500 m	(1 storey)

North West Elevations

Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F	(	4.60	+		+		+		+		+		+		+		+		+		+		+		+
2/F	(	4.60	+		+		+		+		+		+		+		+		+		+		+		+
3/F	(	4.60	+		+		+		+		+		+		+		+		+		+		+		+

)x	3.50	x	1	=	4.60	x	3.50	x	1	=	16.10 m ²
)x	3.50	x	1	=	4.60	x	3.50	x	1	=	16.10 m ²
)x	3.50	x	1	=	4.60	x	3.50	x	1	=	16.10 m ²

Gross Wall Areas 48.30 m²

South East Elevations

Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F	(	4.60	+		+		+		+		+		+		+		+		+		+		+		+
2/F	(	4.60	+		+		+		+		+		+		+		+		+		+		+		+
3/F	(	4.60	+		+		+		+		+		+		+		+		+		+		+		+

)x	3.50	x	1	=	4.60	x	3.50	x	1	=	16.10 m ²
)x	3.50	x	1	=	4.60	x	3.50	x	1	=	16.10 m ²
)x	3.50	x	1	=	4.60	x	3.50	x	1	=	16.10 m ²

Gross Wall Areas 48.30 m²

South West Elevations

Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F	(	8.04	+	7.94	+		+		+		+		+		+		+		+		+		+		+
2/F	(	8.04	+	7.94	+		+		+		+		+		+		+		+		+		+		+
3/F	(	8.04	+	7.94	+		+		+		+		+		+		+		+		+		+		+

)x	3.50	x	1	=	15.98	x	3.50	x	1	=	55.93 m ²
)x	3.50	x	1	=	15.98	x	3.50	x	1	=	55.93 m ²
)x	3.50	x	1	=	15.98	x	3.50	x	1	=	55.93 m ²

Gross Wall Areas 167.79 m²

North East Elevations

Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F	(	1.75	+		+		+		+		+		+		+		+		+		+		+		+
2/F	(	1.75	+		+		+		+		+		+		+		+		+		+		+		+
3/F	(	1.75	+		+		+		+		+		+		+		+		+		+		+		+

)x	3.50	x	1	=	1.75	x	3.50	x	1	=	6.13 m ²
)x	3.50	x	1	=	1.75	x	3.50	x	1	=	6.13 m ²
)x	3.50	x	1	=	1.75	x	3.50	x	1	=	6.13 m ²

Gross Wall Areas 18.38 m²

Total Wall Areas 282.77 m²

Total Glazing Area (Window + Balcony) Calculation

Sheet no. 2

Glazing heights (Residential Units) :

Face NW:	No window located at this side								
Face SE:	No window located at this side								
Face SW:	1-3/F (Block C Master Bedroom)	W01	=	2.500 m	(3 storeys)				
	1-3/F (Block C Bedroom 2)	W02	=	2.500 m	(3 storeys)				
	1-3/F (Block C Living and Dining)	SD01	=	2.685 m	(3 storeys)				
	1-3/F (Block B Living and Dining)	SD01R	=	2.685 m	(3 storeys)				
	1-3/F (Block B Bedroom 2)	W02R	=	2.500 m	(3 storeys)				
	1-3/F (Block B Master Bedroom)	W01R	=	2.500 m	(3 storeys)				
Face NE:	1-3/F (Block C Bedroom 1)	W04R	=	1.650 m	(3 storeys)				
	1-3/F (Block B Bedroom 1)	W04	=	1.650 m	(3 storeys)				

North West Elevations

No window located at this side

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys
(0.00

$$)x \quad 0.00 \quad x \quad 0 = \quad 0.00 \quad x \quad 0.00 \quad x \quad 0 = \quad 0.00 \text{ m}^2$$

Gross Glazing Areas 0.00 m²

South East Elevations

No window located at this side

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys
(0.00

$$)x \quad 0.00 \quad x \quad 0 = \quad 0.00 \quad x \quad 0.00 \quad x \quad 0 = \quad 0.00 \text{ m}^2$$

Gross Glazing Areas 0.00 m²

South West Elevations

1-3/F (Block C Master Bedroom)
1-3/F (Block C Bedroom 2)
1-3/F (Block C Living and Dining)
1-3/F (Block B Living and Dining)
1-3/F (Block B Bedroom 2)
1-3/F (Block B Master Bedroom)

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys
(2.14
(1.20
(2.01
(2.01
(1.20
(2.14

$$\begin{aligned})x \quad 2.50 \quad x \quad 3 &= \quad 2.14 \quad x \quad 2.50 \quad x \quad 3 &= \quad 16.05 \text{ m}^2 \\)x \quad 2.50 \quad x \quad 3 &= \quad 1.20 \quad x \quad 2.50 \quad x \quad 3 &= \quad 9.00 \text{ m}^2 \\)x \quad 2.69 \quad x \quad 3 &= \quad 2.01 \quad x \quad 2.69 \quad x \quad 3 &= \quad 16.19 \text{ m}^2 \\)x \quad 2.69 \quad x \quad 3 &= \quad 2.01 \quad x \quad 2.69 \quad x \quad 3 &= \quad 16.19 \text{ m}^2 \\)x \quad 2.50 \quad x \quad 3 &= \quad 1.20 \quad x \quad 2.50 \quad x \quad 3 &= \quad 9.00 \text{ m}^2 \\)x \quad 2.50 \quad x \quad 3 &= \quad 2.14 \quad x \quad 2.50 \quad x \quad 3 &= \quad 16.05 \text{ m}^2 \end{aligned}$$

Gross Glazing Areas 82.48 m²

North East Elevations

1-3/F (Block C Bedroom 1)
1-3/F (Block B Bedroom 1)

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys
(0.65
(0.65

$$\begin{aligned})x \quad 1.65 \quad x \quad 3 &= \quad 0.65 \quad x \quad 1.65 \quad x \quad 3 &= \quad 3.22 \text{ m}^2 \\)x \quad 1.65 \quad x \quad 3 &= \quad 0.65 \quad x \quad 1.65 \quad x \quad 3 &= \quad 3.22 \text{ m}^2 \end{aligned}$$

Gross Glazing Areas 6.44 m²

Total Gross Glazing Areas 88.92 m²

North West Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at	North West Elevations	=	48.30 m²
Glazing Areas at	North West Elevations	=	0.00 m²
Breakdown of Glazing Areas			
Glazing Areas	Unshaded	(0)	= 0.00 m²
Total		=	0.00 m²

Opaque Wall Areas at	North West Elevations	=	48.30 m²
Breakdown of Opaque Wall Areas			
Tiles	(NW-WA1)	=	48.30 m²
Window to Wall Ratio (WWR) = 0.00 / 48.30 = 0.00			

Wall Orientation Factor Gw = 0.965 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at North West Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)
Gross white matt tiles	100%	0.3
Average Absorptivity =		0.30

'U' value of Opaque Wall Areas

U = 1/(Ri+x₁/k₁+x₂/k₂+...+x_n/k_n+Ra+Ro) where

Ri Surface film resistance of internal surface (Refer to Table 2)

Ro Surface film resistance of external surface (Refer to Table 2)

Ra Air space resistance (Refer to Table 3)

x Thickness of building materials

k Thermal conductivity of building materials (Refer to Table 1)

NW-WA1	Description:	Tiles
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to Table 3)	Ra	= 0
10mm ceramic external tiles	0.01 / 1.5	= 0.0067
25mm external rendering and tile adhesive	0.025 / 0.72	= 0.035
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		0.284

Uw1 = $\frac{1}{0.284}$ = 3.52 W/m²K

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

Sheet No. 4 BD Ref No. _____
Building Address TYST 121 Block B & C

Facade Orientation Facing North West Gross Wall Area (Ao) = 48.30
Window to Wall Ratio (WWR) 0.00 Wall Orientation Factor (Gw) = 0.965

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		Code No.		
Description	Units	NW-WA1		
External Finish Material		10mm ceramic external tiles		
Conductivity	W/mK	1.50		
Thickness	m	0.010		
Average Absorptivity	(α)	0.30		
Intermediate component		25mm external rendering and tile adhesive		
Conductivity	W/mK	0.72		
Thickness	m	0.025		
Intermediate component		125mm concrete wall		
Conductivity		2.16		
Thickness		0.125		
Intermediate component				
Conductivity				
Thickness				
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		15mm internal plaster		
Conductivity	W/mK	0.72		
Thickness	m	0.015		
U-value of Opaque Area (Uwi)	W/m²K	3.52		
Opaque Wall Area (Aw)	m²	48.30		
Heat Conduction = 3.57(Aw/Ao) Uwi αwi Gw		3.64		

$$\text{Heat Conduction through Opaque Walls} = 3.57(Aw/Ao) Uwi \alpha wi Gw \quad \text{where } i= 1, 2, \dots, n$$

$$= \underline{\quad 3.64 \quad} \text{ W/m}^2$$

Part 2 - Calculation of Heat Conduction through Glazing		
Components / Details	Units	Code No.
Description	Units	0
Glazing Type		GL-01
Thickness	m	0.012
Glazing Area (Afi)	m²	0.00
U-value of Glazing (Ufi)	W/m²K	5.24
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		0.00

$$\text{Heat Conduction through Glazing} = 0.64 (Afi/Ao) Ufi Gw \quad \text{where } i= 1, 2, \dots, n$$

$$= \underline{\quad 0.00 \quad} \text{ W/m}^2$$

Part 3 - Calculation of Solar Radiation through Glazing		
Components / Details	Units	Code No.
Description	Units	0
Glazing Type		GL-01
Thickness	m	0.012
Glazing Area (Afi)	m²	0.00
Shading Coefficient of Glazing (SCf)		0.45
Visible Light Transmittance (VLT)	%	52
External Reflectance (ER)	%	6
External Shading Multiplier (ESC)		1.000
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		0.00

$$\text{Solar Radiation through Glazing} = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw \quad \text{where } i= 1, 2, \dots, n$$

$$= \underline{\quad 0.00 \quad} \text{ W/m}^2$$

$$\text{Summary of RTTV at North West Elevations}$$

$$= \underline{\quad 3.64 \quad} + \quad 0.00 \quad + \quad 0.00$$

$$= \underline{\quad 3.64 \quad} \text{ W/m}^2$$

South East Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at	South East Elevations	=	48.30 m²
Glazing Areas at	South East Elevations	=	0.00 m²
Breakdown of Glazing Areas Glazing Areas Unshaded	(0)	=	0.00 m²
Total		=	0.00 m²

Opaque Wall Areas at	Gross Wall Areas	=	48.30 m²
Breakdown of Opaque Wall Areas Tiles	(SE-WA1)	=	48.30 m²
Window to Wall Ratio (WWR)	= 0.00 / 48.30	=	0.00

Wall Orientation Factor Gw = 1.051 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at South East Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity
Gross white matt tiles	100%	0.3
Average Absorptivity =		0.30

'U' value of Opaque Wall Areas
U = 1/(Ri+x1/k1+x2/k2+...+xn/kn+Ra+Ro) where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

SE-WA1	Description:	Tiles
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to Table 3)	Ra	= 0
10mm ceramic external tiles	0.01 / 1.5	= 0.0067
25mm external rendering and tile adhesive	0.025 / 0.72	= 0.035
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		0.284

Uw1 = $\frac{1}{0.284}$ = 3.52 W/m²K

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

Sheet No. 6BD Ref No. _____

Building Address TYST 121 Block B & C

Facade Orientation Facing South EastGross Wall Area (Ao) = 48.30Window to Wall Ratio (WWR) 0.00Wall Orientation Factor (Gw) = 1.051

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		Code No.		
Description	Units	SE-WA1		
External Finish Material		10mm ceramic external		
Conductivity	W/mK	1.50		
Thickness	m	0.010		
Average Absorptivity	(α)	0.30		
Intermediate component		25mm external rendering and tile adhesive		
Conductivity	W/mK	0.72		
Thickness	m	0.025		
Intermediate component		125mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.125		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		15mm internal plaster		
Conductivity	W/mK	0.72		
Thickness	m	0.015		
U-value of Opaque Area (Uwi)	W/m²K	3.52		
Opaque Wall Area (Aw1)	m²	48.30		
Heat Conduction = 3.57(Aw1/Ao) Uwi αwi Gw		3.96		

Heat Conduction through Opaque Walls = 3.57(Aw1/Ao) Uwi αwi Gw where i= 1, 2, ..., n
= 3.96 W/m²

Part 2 - Calculation of Heat Conduction through Glazing		
Components / Details		Code No.
Description	Units	0
Glazing Type		GL-01
Thickness	m	0.012
Glazing Area (Afi)	m²	0.00
U-value of Glazing (Ufi)	W/m²K	5.24
Heat Conduction = 0.64 (Afi/Ao) Ufi Gw		0.00

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

Part 3 - Calculation of Solar Radiation through Glazing		
Components / Details		Code No.
Description	Units	0
Glazing Type		GL-01
Thickness	m	0.012
Glazing Area (Afi)	m²	0.00
Shading Coefficient of Glazing (SCf)		0.45
Visible Light Transmittance (VLT)	%	52
External Reflectance (ER)	%	6
External Shading Multiplier (ESC)		1.000
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		0.00

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

Summary of RTTV at South East Elevations
= 3.96 + 0.00 + 0.00
= 3.96 W/m²

South West Elevations

Gross Wall Areas
(Opaque Walls + Glazing Areas) (Ao) at South West Elevations = 167.79 m²

Glazing Areas at South West Elevations = 82.48 m²

Breakdown of Glazing Areas

Glazing Areas Unshaded (W01) = 16.05 m²
(W02) = 9.00 m²

Glazing Areas Shaded by Balcony (SD01) = 16.19 m²
Glazing Area = Length of Glazing x Glazing Height x No. of Storeys
1-3/F (2.01) x 2.69 x 3 = 16.19 m²
OPF = 1.09 / 3.30 = 0.33 ESC = 0.765

Glazing Areas Shaded by Balcony (SD01R) = 16.19 m²
Glazing Area = Length of Glazing x Glazing Height x No. of Storeys
1-3/F (2.01) x 2.69 x 3 = 16.19 m²
OPF = 1.09 / 3.30 = 0.33 ESC = 0.765

Glazing Areas Unshaded (W02R) = 9.00 m²
(W01R) = 16.05 m²

Total = 82.48 m²

Opaque Wall Areas at South West Elevations = 85.31 m²

Breakdown of Opaque Wall Areas

Tiles (SW-WA1) = 85.31 m²

Window to Wall Ratio (WWR) = 82.48 / 167.79 = 0.49

Sheet no. 7

Wall Orientation Factor Gw = 1.092 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at South West Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)
Gross white matt tiles	100%	0.3

Average Absorptivity = 0.30

'U' value of Opaque Wall Areas

$U = 1 / (R_i + x_1/k_1 + x_2/k_2 + \dots + x_n/k_n + R_a + R_o)$

where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

SW-WA1	Description:	Tiles
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to Table 3)	Ra	= 0
10mm ceramic external tiles	0.01 / 1.5	= 0.0067
25mm external rendering and tile adhesive	0.025 / 0.72	= 0.035
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		0.284

$U_{w1} = \frac{1}{0.284} = 3.52 \text{ W/m}^2\text{K}$

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

Sheet No. 8 BD Ref No. _____
Building Address TYST 121 Block B & C

Facade Orientation Facing South West Gross Wall Area (A_o) = 167.79
Window to Wall Ratio (WWR) 0.49 Wall Orientation Factor (G_w) = 1.092

Part 1 - Calculation of Heat Conduction through Opaque Walls

Components / Details		Code No.	
Description	Units	SW-WA1	
External Finish Material		10mm ceramic external tiles	
Conductivity	W/mK	1.50	
Thickness	m	0.010	
Average Absorptivity	(α)	0.30	
Intermediate component		25mm external rendering and tile adhesive	
Conductivity	W/mK	0.72	
Thickness	m	0.025	
Intermediate component		125mm concrete wall	
Conductivity	W/mK	2.16	
Thickness	m	0.125	
Intermediate component			
Conductivity	W/mK		
Thickness	m		
Intermediate component			
Conductivity	W/mK		
Thickness	m		
Internal Finish Material		15mm internal plaster	
Conductivity	W/mK	0.72	
Thickness	m	0.015	
U-value of Opaque Area (U _{wi})	W/m²K	3.52	
Opaque Wall Area (A _{wi})	m²	85.31	
Heat Conduction = 3.57(A _{wi} /A _o) U _{wi} α _{wi} G _w		2.09	

$$\text{Heat Conduction through Opaque Walls} = \frac{3.57(A_{wi}/A_o) U_{wi} \alpha_{wi} G_w}{2.09} \text{ W/m}^2 \quad \text{where } i=1, 2, \dots, n$$

