住戶康樂設施總熱傳送值的摘要匯表
OTTV of Resident's Recreational Facilities Summary Sheet

屋宇署 BUILDINGS DEPARTMENT

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)

PNAP APP-156 附錄 Appendix B

地址 Address: 45 PAU CHUNG STREET,KOWLOON

屋宇署檔號 BD Ref. No. 4073/14

建築物類型/用途 Building Type / Use :		住戶康樂設施 Resident's Recreational Facilities
總熱傳送值計算者 OTTV calculated by		☑ 1. 註冊專業工程師 1. Registered Professional Engineers
		☐ 2. 建築師 2. Architect
		☐ 3. 其他，請註明： 3. Others, please specify:
分類 Classification		☐ 平台 Podium / ☐ 樓塔 Tower
層數 (住戶康樂設施) No. of Storeys (RRF)		1
總樓面面積 Gross Floor Area		51.359 平方米 m²
實用樓面面積 Usable Floor Area		51.359 平方米 m²
外牆總面積 (包括窗戶) Total External Wall Area (including windows)		173.5 平方米 m²
窗戶總面積 Total Window Area		20 平方米 m²
窗戶與牆壁的比例 Window to Wall Ratio		= 40:347
天窗總面積 Total Skylight Area		平方米 m²
**加權平均U值 **Weighted Average U-value	不透光牆 Opaque Wall	40 瓦特/平方米 W/m²
	窗戶 Window	4.89 瓦特/平方米 W/m²
	不透光屋頂 Opaque Roof	瓦特/平方米 W/m²
	天窗 Skylight	瓦特/平方米 W/m²
窗戶 Window	玻璃類型 Glass Type	☑ 反射性 Reflective 面積 Area= 平方米m² SC= VLT= % ER= %
		☑ 有色 Tinted 面積 Area= 平方米m² SC= VLT= % ER= %
		☑ 透明 Clear 面積 Area= 20 平方米m² SC= 0.6 VLT= 49 % ER= 6 %
	雙層玻璃 Double Glazing	☐ 有 Yes ☑ 無 No
	外遮光物 External Shading	外懸伸建物 Overhang ☐ 有 Yes ☑ 無 No
		側鰭伸建物 Sidefin ☐ 有 Yes ☑ 無 No
天窗 Skylight	玻璃類型 Glass Type	☐ 反射性 Reflective 面積 Area= 平方米m² SC= VLT= % ER= %
		☐ 有色 Tinted 面積 Area= 平方米m² SC= VLT= % ER= %
		☐ 透明 Clear 面積 Area= 平方米m² SC= VLT= % ER= %
	雙層玻璃 Double Glazing	☐ 有 Yes ☑ 無 No
	外遮光物 External Shading	☐ 有 Yes ☑ 無 No
		☐ 有 Yes ☑ 無 No
**加權平均吸熱率值 **Weighted Average Absorptivity	牆壁 Wall	0.57
	屋頂 Roof	
**加權平均密度值 **Weighted Average Density	牆壁 Wall	378 公斤/平方米 kg/m²
	屋頂 Roof	公斤/平方米 kg/m²
住戶康樂設施總熱傳送值 $OTTV_{RRF}$	牆壁 Wall	18.17 瓦特/平方米 W/m²
	屋頂 Roof	7.62 瓦特/平方米 W/m²
	總平均數 Overall Average	15.76 瓦特/平方米 W/m²

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

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
** Weighted by area
Window and skylight data should represent the major proportion of its use in the development.

認可人士、註冊結構工程師及註冊岩土工程師作供證實之用 (倘適用)

簽署*
Signature*

Ir Lau Pak Kin
Registered Professional Engineer
(Mechanical & Building Services)
Registration No. RP 0203