Part 2 - Calculation of Heat Conduction through Glazing

Components / Details		Code No.					
Description	Units	W01	W02	SD01	SD01R	W02R	W01R
Glazing Type		GL-01	GL-01	GL-01	GL-01	GL-01	GL-01
Thickness	m	0.012	0.012	0.012	0.012	0.012	0.012
Glazing Area (A _{fi})	m²	16.05	9.00	16.19	16.19	9.00	16.05
U-value of Glazing (U _{fi})	W/m²K	5.24	5.24	5.24	5.24	5.24	5.24
Heat Conduction = 0.64 (A _{fi} /A _o) U _{fi} G _w		0.35	0.20	0.35	0.35	0.20	0.35

$$\text{Heat Conduction through Glazing} = \frac{0.64 (A_{fi}/A_o) U_{fi} G_w}{1.80} \text{ W/m}^2 \quad \text{where } i=1, 2, \dots, n$$

Part 3 - Calculation of Solar Radiation through Glazing

Components / Details		Code No.					
Description	Units	W01	W02	SD01	SD01R	W02R	W01R
Glazing Type		GL-01	GL-01	GL-01	GL-01	GL-01	GL-01
Thickness	m	0.012	0.012	0.012	0.012	0.012	0.012
Glazing Area (A _{fi})	m²	16.05	9.00	16.19	16.19	9.00	16.05
Shading Coefficient of Glazing (SC _{fi})		0.45	0.45	0.45	0.45	0.45	0.45
Visible Light Transmittance (VLT)	%	52	52	52	52	52	52
External Reflectance (ER)	%	6	6	6	6	6	6
External Shading Multiplier (ESC)		1.00	1.00	0.765	0.765	1.00	1.00
Solar Radiation = 41.75 (A _{fi} /A _o)(SC _{fi})(ESC _{wi})G _w		1.96	1.10	1.51	1.51	1.10	1.96

$$\text{Solar Radiation through Glazing} = \frac{41.75 (A_{fi}/A_o)(SC_{fi})(ESC_{wi})G_w}{9.15} \text{ W/m}^2 \quad \text{where } i=1, 2, \dots, n$$

$$\begin{aligned} \text{Summary of RTTV at South West Elevations} &= 2.09 + 1.80 + 9.15 \\ &= 13.05 \text{ W/m}^2 \end{aligned}$$

North East Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at	North East Elevations	=	18.38 m²
Glazing Areas at	North East Elevations	=	6.44 m²
Breakdown of Glazing Areas Glazing Areas Unshaded	(W04R) (W04)	= =	3.22 m² 3.22 m²
Total		=	6.44 m²

Opaque Wall Areas at	Gross Wall Areas	=	11.94 m²
Breakdown of Opaque Wall Areas Aluminium Cladding	(NE-WA1)	=	11.94 m²
Window to Wall Ratio (WWR)	= 6.44 / 18.38	=	0.35

Wall Orientation Factor Gw = 0.924 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at North East Elevations

External Wall Material	% of wall/roof area	α Absorptivity (Refer to Table 5)
Average Absorptivity =		0.00
Aluminium Alloy		0.5

'U' value of Opaque Wall Areas
U = 1/(Ri+x_i/k₁+x_j/k₂+...+x_n/k_n+Ra+f) where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

NE-WA1	Description:	Aluminium Cladding
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to	Ra	= 0
15mm aluminium cladding	0.015 / 160	= 0.0001
50mm insulation board	0.05 / 0.034	= 1.4706
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		1.713
Uw3 = $\frac{1}{1.713}$		= 0.58 W/m²K

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

Sheet No. 10 BD Ref No. _____
Building Address TYST 121 Block B & C

Facade Orientation Facing North East Gross Wall Area (Ao) = 18.38
Window to Wall Ratio (WWR) 0.35 Wall Orientation Factor (Gw) = 0.924

Part 1 - Calculation of Heat Conduction through Opaque Walls			
Components / Details		Code No.	
Description	Units	NE-WA1	
External Finish Material		15mm aluminium	
Conductivity	W/mK	160.00	
Thickness	m	0.015	
Average Absorptivity	(α)	0.50	
Intermediate component		50mm insulation board	
Conductivity	W/mK	0.034	
Thickness	m	0.050	
Intermediate component		125mm concrete wall	
Conductivity	W/mK	2.16	
Thickness	m	0.125	
Intermediate component			
Conductivity	W/mK		
Thickness	m		
Intermediate component			
Conductivity	W/mK		
Thickness	m		
Internal Finish Material		15mm internal plaster	
Conductivity	W/mK	0.72	
Thickness	m	0.015	
U-value of Opaque Area (Uwi)	W/m²K	0.58	
Opaque Wall Area (Aw)	m²	11.94	
Heat Conduction = 3.57(Aw/Ao) Uwi awl Gw		0.63	

$$\text{Heat Conduction through Opaque Walls} = 3.57(Aw/Ao) Uwi awl Gw \text{ where } i = 1, 2, \dots, n$$

$$= \frac{0.63}{W/m^2}$$

Part 2 - Calculation of Heat Conduction through Glazing			
Components / Details		Code No.	
Description	Units	W04R	W04
Glazing Type		GL-01	GL-01
Thickness	m	0.012	0.012
Glazing Area (Afi)	m²	3.22	3.22
U-value of Glazing (Ufi)	W/m²K	5.24	5.24
Heat Conduction = 0.64 (Afi/Ao) Ufi Gw		0.54	0.54

$$\text{Heat Conduction through Glazing} = 0.64 (Afi/Ao) Ufi C \text{ where } i = 1, 2, \dots, n$$

$$= \frac{1.09}{W/m^2}$$

Part 3 - Calculation of Solar Radiation through Glazing			
Components / Details		Code No.	
Description	Units	W04R	W04
Glazing Type		GL-01	GL-01
Thickness	m	0.012	0.012
Glazing Area (Afi)	m²	3.22	3.22
Shading Coefficient of Glazing (SCf)		0.45	0.45
Visible Light Transmittance (VLT)	%	52	52
External Reflectance (ER)	%	6	6
External Shading Multiplier (ESC)		1.00	1.00
Solar Radiation = 41.75 (Afi/Ao)(SCf)(ESCw)Gw		3.04	3.04

$$\text{Solar Radiation through Glazing} = 41.75 (Afi/Ao)(SCf)(ESCw)Gw \text{ where } i = 1, 2, \dots, n$$

$$= \frac{6.08}{W/m^2}$$

$$\text{Summary of RTTV at North East Elevations}$$

$$= \frac{0.63}{W/m^2} + \frac{1.09}{W/m^2} + \frac{6.08}{W/m^2}$$

$$= \frac{7.79}{W/m^2}$$

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

Tower 1

Sheet No. 11
Building Address TYST 121 Block B & C

BD Ref No. _____

Overall Gross Wall Area [a] 282.77 m²

Facade Orientation Facing	Gross Wall Area (m ²)	Heat Conduction through Opaque Walls (W/m ²)	Heat Conduction through Glazing (W/m ²)	Solar Radiation through Glazing (W/m ²)	RTTVwall at Each Facade (W/m ²)	Area-weighted RTTVwall (W/m ²)
	[b]	[c]	[d]	[e]	[f]=[c]+[d]+[e]	[g]=[f]x[b]/[a]
North West	48.30	3.64	0.00	0.00	3.64	0.62
South East	48.30	3.96	0.00	0.00	3.96	0.68
South West	167.79	2.09	1.80	9.15	13.05	7.74
North East	18.38	0.63	1.09	6.08	7.79	0.51

Overall RTTVwall = 9.55 W/m²

Result: <14W/m², Fulfill the Requirement

Roof

Gross Roof Areas (Opaque Walls + Skylight Areas) (Aro) at Roof = 99.59 m²

Skylight Areas at Roof = 0.00 m²

Breakdown of Skylight Areas () = 0.00 m²

Roof Orientation Factor Gs = 2.16 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at Roof

External Roof Material (Colour/Finish)	% of roof area	α Absorptivity
Gross white matt tiles	100%	0.3

Average Absorptivity = 0.3

'U' value of Opaque Roof Areas

$$U = 1 / (R_i + x_1/k_1 + x_2/k_2 + \dots + x_n/k_n + R_a + R_o)$$

- where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

Opaque Areas at Roof = 99.59 m²

Breakdown of Opaque Roof Areas

RC Roof Areas (R1) = 99.59 m²

Block C R/F Obtained from floor plan 49.561 m²

Block B R/F Obtained from floor plan 50.03 m²

R1	Description:	Roof Area
Roof Material		
External surface film resistance	Ro	= 0.055
Air space resistance	Ra	= 0
30mm tiles	0.03 / 1.5	= 0.020
50mm mortar	0.05 / 0.72	= 0.069
30mm insulation board	0.03 / 0.034	= 0.882
150mm concrete slab	0.15 / 2.16	= 0.069
15mm internal plaster	0.015 / 0.38	= 0.039
Internal surface film resistance	Ri	= 0.162
Total		1.298

$$U_{w1} = \frac{1}{1.298} = 0.77 \text{ W/m}^2\text{K}$$

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

Sheet No. 13 BD Ref No. _____
Building Address TYST 121 Block B & C

Roof Orientation Facing Flat Gross Roof Area (Aro) = 99.59
Skylight to Roof Ratio (SRR) = 0 Roof Orientation Factor (Gs) = 2.16

Part 1 - Calculation of Heat Conduction through Opaque Roof		
Components / Details		Code No.
Description	Units	R1
External Finish Material		30mm tiles
Conductivity	W/mK	1.50
Thickness	m	0.030
Average Absorptivity	(α)	0.3
Intermediate component		50mm mortar
Conductivity	W/mK	0.72
Thickness	m	0.050
Intermediate component		30mm insulation board
Conductivity	W/mK	0.034
Thickness	m	0.030
Intermediate component		150mm concrete slab
Conductivity	W/mK	2.16
Thickness	m	0.150
Intermediate component		
Conductivity	W/mK	
Thickness	m	
Internal Finish Material		15mm internal plaster
Conductivity	W/mK	0.38
Thickness	m	0.015
U-value of the Roof (Uri)	W/m²K	0.77
Opaque Roof Area (Ari)	m²	99.59
Heat Conduction = 3.47(Ari/Aro) Uri ari Gs		1.73

$$\text{Heat Conduction through Opaque Roof} = 3.47(\text{Ari/Aro}) \text{ Uri ari Gs}$$

$$= \underline{\quad 1.73 \quad} \text{ W/m}^2$$

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

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014

Form RTTV (Roof) 2 - Summary of RTTVroof of Building Envelopes

Tower 1

Sheet No.

14

BD Ref No.

Building Address

TYST 121 Block B & C

Overall Roof Area [a]

99.59 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	99.59	1.73	0.00	0.00	1.73	1.73

Overall RTTVroof = 1.73 W/m²

Result:

<4W/m², Fulfill the Requirement

Gross Wall Area (Opaque walls + Glazing Areas) Calculation

Sheet no. 1

Storey heights (Residential Units) :

1/F	=	3.500 m	(1 storey)
2/F	=	3.500 m	(1 storey)
3/F	=	3.500 m	(1 storey)
R/F(Staircase Hood)	=	2.800 m	(1 storey)

North West Elevations

	Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys											
1/F	(	1.50	+	0.85	+	+	+	+	+	+	+	+
2/F	(	0.00	+	+	+	+	+	+	+	+	+	+
3/F	(	5.78	+	1.50	+	+	+	+	+	+	+	+
R/F(Staircase Hood)	(	5.90	+	+	+	+	+	+	+	+	+	+

)x	3.50	x	1	=	2.35	x	3.50	x	1	=	8.23 m ²
)x	3.50	x	1	=	0.00	x	3.50	x	1	=	0.00 m ²
)x	3.50	x	1	=	7.28	x	3.50	x	1	=	25.48 m ²
)x	2.80	x	1	=	5.90	x	2.80	x	1	=	16.52 m ²

Gross Wall Areas 50.23 m²

South East Elevations

	Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys											
1/F	(	2.40	+	3.68	+	+	+	+	+	+	+	+
2/F	(	6.16	+	+	+	+	+	+	+	+	+	+
3/F	(	6.37	+	0.92	+	+	+	+	+	+	+	+
R/F(Staircase Hood)	(	0.97	+	+	+	+	+	+	+	+	+	+

)x	3.50	x	1	=	6.08	x	3.50	x	1	=	21.28 m ²
)x	3.50	x	1	=	6.16	x	3.50	x	1	=	21.56 m ²
)x	3.50	x	1	=	7.29	x	3.50	x	1	=	25.52 m ²
)x	2.80	x	1	=	0.97	x	2.80	x	1	=	2.72 m ²

Gross Wall Areas 71.07 m²

South West Elevations

	Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys											
1/F	(	6.98	+	+	+	+	+	+	+	+	+	+
2/F	(	6.78	+	+	+	+	+	+	+	+	+	+
3/F	(	6.78	+	0.92	+	1.10	+	0.91	+	+	+	+
R/F(Staircase Hood)	(	2.93	+	+	+	+	+	+	+	+	+	+

)x	3.50	x	1	=	6.98	x	3.50	x	1	=	24.41 m ²
)x	3.50	x	1	=	6.78	x	3.50	x	1	=	23.71 m ²
)x	3.50	x	1	=	9.70	x	3.50	x	1	=	33.95 m ²
)x	2.80	x	1	=	2.93	x	2.80	x	1	=	8.19 m ²

Gross Wall Areas 90.27 m²

North East Elevations

	Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys											
1/F	(	8.64	+	+	+	+	+	+	+	+	+	+
2/F	(	1.80	+	+	+	+	+	+	+	+	+	+
3/F	(	2.96	+	+	+	+	+	+	+	+	+	+
R/F(Staircase Hood)	(	0.00	+	+	+	+	+	+	+	+	+	+

)x	3.50	x	1	=	8.64	x	3.50	x	1	=	30.24 m ²
)x	3.50	x	1	=	1.80	x	3.50	x	1	=	6.30 m ²
)x	3.50	x	1	=	2.96	x	3.50	x	1	=	10.36 m ²
)x	2.80	x	1	=	0.00	x	2.80	x	1	=	0.00 m ²

Gross Wall Areas 46.90 m²

Total Wall Areas 258.46 m²

Total Glazing Area (Window + Balcony) Calculation

Sheet no. 2

Glazing heights (Residential Units) :

Face NW:	1/F (Utility)	NW-W1	=	2.685 m	(1 storey)
	5/F (Staircase)	NW-W2	=	0.600 m	(1 storey)
Face SE:	1/F (Master Bedroom)	W20	=	2.500 m	(1 storey)
	2/F (Living and Dining Sliding Door)	SD08	=	2.500 m	(1 storey)
	3/F (Master Bedroom Window)	W14	=	1.650 m	(1 storey)
	3/F (Master Bedroom Sliding Door)	SD07	=	2.700 m	(1 storey)
Face SW:	1/F (Living and Dining)	SD06	=	2.700 m	(1 storey)
	1/F (Master Bedroom)	W20	=	2.500 m	(1 storey)
	2/F (Living and Dining)	SD08	=	2.750 m	(1 storey)
	3/F (Bedroom 2)	W13	=	2.500 m	(1 storey)
	3/F (Master Bedroom Window)	SD07	=	2.700 m	(1 storey)
	3/F (Master Bedroom Sliding Door)	SD07	=	2.900 m	(1 storey)
	3/F (Staircase)	SW-W7	=	1.950 m	(1 storey)
	R/F (Staircase)	SW-W8	=	1.950 m	(1 storey)
Face NE:	1/F (Utility)	W04	=	1.650 m	(1 storey)
	1/F (Bedroom 2)	W22	=	1.650 m	(1 storey)
	1/F (Bedroom 1)	W26	=	1.650 m	(1 storey)
	2/F (Utility)	W15	=	1.650 m	(1 storey)
	3/F (Bedroom 1 Sliding Door)	D07	=	2.550 m	(1 storey)
	3/F (Bedroom 1)	W14	=	1.650 m	(1 storey)

North West Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

1/F (Utility)	(0.77
5/F (Staircase)	(0.60

)x 2.69 x 1 =	0.77 x 2.69 x 1 =	2.07 m ²
)x 0.60 x 1 =	0.60 x 0.60 x 1 =	0.36 m ²

Gross Glazing Areas 2.07 m²

South East Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

1/F (Master Bedroom)	(1.60
2/F (Living and Dining Sliding Door)	(0.50
3/F (Master Bedroom Window)	(0.60
3/F (Master Bedroom Sliding Door)	(0.50

)x 2.50 x 1 =	1.60 x 2.50 x 1 =	4.00 m ²
)x 2.50 x 1 =	0.50 x 2.50 x 1 =	1.25 m ²
)x 1.65 x 1 =	0.60 x 1.65 x 1 =	0.99 m ²
)x 2.70 x 1 =	0.50 x 2.70 x 1 =	1.35 m ²

Gross Glazing Areas 7.59 m²

South West Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

1/F (Living and Dining)	(3.10
1/F (Master Bedroom)	(2.39
2/F (Living and Dining)	(5.17
3/F (Bedroom 2)	(2.18
3/F (Master Bedroom Window)	(0.82
3/F (Master Bedroom Sliding Door)	(2.66
3/F (Staircase)	(1.11
R/F (Staircase)	(1.11

)x 2.70 x 1 =	3.10 x 2.70 x 1 =	8.37 m ²
)x 2.50 x 1 =	2.39 x 2.50 x 1 =	5.96 m ²
)x 2.75 x 1 =	5.17 x 2.75 x 1 =	14.20 m ²
)x 2.50 x 1 =	2.18 x 2.50 x 1 =	5.44 m ²
)x 2.70 x 1 =	0.82 x 2.70 x 1 =	2.21 m ²
)x 2.90 x 1 =	2.66 x 2.90 x 1 =	7.70 m ²
)x 1.95 x 1 =	1.11 x 1.95 x 1 =	2.16 m ²
)x 1.95 x 1 =	1.11 x 1.95 x 1 =	2.16 m ²

Gross Glazing Areas 48.22 m²

North East Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

1/F (Utility)	(0.65
1/F (Bedroom 2)	(1.20
1/F (Bedroom 1)	(2.10
2/F (Utility)	(0.60
3/F (Bedroom 1 Sliding Door)	(0.75
3/F (Bedroom 1)	(0.60

)x 1.65 x 1 =	0.65 x 1.65 x 1 =	1.07 m ²
)x 1.65 x 1 =	1.20 x 1.65 x 1 =	1.98 m ²
)x 1.65 x 1 =	2.10 x 1.65 x 1 =	3.47 m ²
)x 1.65 x 1 =	0.60 x 1.65 x 1 =	0.99 m ²
)x 2.55 x 1 =	0.75 x 2.55 x 1 =	1.91 m ²
)x 1.65 x 1 =	0.60 x 1.65 x 1 =	0.99 m ²

Gross Glazing Areas 10.41 m²

Total Gross Glazing Areas 68.28 m²

North West Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at	North West Elevations	=	50.23 m²
Glazing Areas at	North West Elevations	=	2.07 m²
Breakdown of Glazing Areas			
Glazing Areas	Shaded by Balcony	(	NW-W1)
Glazing Area = Length of Glazing x Glazing Height x No. of Storeys			
1/F	(0.77) x 2.69 x 1	=	2.07 m²
	OPF = 1.10 / 3.30 = 0.33	ESC =	0.826
Glazing Areas	Unshaded	(	NW-W2)
Total		=	2.67 m²

Opaque Wall Areas at	North West Elevations	=	48.16 m²
Breakdown of Opaque Wall Areas			
Tiles	(	NW-WA1)	= 48.16 m²
Window to Wall Ratio (WWR)	= 2.07 / 50.23	=	0.04

Wall Orientation Factor Gw = 0.965 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at North West Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)
Gross white matt tiles	100%	0.3
Average Absorptivity =		0.30
White granite		0.5

'U' value of Opaque Wall Areas

U = 1/(Ri+x₁/k₁+x₂/k₂+...+x_n/k_n+Ra+Ro) where

Ri Surface film resistance of internal surface (Refer to Table 2)

Ro Surface film resistance of external surface (Refer to Table 2)

Ra Air space resistance (Refer to Table 3)

x Thickness of building materials

k Thermal conductivity of building materials (Refer to Table 1)

NW-WA1	Description:	Tiles
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to Table 3)	Ra	= 0
10mm ceramic external tiles	0.01 / 1.5	= 0.0067
25mm external rendering and tile adhesive	0.025 / 0.72	= 0.035
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		0.284

Uw1 = $\frac{1}{0.284}$ = 3.52 W/m²K

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

Sheet No. 4 BD Ref No. _____
Building Address TYST 121 Block D

Facade Orientation Facing North West Gross Wall Area (Ao) = 50.23
Window to Wall Ratio (WWR) 0.04 Wall Orientation Factor (Gw) = 0.965

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		Code No.		
Description	Units	NW-WA1		
External Finish Material		10mm ceramic external tiles		
Conductivity	W/mK	1.50		
Thickness	m	0.010		
Average Absorptivity	(α)	0.30		
Intermediate component		25mm external rendering and tile adhesive		
Conductivity	W/mK	0.72		
Thickness	m	0.025		
Intermediate component		125mm concrete wall		
Conductivity		2.16		
Thickness		0.125		
Intermediate component				
Conductivity				
Thickness				
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		15mm internal plaster		
Conductivity	W/mK	0.72		
Thickness	m	0.015		
U-value of Opaque Area (Uwi)	W/m²K	3.52		
Opaque Wall Area (Aw)	m²	48.16		
Heat Conduction = 3.57(Aw/Ao) Uwi awi Gw		3.49		

Heat Conduction through Opaque Walls = 3.57(Aw/Ao) Uwi awi Gw where i= 1, 2, ..., n
= 3.49 W/m²

Part 2 - Calculation of Heat Conduction through Glazing			
Components / Details		Code No.	
Description	Units	NW-W1	NW-W2
Glazing Type		GL-01	GL-01
Thickness	m	0.012	0.012
Glazing Area (Afi)	m²	2.07	0.60
U-value of Glazing (Ufi)	W/m²K	5.24	5.24
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		0.13	0.04

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n
= 0.17 W/m²

Part 3 - Calculation of Solar Radiation through Glazing			
Components / Details		Code No.	
Description	Units	NW-W1	NW-W2
Glazing Type		GL-01	GL-01
Thickness	m	0.012	0.012
Glazing Area (Afi)	m²	2.07	0.60
Shading Coefficient of Glazing (SCf)		0.45	0.45
Visible Light Transmittance (VLT)	%	52	52
External Reflectance (ER)	%	6	6
External Shading Multiplier (ESC)		0.826	1.000
Solar Radiation = 41.75 (Afi/Ao)(SCf)(ESCwi)Gw		0.62	0.22

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCf)(ESCwi)Gw where i= 1, 2, ..., n
= 0.83 W/m²

Summary of RTTV at North West Elevations
= 3.49 + 0.17 + 0.83
= 4.49 W/m²

Sheet no. 5

$$= 71.07 \text{ m}^2$$
$$= 7.59 \text{ m}^2$$

(	W20	)	=	4.00 m ²
(	SD08	)	=	1.25 m ²
(	W14	)	=	0.99 m ²
(	SD07	)	=	1.35 m ²

Total = 7.59 m²

$$= 63.48 \text{ m}^2$$

(SE-WA1)
(SE-WA2)

$$= 57.55 \text{ m}^2$$
$$= 5.94 \text{ m}^2$$
$$\text{Window to Wall Ratio (WWR)} = \frac{7.59}{71.07} = 0.11$$

Gw = 1.051 (Refer to Table 9)

South East Elevations

Average Absorptivity = 0.30

White granite	0.5
---------------	-----

k Thermal conductivity of building materials (Refer to Table 1)

Description:	Tiles

	0.015	7	0.72	=	0.021
			Ri	=	0.12

W/m²K

Description: Aluminum Cladding

0.015	7	0.72	=	0.021
		Ri	=	0.12

W/m²K

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

Sheet No. 6 BD Ref No. _____
Building Address TYST 121 Block D

Facade Orientation Facing South East Gross Wall Area (Ao) = 71.07
Window to Wall Ratio (WWR) 0.11 Wall Orientation Factor (Gw) = 1.051

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		Code No.		
Description	Units	SE-WA1	SE-WA2	
External Finish Material		10mm ceramic external	15mm aluminium cladding	
Conductivity	W/mK	1.50	160.00	
Thickness	m	0.010	0.015	
Average Absorptivity	(α)	0.30	0.50	
Intermediate component		25mm external rendering and tile adhesive	50mm insulation board	
Conductivity	W/mK	0.72	0.034	
Thickness	m	0.025	0.050	
Intermediate component		125mm concrete wall	125mm concrete wall	
Conductivity	W/mK	2.16	2.16	
Thickness	m	0.125	0.125	
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		15mm internal plaster	15mm internal plaster	
Conductivity	W/mK	0.72	0.72	
Thickness	m	0.015	0.015	
U-value of Opaque Area (Uwi)	W/m²K	3.52	0.58	
Opaque Wall Area (Aw)	m²	57.55	5.94	
Heat Conduction = 3.57(Aw/Ao) Uwi awi Gw		3.21	0.09	

Heat Conduction through Opaque Walls = 3.57(Aw/Ao) Uwi awi Gw where i= 1, 2, ..., n
= 3.30 W/m²

Part 2 - Calculation of Heat Conduction through Glazing					
Components / Details		Code No.			
Description	Units	W20	SD08	W14	SD07
Glazing Type		GL-01	GL-01	GL-01	GL-01
Thickness	m	0.012	0.012	0.012	0.012
Glazing Area (Afi)	m²	4.00	1.25	0.99	1.35
U-value of Glazing (Ufi)	W/m²K	5.24	5.24	5.24	5.24
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		0.20	0.06	0.05	0.07

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi G where i= 1, 2, ..., n
= 0.38

Part 3 - Calculation of Solar Radiation through Glazing					
Components / Details		Code No.			
Description	Units	W20	SD08	W14	SD07
Glazing Type		GL-01	GL-01	GL-01	GL-01
Thickness	m	0.012	0.012	0.012	0.012
Glazing Area (Afi)	m²	4.00	1.25	0.99	1.35
Shading Coefficient of Glazing (SCf)		0.45	0.45	0.45	0.45
Visible Light Transmittance (VLT)	%	52	52	52	52
External Reflectance (ER)	%	6	6	6	6
External Shading Multiplier (ESC)		1.000	1.000	1.000	1.000
Solar Radiation = 41.75 (Afi/Ao)(SCf)(ESCw)Gw		1.11	0.35	0.28	0.38

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCf)(ESCw)Gw where i= 1, 2, ..., n
= 2.11

Summary of RTTV at South East Elevations
= 3.30 + 0.38 + 2.11
= 5.78 W/m²

South West Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at	South West Elevations	=	90.27 m ²
Glazing Areas at	South West Elevations	=	48.22 m ²
Breakdown of Glazing Areas			
Glazing Areas Unshaded	(SD06)	=	8.37 m ²
	(W20)	=	5.96 m ²
Glazing Areas Shaded by Balcony	(SD08)	=	14.20 m ²
2/F	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys (5.17 x 2.75 x 1)	=	14.20 m ²
	OPF = 1.09 / 3.30 = 0.33	ESC =	0.765
Glazing Areas Shaded by Side Fin (Left)	(W13)	=	5.44 m ²
3/F	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys (2.18 x 2.50 x 1)	=	5.44 m ²
	SPF = 1.09 / 2.22 = 0.49	ESC =	0.956
Glazing Areas Shaded by Balcony	(SD07)	=	2.21 m ²
3/F	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys (0.82 x 2.70 x 1)	=	2.21 m ²
	OPF = 1.09 / 3.30 = 0.33	ESC =	0.765
Glazing Areas Shaded by Side Fin (Right) & Balcony	(SD07)	=	7.70 m ²
3/F	Glazing Area = Length of Glazing x Glazing Height x No. of Storeys (2.66 x 2.90 x 1)	=	7.70 m ²
	OPF = 1.09 / 3.30 = 0.33	ESC1 =	0.765
	SPF = 1.09 / 3.50 = 0.31	ESC2 =	0.925
	ESC = 0.765 x 0.925	=	0.707
Glazing Areas Unshaded	(SW-W7)	=	2.16 m ²
	(SW-W8)	=	2.16 m ²
Total		=	48.22 m ²
Opaque Wall Areas at	South West Elevations	=	42.05 m ²
Breakdown of Opaque Wall Areas			
Tiles	(SW-WA1)	=	30.28 m ²
Aluminum Cladding	(SW-WA2)	=	11.77 m ²
Window to Wall Ratio (WWR)	=	48.22 / 90.27	= 0.53

Sheet no. 7

Wall Orientation Factor Gw = 1.092 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at South West Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)
Gross white matt tiles	100%	0.3
Average Absorptivity =		0.30

White granite	0.5
Aluminium Alloy	0.5

'U' value of Opaque Wall Areas

$$U = 1 / (R_i + x_1/k_1 + x_2/k_2 + \dots + x_n/k_n + R_o)$$

where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

SW-WA1	Description:	Tiles
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to Table 3)	Ra	= 0
10mm ceramic external tiles	0.01 / 1.5	= 0.0067
25mm external rendering and tile adhesive	0.025 / 0.72	= 0.035
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		0.284
Uw1 = $\frac{1}{0.284}$ = 3.52 W/m ² K		

SW-WA2	Description:	Aluminum Cladding
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to Table 3)	Ra	= 0
15mm aluminium cladding	0.015 / 160	= 0.000
50mm insulation board	0.05 / 0.034	= 1.471
125mm concrete wall	0.125 / 2.16	= 0.058
15mm internal plaster	0.015 / 0.72	= 0.021
Internal surface film resistance	Ri	= 0.12
Total		1.713
Uw2 = $\frac{1}{1.713}$ = 0.58 W/m ² K		

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

Sheet No. 8 BD Ref No. _____
Building Address TYST 121 Block D

Facade Orientation Facing South West Gross Wall Area (Ao) = 90.27
Window to Wall Ratio (WWR) 0.53 Wall Orientation Factor (Gw) = 1.092

Part 1 - Calculation of Heat Conduction through Opaque Walls

Components / Details		Code No.	
Description	Units	SW-WA1	SW-WA2
External Finish Material		10mm ceramic external tiles	15mm aluminium cladding
Conductivity	W/mK	1.50	160.00
Thickness	m	0.010	0.015
Average Absorptivity	(α)	0.30	0.50
Intermediate component		25mm external rendering and tile adhesive	50mm insulation board
Conductivity	W/mK	0.72	0.034
Thickness	m	0.025	0.050
Intermediate component		125mm concrete wall	125mm concrete wall
Conductivity	W/mK	2.16	2.16
Thickness	m	0.125	0.125
Intermediate component			
Conductivity	W/mK		
Thickness	m		
Intermediate component			
Conductivity	W/mK		
Thickness	m		
Internal Finish Material		15mm internal plaster	15mm internal plaster
Conductivity	W/mK	0.72	0.72
Thickness	m	0.015	0.015
U-value of Opaque Area (Uwi)	W/m²K	3.52	0.58
Opaque Wall Area (Aw1)	m²	30.28	11.77
Heat Conduction = 3.57(Aw1/Ao) Uwi aw1 Gw		1.38	0.15

Heat Conduction through Opaque Walls = $3.57(Aw1/Ao) Uwi aw1 Gw$ where i= 1, 2, ..., n
= 1.53 W/m²

Part 2 - Calculation of Heat Conduction through Glazing

Components / Details		Code No.							
Description	Units	SD06	W20	SD08	W13	SD07	SD07	SW-W7	SW-W8
Glazing Type		GL-01	GL-01	GL-01	GL-01	GL-01	GL-01	GL-01	GL-01
Thickness	m	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
Glazing Area (Afi)	m²	8.37	5.96	14.20	5.44	2.21	7.70	2.16	2.16
U-value of Glazing (Ufi)	W/m²K	5.24	5.24	5.24	5.24	5.24	5.24	5.24	5.24
Heat Conduction = 0.64 (Afi/Ao) Ufi Gw		0.34	0.24	0.58	0.22	0.09	0.31	0.09	0.09

Heat Conduction through Glazing = $0.64 (Afi/Ao) Ufi Gw$ where i= 1, 2, ..., n
= 1.96 W/m²

Part 3 - Calculation of Solar Radiation through Glazing

Components / Details		Code No.							
Description	Units	SD06	W20	SD08	W13	SD07	SD07	SW-W7	SW-W8
Glazing Type		GL-01	GL-01	GL-01	GL-01	GL-01	GL-01	GL-01	GL-01
Thickness	m	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
Glazing Area (Afi)	m²	8.37	5.96	14.20	5.44	2.21	7.70	2.16	2.16
Shading Coefficient of Glazing (SCfi)		0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Visible Light Transmittance (VLT)	%	52	52	52	52	52	52	52	52
External Reflectance (ER)	%	6	6	6	6	6	6	6	6
External Shading Multiplier (ESC)		1.00	1.00	0.765	0.956	0.765	0.707	1.00	1.00
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		1.90	1.36	2.47	1.18	0.38	1.24	0.49	0.49

Solar Radiation through Glazing = $41.75 (Afi/Ao)(SCfi)(ESCwi)Gw$ where i= 1, 2, ..., n
= 9.51 W/m²

Summary of RTTV at South West Elevations
= 1.53 + 1.96 + 9.51
= 13.00 W/m²

North East Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at North East Elevations = 46.90 m²

Glazing Areas at North East Elevations = 10.41 m²

Breakdown of Glazing Areas
Glazing Areas Unshaded (W04) = 1.07 m²
(W22) = 1.98 m²

Glazing Areas Unshaded (W26) = 3.47 m²

Glazing Areas Unshaded (W15) = 0.99 m²

Glazing Areas Shaded by Utility Platform
Glazing Area = Length of Glazing x Glazing Height x No. of Storeys
(0.75) x 2.55 x 1 = 1.91 m²
OPF = 1.00 / 3.30 = 0.30 ESC = 0.830

Glazing Areas Unshaded (W14) = 0.99 m²

Total = 10.41 m²

Opaque Wall Areas at Gross Wall Areas = 36.49 m²

Breakdown of Opaque Wall Areas
Tile (NE-WA1) = 36.49 m²

Window to Wall Ratio (WWR = 10.41 / 46.90 = 0.22

Wall Orientation Factor Gw = 0.924 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at North East Elevations

External Wall Material	% of wall/roof area	α Absorptivity (Refer to Table 5)
Gross white matt tiles	100%	0.3

Average Absorptivity = 0.30

'U' value of Opaque Wall Areas
 $U = 1 / (R_i + x_1/k_1 + x_2/k_2 + \dots + x_n/k_n + R_o + f)$ where
Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

NE-WA1	Description:	Tile
Wall Material		
External surface film resistance	Ro	= 0.044
Air space resistance (Refer to 10mm ceramic external tiles	Ra	= 0
25mm external rendering and tile	0.01 / 1.5	= 0.0067
125mm concrete wall	0.025 / 0.72	= 0.035
15mm internal plaster	0.125 / 2.16	= 0.058
Internal surface film resistance	0.015 / 0.72	= 0.021
	Ri	= 0.12
Total		0.284

$U_{w1} = \frac{1}{0.284} = 3.52 \text{ W/m}^2\text{K}$

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

Sheet No. 10 BD Ref No. _____
Building Address TYST 121 Block D

Facade Orientation Facing North East Gross Wall Area (A_o) = 46.90
Window to Wall Ratio (WWR) 0.22 Wall Orientation Factor (G_w) = 0.924

Part 1 - Calculation of Heat Conduction through Opaque Walls			
Components / Details		Code No.	
Description	Units	NE-WA1	
External Finish Material		10mm ceramic external	
Conductivity	W/mK	1.50	
Thickness	m	0.010	
Average Absorptivity	(α)	0.30	
Intermediate component		25mm external rendering and tile adhesives	
Conductivity	W/mK	0.72	
Thickness	m	0.025	
Intermediate component		125mm concrete wall	
Conductivity	W/mK	2.16	
Thickness	m	0.125	
Intermediate component			
Conductivity	W/mK		
Thickness	m		
Intermediate component			
Conductivity	W/mK		
Thickness	m		
Internal Finish Material		15mm internal plaster	
Conductivity	W/mK	0.72	
Thickness	m	0.015	
U-value of Opaque Area (U _{wi})	W/m²K	3.52	
Opaque Wall Area (A _{wi})	m²	36.49	
Heat Conduction = 3.57(A _{wi} /A _o) U _{wi} a _{wi} G _w		2.71	

$$\text{Heat Conduction through Opaque Walls} = 3.57(A_{wi}/A_o) U_{wi} a_{wi} G_w \text{ where } i = 1, 2, \dots, n$$

$$= \frac{2.71}{W/m^2}$$

Part 2 - Calculation of Heat Conduction through Glazing							
Components / Details		Code No.					
Description	Units	W04	W22	W26	W15	D07	W14
Glazing Type		GL-01	GL-01	GL-01	GL-01	GL-01	GL-01
Thickness	m	0.012	0.012	0.012	0.012	0.012	0.012
Glazing Area (A _{fi})	m²	1.07	1.98	3.47	0.99	1.91	0.99
U-value of Glazing (U _{fi})	W/m²K	5.24	5.24	5.24	5.24	5.24	5.24
Heat Conduction = 0.64 (A _{fi} /A _o) U _{fi} G _w		0.07	0.13	0.23	0.07	0.13	0.07

$$\text{Heat Conduction through Glazing} = 0.64 (A_{fi}/A_o) U_{fi} C \text{ where } i = 1, 2, \dots, n$$

$$= \frac{0.69}{W/m^2}$$

Part 3 - Calculation of Solar Radiation through Glazing							
Components / Details		Code No.					
Description	Units	W04	W22	W26	W15	D07	W14
Glazing Type		GL-01	GL-01	GL-01	GL-01	GL-01	GL-01
Thickness	m	0.012	0.012	0.012	0.012	0.012	0.012
Glazing Area (A _{fi})	m²	1.07	1.98	3.47	0.99	1.91	0.99
Shading Coefficient of Glazing (SC _{fi})		0.45	0.45	0.45	0.45	0.45	0.45
Visible Light Transmittance (VLT)	%	52	52	52	52	52	52
External Reflectance (ER)	%	6	6	6	6	6	6
External Shading Multiplier (ESC)		1.00	1.00	1.00	1.00	0.83	1.00
Solar Radiation = 41.75 (A _{fi} /A _o)(SC _{fi})(ESC _{wi})G _w		0.40	0.73	1.28	0.37	0.59	0.37

$$\text{Solar Radiation through Glazing} = 41.75 (A_{fi}/A_o)(SC_{fi})(ESC_{wi})G_w \text{ where } i = 1, 2, \dots, n$$

$$= \frac{3.73}{W/m^2}$$

$$\text{Summary of RTTV at North East Elevations}$$

$$= \frac{2.71}{W/m^2} + \frac{0.69}{W/m^2} + \frac{3.73}{W/m^2}$$

$$= \frac{7.13}{W/m^2}$$

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

Tower 1

Sheet No. 11

BD Ref No. _____

Building Address TYST 121 Block D

Overall Gross Wall Area [a] 258.46 m²

Facade Orientation Facing	Gross Wall Area (m ²)	Heat Conduction through Opaque Walls (W/m ²)	Heat Conduction through Glazing (W/m ²)	Solar Radiation through Glazing (W/m ²)	RTTVwall at Each Facade (W/m ²)	Area-weighted RTTVwall (W/m ²)
	[b]	[c]	[d]	[e]	[f]=[c]+[d]+[e]	[g]=[f]x[b]/[a]
North West	50.23	3.49	0.17	0.83	4.49	0.87
South East	71.07	3.30	0.38	2.11	5.78	1.59
South West	90.27	1.53	1.96	9.51	13.00	4.54
North East	46.90	2.71	0.69	3.73	7.13	1.29

Overall RTTVwall = 8.30 W/m²

Result: <14W/m², Fulfill the Requirement

Roof

Sheet no. 12

Gross Roof Areas
(Opaque Walls + Skylight Areas) (Aro) at Roof = 65.80 m²

Skylight Areas at Roof = 0.00 m²

Breakdown of Skylight Areas
() = 0.00 m²

Opaque Areas at Roof = 65.80 m²

Breakdown of Opaque Roof Areas
(R1) = 65.80 m²

RC Roof Areas	Obtained from floor plan	7.14 m ²
2/F	Obtained from floor plan	38.66 m ²
R/F	Obtained from floor plan	19.994 m ²
Top Roof		

Roof Orientation Factor Gs = 2.16 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at Roof

External Roof Material (Colour/Finish)	% of roof area	α Absorptivity
Gross white matt tiles	100%	0.3

Average Absorptivity = 0.3

'U' value of Opaque Roof Areas

$$U = 1 / (R_i + x_1/k_1 + x_2/k_2 + \dots + x_n/k_n + R_a + R_o)$$

where Ri Surface film resistance of internal surface (Refer to Table 2)
 Ro Surface film resistance of external surface (Refer to Table 2)
 Ra Air space resistance (Refer to Table 3)
 x Thickness of building materials
 k Thermal conductivity of building materials (Refer to Table 1)

R1	Description:	Roof Area
Roof Material		
External surface film resistance	Ro =	0.055
Air space resistance	Ra =	0
30mm tiles	0.03 / 1.5 =	0.020
50mm mortar	0.05 / 0.72 =	0.069
30mm insulation board	0.03 / 0.034 =	0.882
150mm concrete slab	0.15 / 2.16 =	0.069
15mm internal plaster	0.015 / 0.38 =	0.039
Internal surface film resistance	Ri =	0.162
Total		1.298

$$U_{w1} = \frac{1}{1.298} = 0.77 \text{ W/m}^2\text{K}$$

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

Sheet No. 13 BD Ref No. _____
 Building Address TYST 121 Block D

Roof Orientation Facing Flat Gross Roof Area (Aro) = 65.80
 Skylight to Roof Ratio (SRR) = 0 Roof Orientation Factor (Gs) = 2.16

Part 1 - Calculation of Heat Conduction through Opaque Roof		
Components / Details		Code No.
Description	Units	R1
External Finish Material		30mm tiles
Conductivity	W/mK	1.50
Thickness	m	0.030
Average Absorptivity	(α)	0.3
Intermediate component		50mm mortar
Conductivity	W/mK	0.72
Thickness	m	0.050
Intermediate component		30mm insulation board
Conductivity	W/mK	0.034
Thickness	m	0.030
Intermediate component		150mm concrete slab
Conductivity	W/mK	2.16
Thickness	m	0.15
Intermediate component		
Conductivity	W/mK	
Thickness	m	
Internal Finish Material		15mm internal plaster
Conductivity	W/mK	0.38
Thickness	m	0.015
U-value of the Roof (Uri)	W/m²K	0.77
Opaque Roof Area (Ari)	m²	65.80
Heat Conduction = 3.47(Ari/Aro) Uri ari Gs		1.73

$$\text{Heat Conduction through Opaque Roof} = 3.47(\text{Ari/Aro}) \text{ Uri ari Gs}$$

$$= \underline{\quad 1.73 \quad} \text{ W/m}^2$$

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

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014

Form RTTV (Roof) 2 - Summary of RTTVroof of Building Envelopes

Tower 1

Sheet No.

14

BD Ref No.

Building Address

TYST 121 Block D

Overall Roof Area [a]

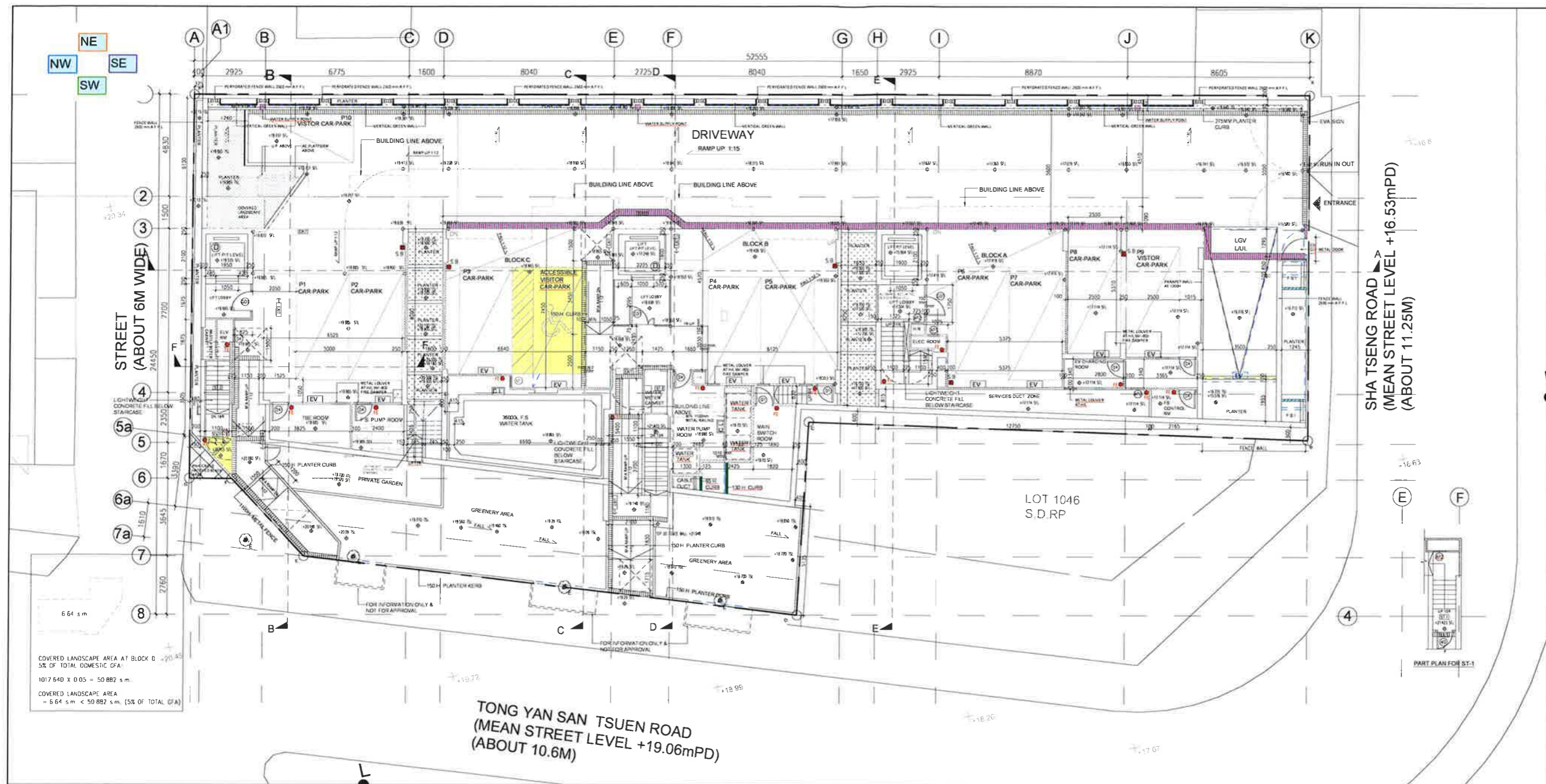
65.80 m²

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	65.80	1.73	0.00	0.00	1.73	1.73

Overall RTTVroof = 1.73 W/m²

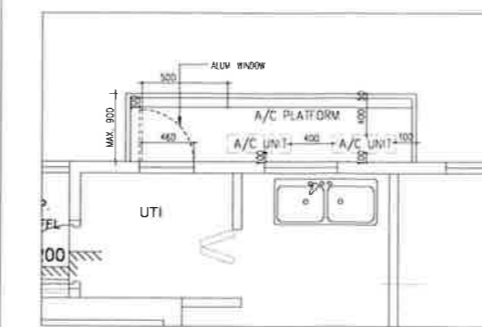
Result:

<4W/m², Fulfill the Requirement



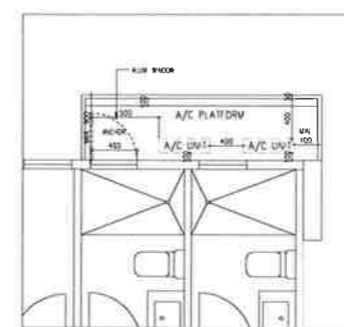
GROUND FLOOR PLAN

SCALE 1:100



TYPICAL PLAN FOR AC PLATFORM AT BLOCK D

1:50



TYPICAL PLAN FOR AC PLATFORM AT BLOCK B & C

1:50



SECTION OF VERTICAL GREEN 1:50

BD REF.	FSD REF.
2/9028/18	
DESCRIPTION	DATE
MAJOR AMENDMENT	23/01/2020
MAJOR AMENDMENT (RE-SUBMISSION)	27/03/2020
1ST AMENDMENT	23/09/2020
2ND AMENDMENT	25/02/2021
3RD AMENDMENT	01/04/2021
4TH AMENDMENT	19/07/2021
5TH AMENDMENT	03/12/2021
6TH AMENDMENT	21/01/2022

CLIENT(S)
SUPER SKY DEVELOPMENT LIMITED

GREAT MEGA
ARCHITECTS & CONSULTANTS LIMITED
FLAT A/F, 118, 3/F, LUDMART ROAD, LUDMART, HONG KONG
+852 9111 2860 F +852 9122 0218

AUTHORIZED PERSON

SO CHI WANG
MHKIS, RPS(BS)
Authorized Person AP(S)1/15
STRUCTURAL ENGINEER

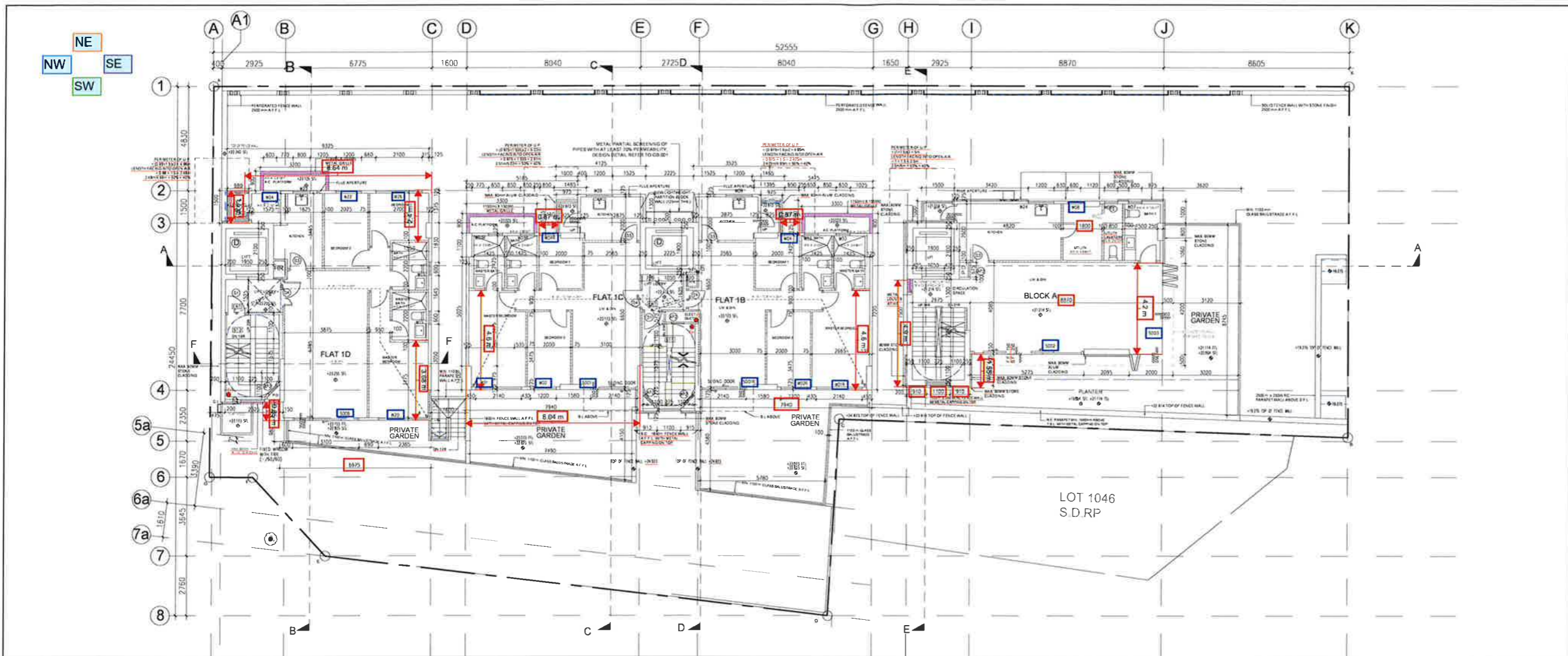
PROJECT TITLE
PROPOSED RESIDENTIAL
DEVELOPMENT AT DD.121 TONG
YAN SAN TSUEN LOT 2168

THE WORKS SHOWN ON THESE PLANS
ARE TYPE II WORKS (BUILDING WORKS) IN
RESPECT OF WHICH CONSENT IS APPLIED
FOR THE PURPOSE OF FAST TRACK
CONSENT APPLICATION UNDER
REGULATION 33 OF THE BUILDING
(ADMINISTRATION) REGULATIONS

DRAWING TITLE
GROUND FLOOR PLAN

DATE	SCALE
21/01/2022	1:100 @ A1
DRAWN	CHECKED
WL	PS
DWG. NO.	REV.
GB - 002	G

NOTE
ALWAYS VERIFY MEASUREMENTS AND
DETAILS ON SITE. DO NOT ATTEMPT TO
RE-SCALE DRAWING. ALL MATTERS SHOWN IN
THIS DRAWING(S) ARE AND WILL FOREVER
REMAIN THE PROPERTY OF THE FIRM AND/OR
ITS AFFILIATIONS.



FIRST FLOOR PLAN

SCALE 1:100



TYPICAL WINDOW SCHEDULE

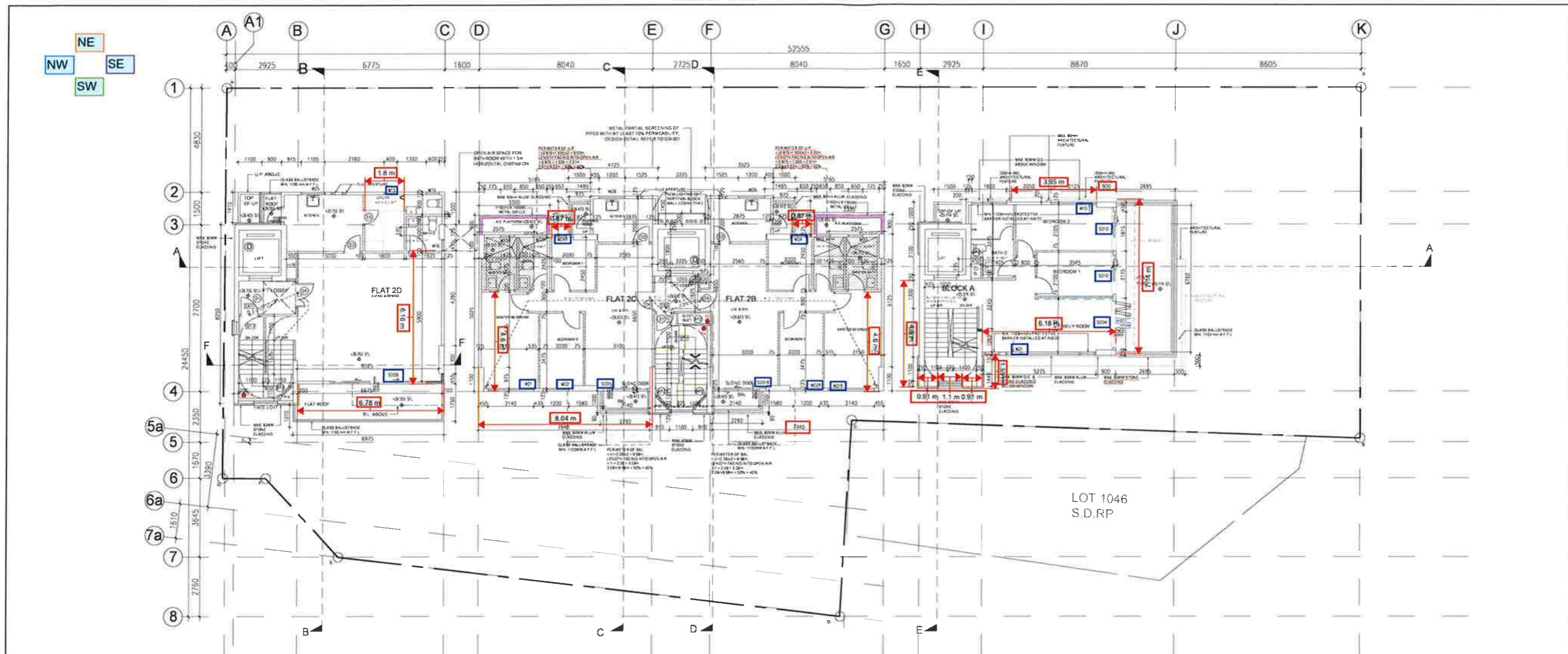
N.T.S.

WINDOW AREA & OPENABLE AREA CALCULATION																													
FLAT	USE (EACH HOUSE)	WINDOW TYPE	U.F.A (sq.m)	REQUIRED LIGHTING WINDOW AREA (sq.m) U.F.A x 1/10	PROVIDED LIGHTING WINDOW AREA (sq.m)			REQUIRED OPENABLE WINDOW AREA (sq.m) U.F.A x 1/15	PROVIDED OPENABLE WINDOW AREA (sq.m)																				
BKA	LIVING & DINING	SD02	36.780	3.678	7.948	*	1.110	m x 1.790	2.299	4.832	*	1.285	m x 1.880	m H															
						*	1.110	m x 1.790			m H																		
						*	1.110	m x 1.790			m H																		
		SD03				4.060	*	0.480			m x 1.775	m H	9.982	*	0.675	m x 1.840	m H												
							*	0.480			m x 1.775	m H		*	0.675	m x 1.840	m H												
							*	0.660			m x 1.785	m H		*	0.815	m x 1.840	m H												
	KITCHEN	W24	12.319	1.232	1.246		*	0.500	m x 0.220	m H	0.770	1.408		*	0.550	m x 1.280	m H												
							*	0.450	m x 1.140	m H				2.575	*	0.590	m x 1.455	m H	0.834	3.306	*	0.725	m x 1.520	m H					
							*	0.450	m x 1.140	m H					*	0.590	m x 1.455	m H			*	0.725	m x 1.520	m H					
		W21				13.350	1.335	5.529	*	0.650			m x 1.380		m H	0.439	2.604	*			0.590	m x 1.360	m H						
									*	0.570			m x 1.345	m H	2.575			*			0.590	m x 1.455	m H	0.577	0.802	*	0.590	m x 1.360	m H
									*	2.262			m x 1.370	m H				*			0.590	m x 1.455	m H			*	0.840	m x 1.550	m H
	FAMILY ROOM	SD04	13.350	1.335	2.575				*	0.590	m x 1.455	m H	0.439	2.604				*			0.840	m x 1.550	m H						
									*	0.590	m x 1.455	m H			0.439			2.604	*	0.840	m x 1.550	m H							
									*	0.590	m x 1.455	m H							0.577	0.802	*	0.590	m x 1.360			m H			
		BEDROOM 1				7.024	0.702	2.001	*	0.690	m x 1.450	m H				0.577	0.802				*	0.590	m x 1.360			m H			
									*	0.690	m x 1.450	m H			0.439						2.604	*	0.840	m x 1.550	m H				
									*	0.690	m x 1.450	m H							0.577			0.802	*	0.590	m x 1.360	m H			
	BEDROOM 2	SD10	9.226	0.923	2.501				*	0.570	m x 1.350	m H	0.577	0.802									*	0.590	m x 1.360	m H			
									*	1.250	m x 1.385	m H			0.439			2.604					*	0.840	m x 1.550	m H			
*									0.570	m x 1.350	m H	0.577							0.802	*			0.590	m x 1.360	m H				
MASTER BEDROOM		W10A				33.913	3.391	2.890	*	1.260	m x 1.590					m H	2.120			7.480			*	4.250	m x 1.760	m H			
									*	1.970	m x 1.620				m H	0.439					2.604		*	0.840	m x 1.550	m H			
									*	1.970	m x 1.620	m H			0.577							0.802	*	0.590	m x 1.360	m H			
	SD05	33.913	3.391	9.574	*				0.570	m x 1.555	m H	0.439	2.604	*									0.840	m x 1.550	m H				
					*				1.260	m x 1.590	m H			0.577		0.802		*					0.590	m x 1.360	m H				
					*				1.970	m x 1.620	m H				0.439			2.604	*				0.840	m x 1.550	m H				
MASTER BATH	W21A				8.008	0.801	2.092	*	0.570	m x 1.585	m H						0.439		2.604	*			0.840	m x 1.550	m H				
								*	0.570	m x 1.585	m H			0.577						0.802	*		0.590	m x 1.360	m H				
								*	0.570	m x 1.585	m H				0.439						2.604	*	0.840	m x 1.550	m H				
	BATH 1	W11A	4.125	0.413				0.616	*	2.620	m x 1.610	m H	0.439									2.604	*	0.840	m x 1.550	m H			
									*	0.750	m x 1.660	m H		0.577		0.802							*	0.590	m x 1.360	m H			
									*	0.750	m x 1.660	m H			0.439			2.604					*	0.840	m x 1.550	m H			
BATH 2		W07			6.169	0.617	1.835		*	0.500	m x 0.210	m H					0.439		2.604				*	0.840	m x 1.550	m H			
									*	0.370	m x 1.380	m H		0.577						0.802			*	0.590	m x 1.360	m H			
									*	0.750	m x 1.405	m H			0.439						2.604		*	0.840	m x 1.550	m H			
	UTILITY	W08	4.680	0.468				0.616	*	0.500	m x 0.210	m H	0.439									2.604	*	0.840	m x 1.550	m H			
									*	0.370	m x 1.380	m H		0.577		0.802							*	0.590	m x 1.360	m H			
									*	0.500	m x 0.210	m H			0.439			2.604					*	0.840	m x 1.550	m H			
UTILITY LAVATORY		W08			2.470	0.247	0.616		*	0.370	m x 1.380	m H					0.439		2.604				*	0.840	m x 1.550	m H			
									*	0.370	m x 1.380	m H		0.577						0.802			*	0.590	m x 1.360	m H			
									*	0.500	m x 0.210	m H			0.439						2.604		*	0.840	m x 1.550	m H			

BD REF.	FSD REF.
29028/18	
DESCRIPTION	DATE
MAJOR AMENDMENT	23/01/2020
MAJOR AMENDMENT (RE-SUBMISSION)	27/03/2020
1ST AMENDMENT	23/09/2020
2ND AMENDMENT	25/02/2021
3RD AMENDMENT	01/04/2021
4TH AMENDMENT	19/07/2021
5TH AMENDMENT	03/12/2021
6TH AMENDMENT	21/01/2022

CLIENT(S)
SUPER SKY DEVELOPMENT LIMITED

GREAT MEGA
ARCHITECTS & CONSULTANTS LIMITED
FLAT 4/F, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 13



SECOND FLOOR PLAN

SCALE 1:100



TYPICAL WINDOW SCHEDULE

N.T.S.

WINDOW AREA & OPENABLE AREA CALCULATION									
FLAT	USE (EACH HOUSE)	TYPE	UFA (s.m.)	REQUIRED LIGHTING WINDOW AREA (s.m.) UFA x 1/10	PROMOTED LIGHTING WINDOW AREA (s.m.)	REQUIRED OPENABLE WINDOW AREA (s.m.) UFA x 1/16	PROMOTED OPENABLE WINDOW AREA (s.m.)		
1B	LIVING & DINING	SD01R	21.740	2.174	2.656	1.359	3.296	0.975 m x 1.690 m H	
	MASTER BEDROOM	W01R	11.299	1.130	2.798	0.706	0.908	0.605 m x 1.500 m H	
	BEDROOM 1	W04	4.773	0.477	0.076	0.298	0.762	0.495 m x 1.540 m H	
	BEDROOM 2	W02R	6.890	0.689	1.307	0.431	0.780	0.520 m x 1.500 m H	
	KITCHEN	W09	5.574	0.557	0.866	0.348	1.381	0.550 m x 1.255 m H	
	BATH	W03	3.456	0.346	0.479	0.684	0.545	0.545 m x 1.255 m H	
1C	MASTER BATH	W03R	3.698	0.370	0.479	0.684	0.545	0.545 m x 1.255 m H	
	LIVING & DINING	SD01	21.546	2.155	2.656	1.347	3.296	0.975 m x 1.690 m H	
	MASTER BEDROOM	W01	11.299	1.130	2.798	0.706	0.908	0.605 m x 1.500 m H	
	BEDROOM 1	W04R	4.773	0.477	0.525	0.298	0.762	0.495 m x 1.540 m H	
	BEDROOM 2	W02	6.890	0.689	1.307	0.431	0.825	0.550 m x 1.500 m H	
	KITCHEN	W09	5.573	0.557	0.866	0.348	1.381	0.550 m x 1.255 m H	
1D	BATH	W03R	3.454	0.346	0.479	0.684	0.545	0.545 m x 1.255 m H	
	MASTER BATH	W03R	3.698	0.370	0.479	0.684	0.545	0.545 m x 1.255 m H	
	LIVING & DINING	SD06	28.100	2.810	3.945	1.756	2.286	1.475 m x 1.550 m H	
	MASTER BEDROOM	W02	11.428	1.143	5.074	0.714	1.032	0.655 m x 1.575 m H	
	BEDROOM 1	W26	6.082	0.608	2.657	0.380	1.009	0.655 m x 1.540 m H	
	BEDROOM 2	W02	7.062	0.706	1.299	0.441	0.857	0.555 m x 1.545 m H	
2B	KITCHEN	W23	6.640	0.664	0.667	0.415	0.869	0.695 m x 1.250 m H	
	UTI	W04	2.302	0.230	0.525	0.144	0.762	0.495 m x 1.540 m H	
	MASTER BATH	W15	3.630	0.363	0.418	0.363	0.621	0.495 m x 1.255 m H	
	BATH	W15	3.630	0.363	0.418	0.363	0.621	0.495 m x 1.255 m H	
	LIVING & DINING	SD01R	21.763	2.176	2.656	1.360	3.296	0.975 m x 1.690 m H	
	MASTER BEDROOM	W01R	11.299	1.130	2.798	0.706	0.908	0.605 m x 1.500 m H	
2B	BEDROOM 1	W04	4.773	0.477	0.525	0.298	0.762	0.495 m x 1.540 m H	
	BEDROOM 2	W02R	6.890	0.689	1.307	0.431	0.780	0.520 m x 1.500 m H	
	KITCHEN	W09	5.574	0.557	0.866	0.348	1.381	0.550 m x 1.255 m H	
	BATH	W03	3.456	0.346	0.479	0.684	0.545	0.545 m x 1.255 m H	
	MASTER BATH	W03	3.698	0.370	0.479	0.684	0.545	0.545 m x 1.255 m H	

BD REF.	FSD REF.
2/9028/18	
DESCRIPTION	DATE
MAJOR AMENDMENT	23/01/2020
MAJOR AMENDMENT (RE-SUBMISSION)	27/03/2020
1ST AMENDMENT	23/06/2020
2ND AMENDMENT	25/02/2021
3RD AMENDMENT	01/04/2021
4TH AMENDMENT	19/07/2021
5TH AMENDMENT	03/12/2021
6TH AMENDMENT	21/01/2022

CLIENT(S)
SUPER SKY DEVELOPMENT LIMITED

GREAT MEGA
ARCHITECTS & CONSULTANTS LIMITED

AUTHORIZED PERSON

SO CHI WANG
MHKIS, RPS(BS)
Authorized Person AP(S)1/16

STRUCTURAL ENGINEER

PROJECT TITLE
PROPOSED RESIDENTIAL
DEVELOPMENT AT DD.121 TONG
YAN SAN TSUEN LOT 2168

THE WORKS SHOWN ON THESE PLANS
ARE TYPE II WORKS (BUILDING WORKS) IN
RESPECT OF WHICH CONSENT IS APPLIED
FOR THE PURPOSE OF FAST TRACK
CONSENT APPLICATION UNDER
REGULATION 33 OF THE BUILDING
(ADMINISTRATION) REGULATIONS

DRAWING TITLE
SECOND FLOOR PLAN &
TYPICAL WINDOW SCHEDULE

DATE
21/01/2022

SCALE
1:100 @ A1

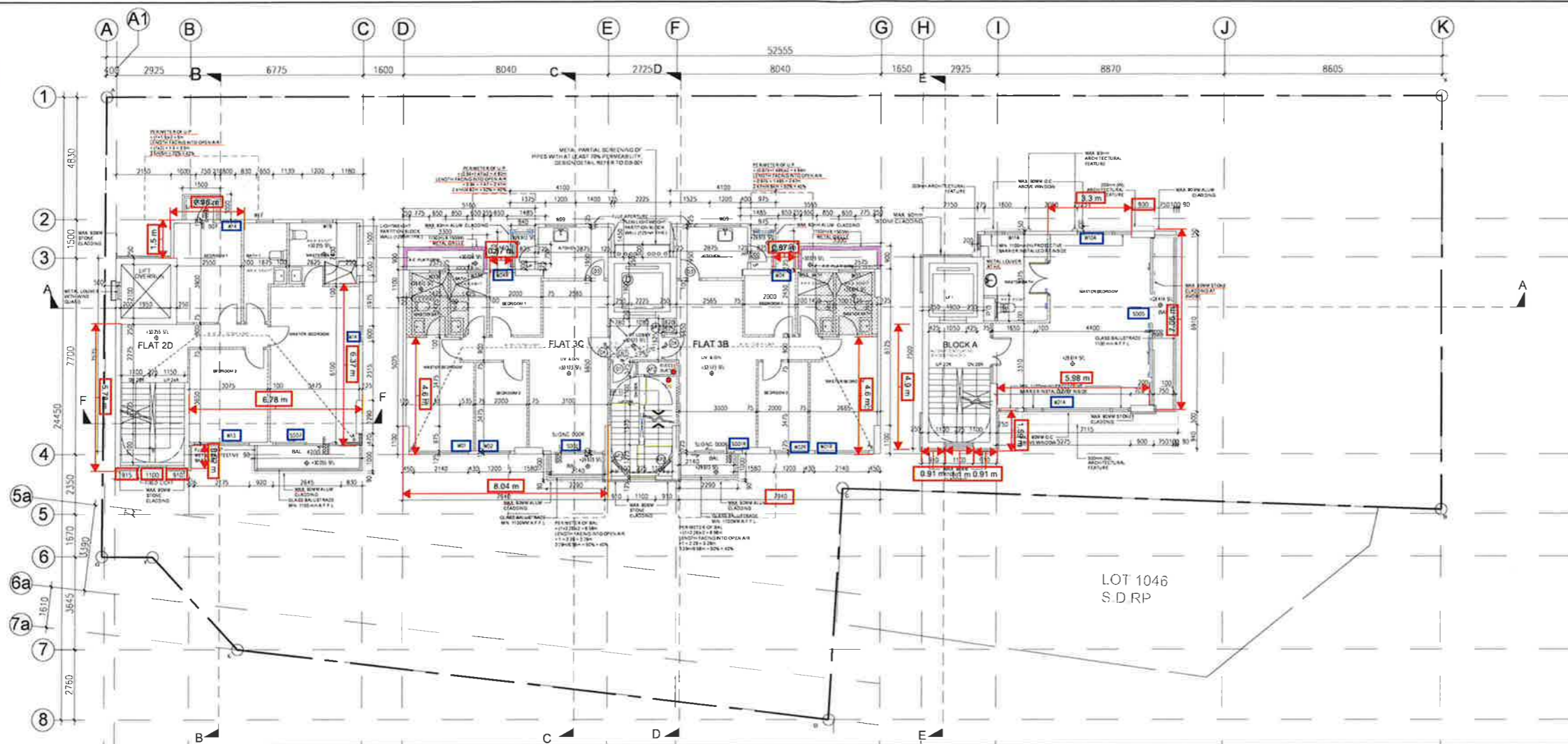
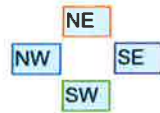
DRAWN
WL

CHECKED
PS

DWG. NO.
GB - 004

REV.
F

NOTE
ALWAYS VERIFY MEASUREMENTS AND
DETAILS ON SITE. DO NOT ATTEMPT TO
RE-SCALE DRAWING. ALL MATTERS SHOWN IN
THIS DRAWING(S) ARE AND WILL FOREVER
REMAIN THE PROPERTY OF THE FIRM AND/OR
ITS AFFILIATIONS.



THIRD FLOOR PLAN

SCALE 1:100



TYPICAL WINDOW SCHEDULE

N.T.S.

WINDOW AREA & OPENABLE AREA CALCULATION									
FLAT	USE (EACH HOUSE)	WINDOW TYPE	UFA (s.m.)	REQUIRED LIGHTING WINDOW AREA (s.m.) UFA x 1/10	PROVIDED LIGHTING WINDOW AREA (s.m.)	REQUIRED OPENABLE WINDOW AREA (s.m.) UFA x 1/16	PROVIDED OPENABLE WINDOW AREA (s.m.)		
2C	LIVING & DINING	SD01	21.546	2.155	2.656	1.347	3.296	0.975	1.690 m H
	MASTER BEDROOM	W01	11.299	1.130	2.798	0.706	0.908	0.605	1.500 m H
	BEDROOM 1	W04R	4.773	0.477	0.525	0.298	0.762	0.495	1.540 m H
	BEDROOM 2	W02	6.890	0.689	1.307	0.431	0.825	0.550	1.500 m H
	KITCHEN	W09	5.573	0.557	0.866	0.348	1.381	0.550	1.255 m H
	BATH	W03R	3.456	0.346	0.479	0.346	0.684	0.545	1.255 m H
	MASTER BATH	W03R	3.698	0.370	0.479	0.370	0.684	0.545	1.255 m H
	LIVING & DINING	SD08	49.472	4.947	7.288	3.092	3.506	1.025	1.710 m H
	KITCHEN	W25	9.399	0.940	0.944	0.587	1.142	0.455	1.255 m H
	UTI	W15	6.219	0.622	0.836	0.389	1.242	0.495	1.255 m H
2D	BEDROOM 1	W14	10.116	1.012	1.227	0.632	1.354	0.495	1.250 m H
	BEDROOM 2	W13	11.223	1.122	2.797	0.701	0.983	0.655	1.500 m H
	MASTER BEDROOM	SD07	21.052	2.105	5.305	1.316	4.861	2.540	1.670 m H
	MASTER BATH	W19	6.470	0.647	1.046	0.647	0.763	0.610	1.250 m H
	BATH 1	W17	5.422	0.542	0.552	0.542	0.688	0.550	1.250 m H
	BATH 2	W16	2.512	0.251	0.283	0.251	0.464	0.370	1.255 m H
	LIVING & DINING	SD01R	21.763	2.176	2.656	1.360	3.296	0.975	1.690 m H
	MASTER BEDROOM	W01R	11.299	1.130	2.798	0.706	0.908	0.605	1.500 m H
	BEDROOM 1	W04	4.773	0.477	0.525	0.298	0.762	0.495	1.540 m H
	BEDROOM 2	W02R	6.890	0.689	1.307	0.431	0.780	0.520	1.500 m H
3B	KITCHEN	W09	5.574	0.557	0.866	0.348	1.381	0.550	1.255 m H
	BATH	W03	3.456	0.346	0.479	0.346	0.684	0.545	1.255 m H
	MASTER BATH	W03R	3.698	0.370	0.479	0.370	0.684	0.545	1.255 m H
	LIVING & DINING	SD01	21.546	2.155	2.656	1.347	3.296	0.975	1.690 m H
	MASTER BEDROOM	W01	11.299	1.130	2.798	0.706	0.908	0.605	1.500 m H
	BEDROOM 1	W04R	4.773	0.477	0.525	0.298	0.762	0.495	1.540 m H
	BEDROOM 2	W02	6.890	0.689	1.307	0.431	0.825	0.550	1.500 m H
	KITCHEN	W09	5.573	0.557	0.866	0.348	1.381	0.550	1.255 m H
	BATH	W03R	3.456	0.346	0.479	0.346	0.684	0.545	1.255 m H
	MASTER BATH	W03R	3.698	0.370	0.479	0.370	0.684	0.545	1.255 m H
3C	LIVING & DINING	SD01	21.546	2.155	2.656	1.347	3.296	0.975	1.690 m H
	MASTER BEDROOM	W01	11.299	1.130	2.798	0.706	0.908	0.605	1.500 m H
	BEDROOM 1	W04R	4.773	0.477	0.525	0.298	0.762	0.495	1.540 m H
	BEDROOM 2	W02	6.890	0.689	1.307	0.431	0.825	0.550	1.500 m H
	KITCHEN	W09	5.573	0.557	0.866	0.348	1.381	0.550	1.255 m H
	BATH	W03R	3.456	0.346	0.479	0.346	0.684	0.545	1.255 m H
	MASTER BATH	W03R	3.698	0.370	0.479	0.370	0.684	0.545	1.255 m H
	LIVING & DINING	SD01	21.546	2.155	2.656	1.347	3.296	0.975	1.690 m H
	MASTER BEDROOM	W01	11.299	1.130	2.798	0.706	0.908	0.605	1.500 m H
	BEDROOM 1	W04R	4.773	0.477	0.525	0.298	0.762	0.495	1.540 m H

BD REF.	FSD REF.
2/9028/18	
DESCRIPTION	DATE
MAJOR AMENDMENT	23/01/2020
MAJOR AMENDMENT (RE-SUBMISSION)	27/03/2020
1ST AMENDMENT	23/09/2020
2ND AMENDMENT	25/02/2021
3RD AMENDMENT	01/04/2021
4TH AMENDMENT	19/07/2021
5TH AMENDMENT	03/12/2021
6TH AMENDMENT	21/01/2022

CLIENT(S)
SUPER SKY DEVELOPMENT LIMITED

GREAT MEGA
ARCHITECTS & CONSULTANTS LIMITED
FLAT 401, 218, THE LOHAS, 100, WING LEE ROAD, HONG KONG
TEL: 3411 1234 FAX: 3411 1235

AUTHORIZED PERSON

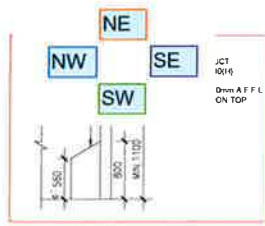
SO CHI WANG
MHKIS, RPS(BS)
Authorized Person AP(S)1/16
STRUCTURAL ENGINEER

PROJECT TITLE
PROPOSED RESIDENTIAL
DEVELOPMENT AT DD.121 TONG
YAN SAN TSUEN LOT 2168

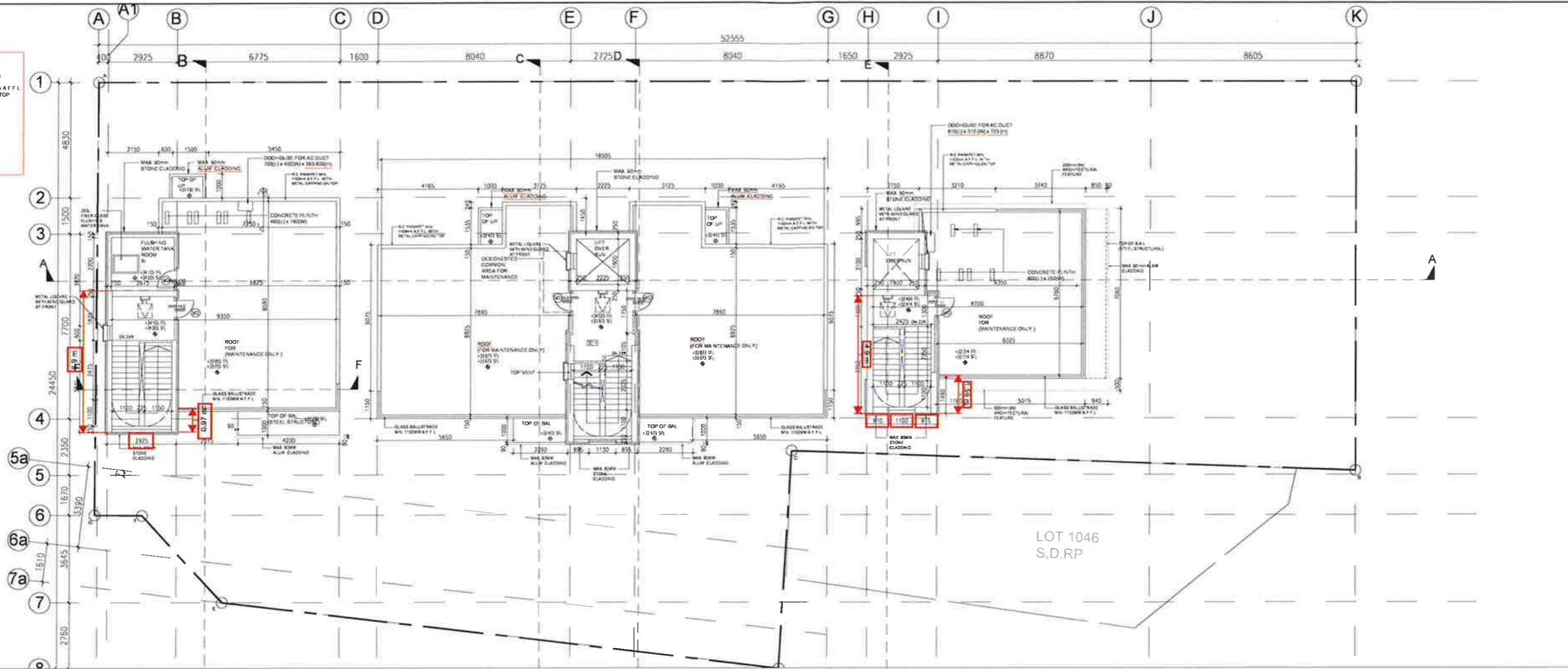
DRAWING TITLE
THIRD FLOOR PLAN &
TYPICAL WINDOW SCHEDULE

DATE	SCALE
21/01/2022	1:100 @ A1
DRAWN	CHECKED
WL	PS
DWG. NO.	REV.
GB - 005	F

NOTE
ALWAYS VERIFY MEASUREMENTS AND
DETAILS ON SITE. DO NOT ATTEMPT TO
RE-SCALE DRAWING. ALL MATTERS SHOWN IN
THIS DRAWING(S) ARE AND WILL FOREVER
REMAIN THE PROPERTY OF THE FIRM AND/OR
ITS AFFILIATIONS.

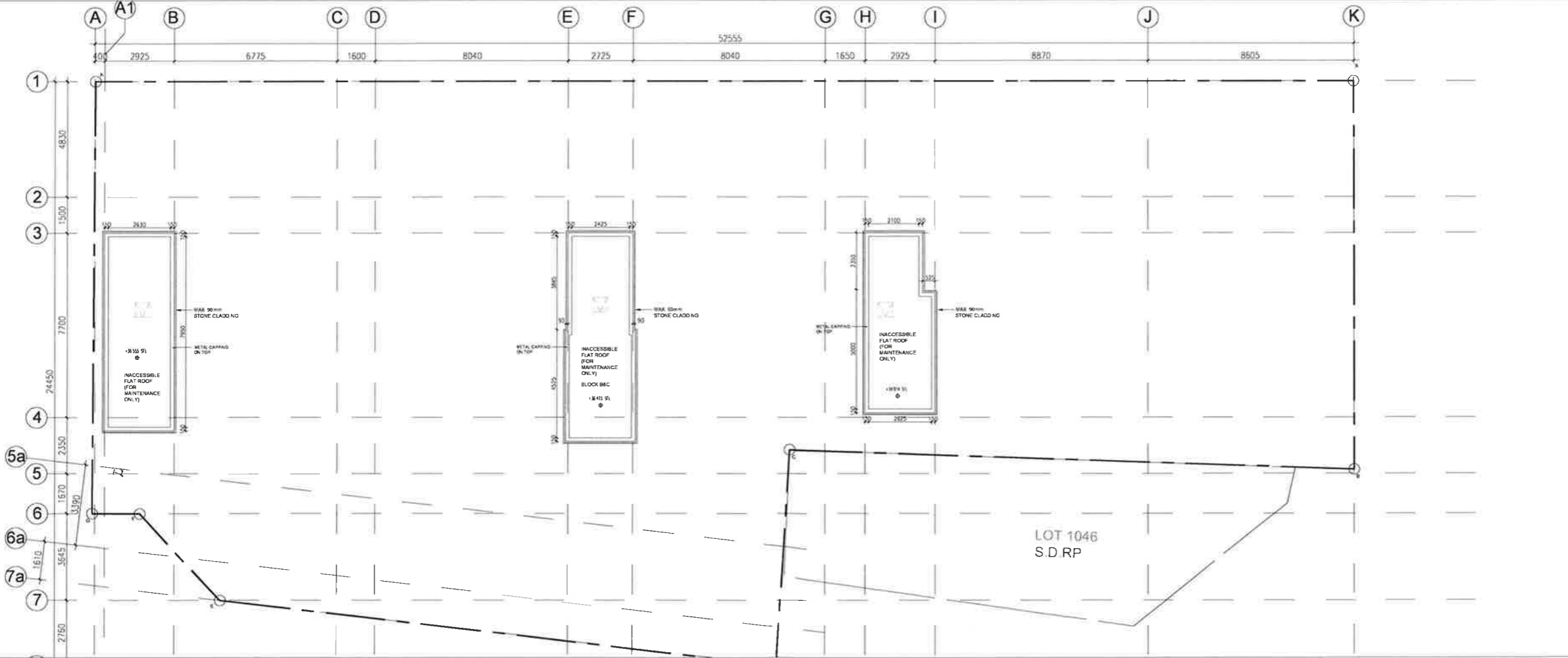


SECTION 1-1
SCALE 1:50



ROOF FLOOR PLAN

SCALE 1:100



UPPER ROOF FLOOR PLAN

SCALE 1:100

BD REF.	FSD REF.
2/9028/18	
DESCRIPTION	DATE
MAJOR AMENDMENT	23/01/2020
MAJOR AMENDMENT (RE-SUBMISSION)	27/03/2020
1ST AMENDMENT	23/09/2020
2ND AMENDMENT	25/02/2021
3RD AMENDMENT	01/04/2021
4TH AMENDMENT	19/07/2021
5TH AMENDMENT	03/12/2021
6TH AMENDMENT	21/01/2022

CLIENT(S)
SUPER SKY DEVELOPMENT LIMITED

GREAT MEGA
ARCHITECTS & CONSULTANTS LIMITED
FLAT A/F, 2/F, 141 LOCKHART ROAD, LAMHONG WING
HONG KONG
TEL: 3522 9052/9053

AUTHORIZED PERSON

SO CHI WANG
MHKIS, RPS(BS)
Authorized Person AP(S)1/16
STRUCTURAL ENGINEER

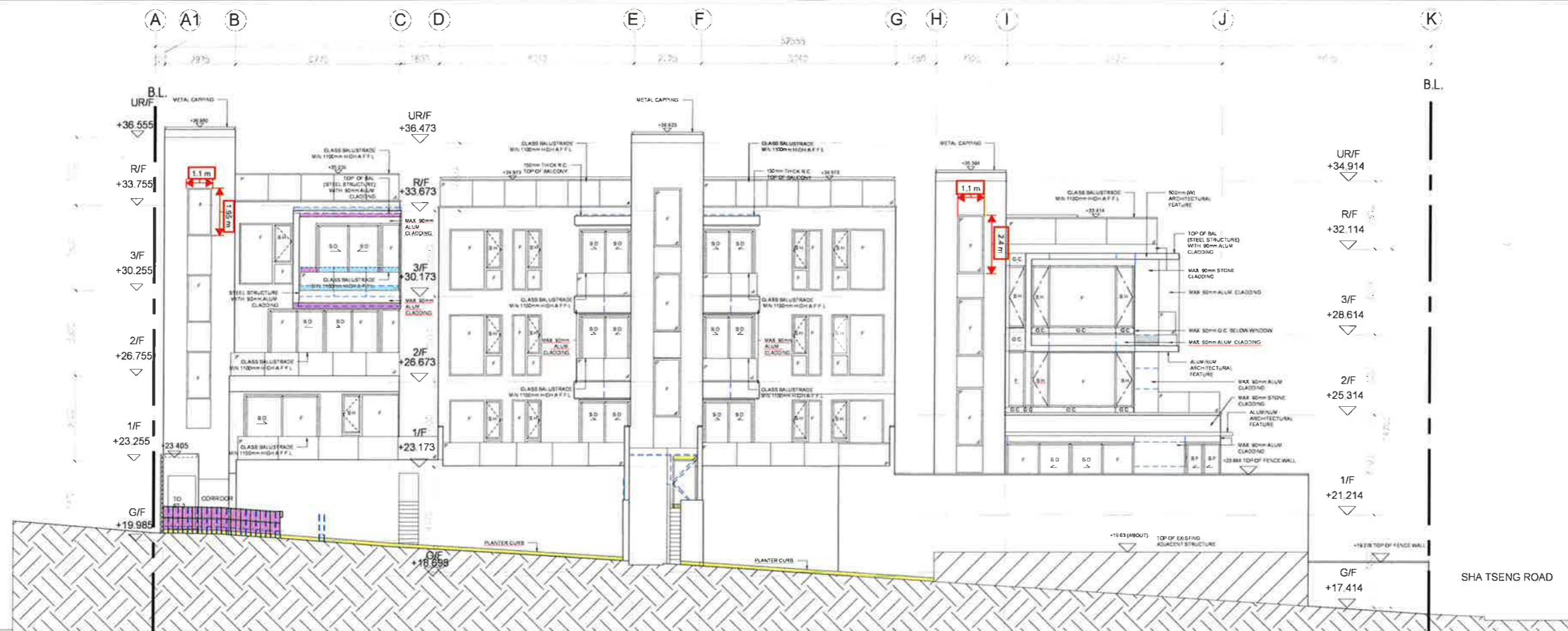
PROJECT TITLE
PROPOSED RESIDENTIAL
DEVELOPMENT AT DD.121 TONG
YAN SAN TSUEN LOT 2168

THE WORKS SHOWN ON THESE PLANS
ARE TYPE II WORKS (BUILDING WORKS) IN
RESPECT OF WHICH CONSENT IS APPLIED
FOR THE PURPOSE OF FAST TRACK
CONSENT APPLICATION UNDER
REGULATION 33 OF THE BUILDING
(ADMINISTRATION) REGULATIONS

DRAWING TITLE
ROOF FLOOR PLAN &
UPPER ROOF PLAN

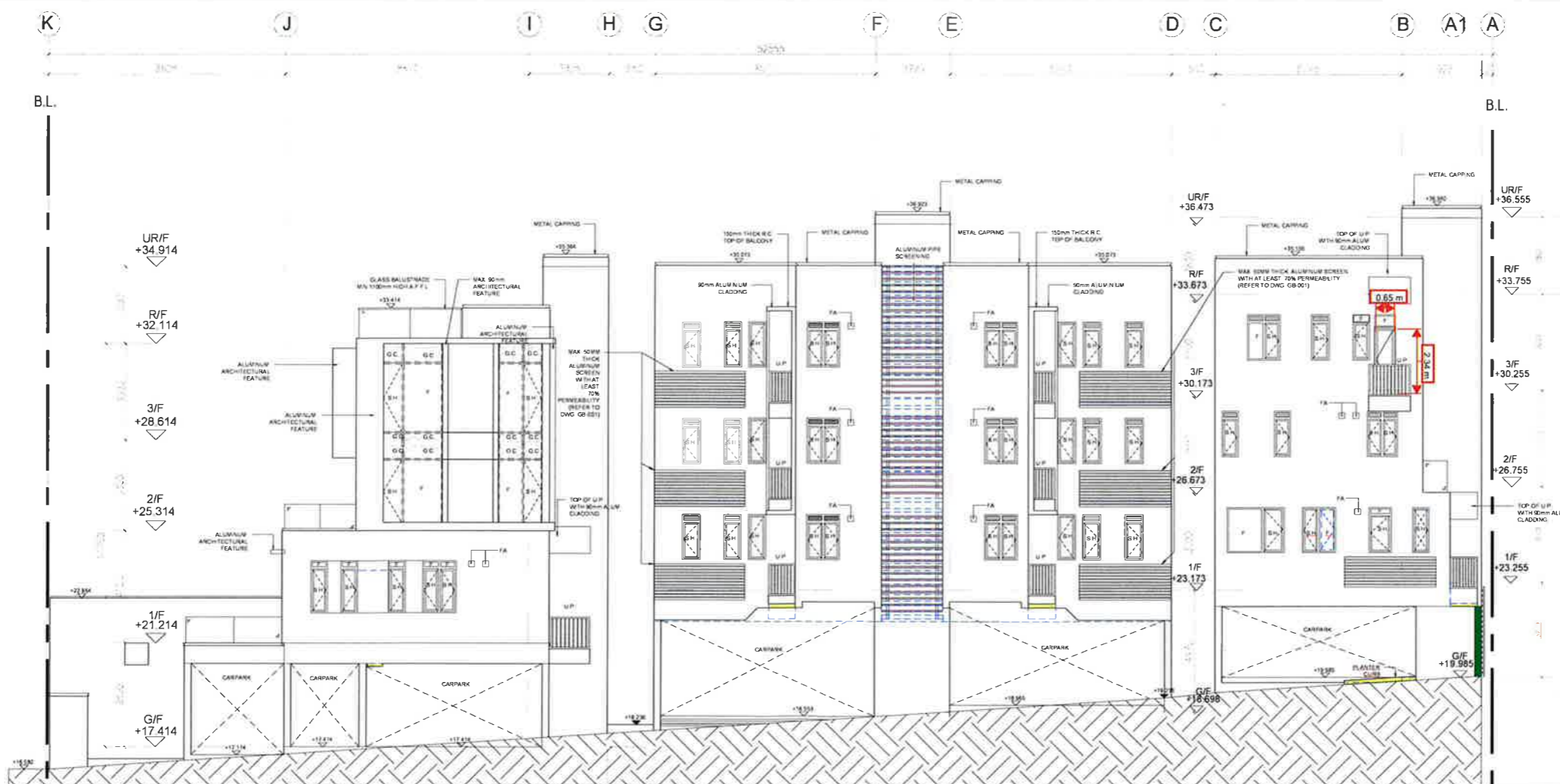
DATE	SCALE
21/01/2022	1:100 @ A1
DRAWN	CHECKED
WL	PS
DWG. NO.	REV.
GB - 006	F

NOTE
ALWAYS VERIFY MEASUREMENTS AND
DETAILS ON SITE. DO NOT ATTEMPT TO
RE-SCALE DRAWING. ALL MATTERS SHOWN IN
THIS DRAWING(S) ARE AND WILL FOREVER
REMAIN THE PROPERTY OF THE FIRM AND/OR
ITS AFFILIATIONS.



SOUTH ELEVATION

SCALE 1:100



NORTH ELEVATION

SCALE 1:100

BD REF.	FSD REF.
2/9028/18	
DESCRIPTION	DATE
MAJOR AMENDMENT	23/01/2020
MAJOR AMENDMENT (RESUBMISSION)	27/03/2020
1ST AMENDMENT	23/09/2020
2ND AMENDMENT	25/02/2021
3RD AMENDMENT	01/04/2021
4TH AMENDMENT	19/07/2021
5TH AMENDMENT	03/12/2021
6TH AMENDMENT	21/01/2022

CLIENT(S)
SUPER SKY DEVELOPMENT LIMITED

GREAT MEGA
DESIGN & BUILD LTD

AUTHORIZED PERSON

SO CHI WANG
MHK'S, RPS(BS)
Authorized Person AP(S)1/16
STRUCTURAL ENGINEER

PROJECT TITLE
PROPOSED RESIDENTIAL
DEVELOPMENT AT DD.121 TONG
YAN SAN TSUEN LOT 2168

DRAWING TITLE
SOUTH ELEVATION,
NORTH ELEVATION

DATE	SCALE
21/01/2022	1:100 @ A1
DRAWN	CHECKED
WL	WC
DWG. NO.	REV.
GB - 007	G

NOTE
ALWAYS VERIFY MEASUREMENTS AND
DETAILS ON SITE. DO NOT ATTEMPT TO
RE-SCALE DRAWING. ALL MATTERS SHOWN IN
THIS DRAWING(S) ARE AND WILL FOREVER
REMAIN THE PROPERTY OF THE FIRM AND/OR
ITS AFFILIATIONS.

BD REF.
2/9028/18

FSD REF.

DESCRIPTION	DATE
MAJOR AMENDMENT	23/01/2020
MAJOR AMENDMENT (RESUBMISSION)	27/03/2020
1ST AMENDMENT	23/09/2020
2ND AMENDMENT	25/02/2021
3RD AMENDMENT	01/04/2021
4TH AMENDMENT	19/07/2021
5TH AMENDMENT	03/12/2021
6TH AMENDMENT	21/01/2022

CLIENT(S)

SUPER SKY DEVELOPMENT LIMITED

GREAT MEGA
DESIGN & BUILD LTD

AUTHORIZED PERSON

SO CHI WANG
MHKIS, RPS(BS)
Authorized Person AP(S)1/16

STRUCTURAL ENGINEER

PROJECT TITLE

PROPOSED RESIDENTIAL
DEVELOPMENT AT DD.121 TONG
YAN SAN TSUEN LOT 2168

THE WORKS SHOWN ON THESE PLANS
ARE TYPE II WORKS (BUILDING WORKS) IN
RESPECT OF WHICH CONSENT IS APPLIED
FOR THE PURPOSE OF FAST TRACK
CONSENT APPLICATION UNDER
REGULATION 33 OF THE BUILDING
(ADMINISTRATION) REGULATIONS

DRAWING TITLE

EAST ELEVATIONS,
WEST ELEVATION,
RTTV CALCULATION

DATE
21/01/2022

SCALE
1:100 @ A1

DRAWN
WL

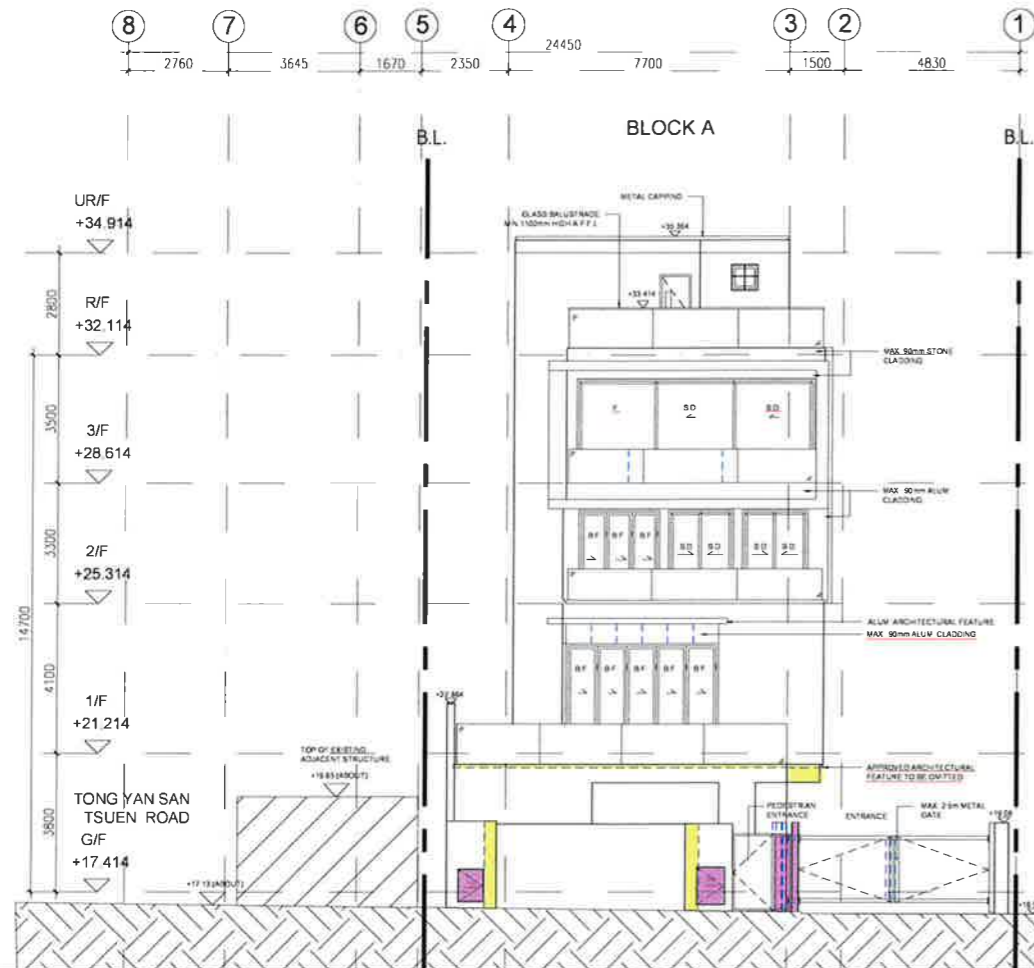
CHECKED
WC

DWG. NO.
GB - 008

REV.
F

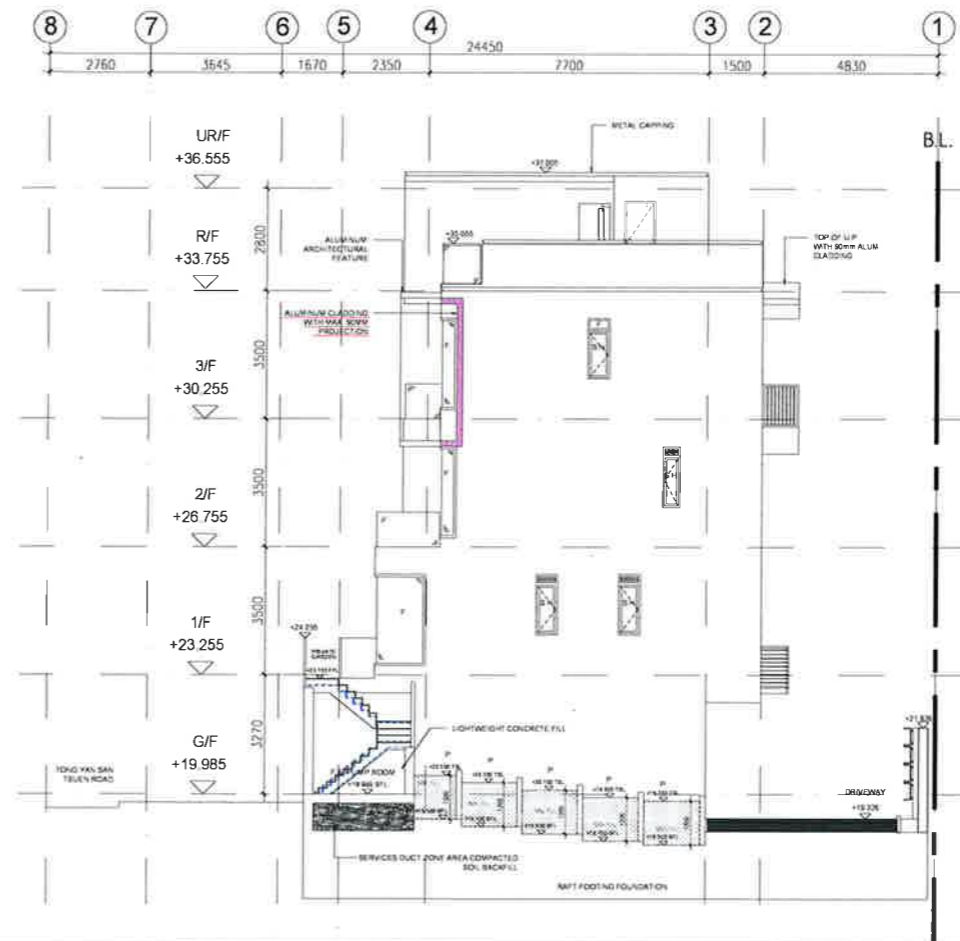
NOTE

ALWAYS VERIFY MEASUREMENTS AND
DETAILS ON SITE. DO NOT ATTEMPT TO
RE-SCALE DRAWING. ALL MATTERS SHOWN IN
THIS DRAWING(S) ARE AND WILL FOREVER
REMAIN THE PROPERTY OF THE FIRM AND/OR
ITS AFFILIATIONS.



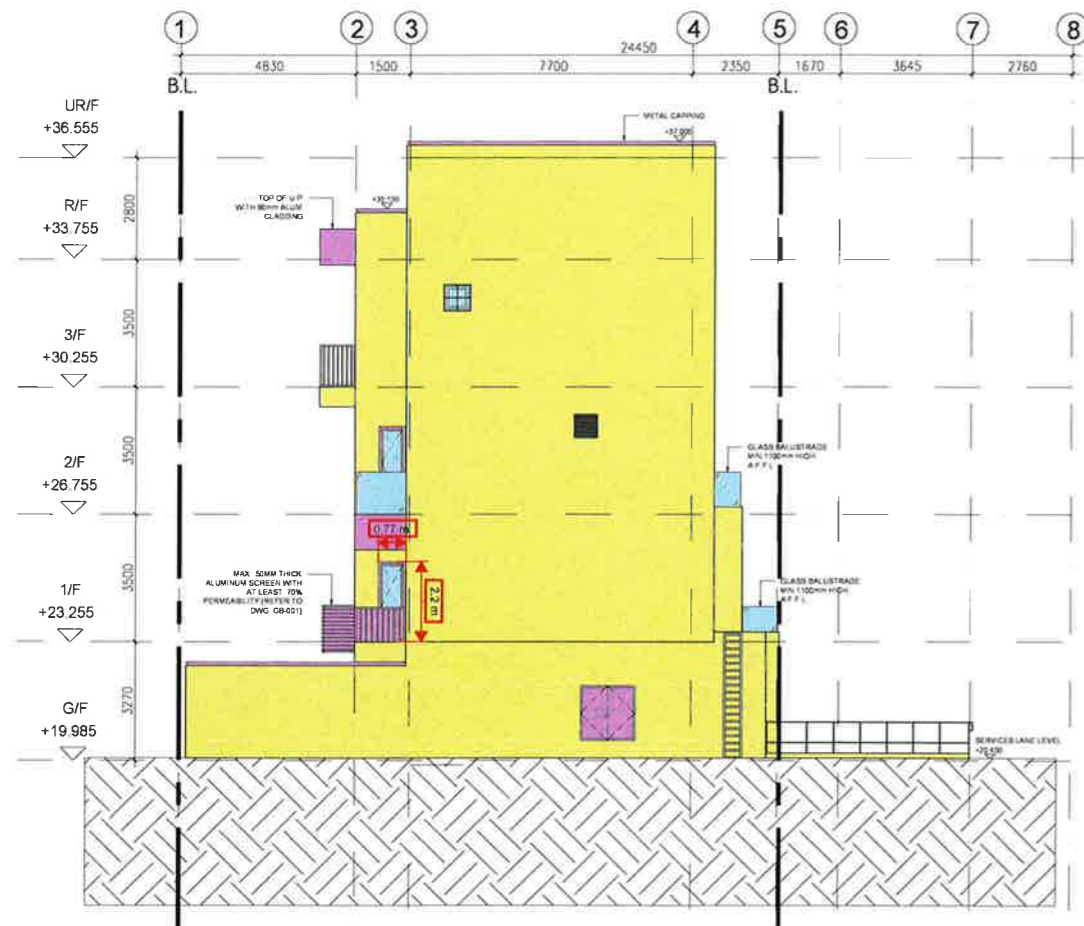
EAST ELEVATION

SCALE 1:100



EAST ELEVATION OF BLOCK D

SCALE 1:100



WEST ELEVATION

SCALE 1:100

RESIDENTIAL THERMAL TRANSFER VALUES (RTTV)

NOTE: FINAL ENERGY EFFICIENCY REPORT AND SUMMARY SHEETS IN APPENDIX A (AS PER PNAP APP-158) OF THE GLAZING ON ELEVATIONS OUTBREAK REFERS

RTTV (BLOCK A)		REQ.	TOTAL	NW	SE	SW	NE
RTTV (BLOCK A)	WALL	$\leq 14 \text{ W/m}^2$	10.07 W/m^2	6.06 W/m^2	12.28 W/m^2	10.84 W/m^2	9.69 W/m^2
	ROOF	$\leq 4 \text{ W/m}^2$	1.72 W/m^2	/	/	/	/
	VISIBLE LIGHT TRANSMITTANCE (GLAZING ON WALL)	$\geq 50\%$	/	/	50% / 52%	50% / 52%	50% / 52%
	EXTERNAL REFLECTANCE (GLAZING ON WALL)	$\leq 20\%$	/	/	6% / 11%	6% / 11%	6% / 11%
	SHADING COEFFICIENT (GLAZING ON WALL)	/	/	/	0.43 / 0.45	0.43 / 0.45	0.43 / 0.45
RTTV (BLOCK B & C)	WALL	$\leq 14 \text{ W/m}^2$	9.55 W/m^2	3.64 W/m^2	3.96 W/m^2	13.05 W/m^2	7.79 W/m^2
	ROOF	$\leq 4 \text{ W/m}^2$	1.73 W/m^2	/	/	/	/
	VISIBLE LIGHT TRANSMITTANCE (GLAZING ON WALL)	$\geq 50\%$	/	52%	52%	52%	52%
	EXTERNAL REFLECTANCE (GLAZING ON WALL)	$\leq 20\%$	/	6%	6%	6%	6%
	SHADING COEFFICIENT (GLAZING ON WALL)	/	/	0.45	0.45	0.45	0.45
RTTV (BLOCK D)	WALL	$\leq 14 \text{ W/m}^2$	8.30 W/m^2	4.49 W/m^2	5.78 W/m^2	13.00 W/m^2	7.13 W/m^2
	ROOF	$\leq 4 \text{ W/m}^2$	1.73 W/m^2	/	/	/	/
	VISIBLE LIGHT TRANSMITTANCE (GLAZING ON WALL)	$\geq 50\%$	/	52%	52%	52%	52%
	EXTERNAL REFLECTANCE (GLAZING ON WALL)	$\leq 20\%$	/	6%	6%	6%	6%
	SHADING COEFFICIENT (GLAZING ON WALL)	/	/	0.45	0.45	0.45	0.45



深圳市佳业达玻璃加工有限公司

地址：深圳市宝安区石岩镇塘头工业园A区2号 电话:0755-2968 1883 传真:0755-2968



工程名称：
日期：

use for glass balustrade, exclude from RTTV calculation

计算程序：W6.3

VLT

ER

U-value

Shading coefficient

No.	试样规格、型号及结构	可见光/VISIBLE LIGHT (%)				K-值 (W/m ² . K)		遮阳系数
		透过率	反射率		Winter night	Summer night		
			Reflectance					
			室外/Out	室内/In				
1	10超白+1.52PVB+10超白	89	7	7	4.83	4.85	0.98	
2	19超白	All (Except Block A 2-3/F)			5.50	5.49	0.99	
3	12水晶灰	52	6	6	5.19	5.24	0.45	
4	10LOWE+1.52PVB+10水晶灰	50	11	10	2.69	2.71	0.43	

For Block A 2-3/F only

注意事项：

1. 本报告所提供的参数仅供参考
2. 如送样检测，本报告只对来样负责
3. 未经本公司书面批准，不得部分复制本报告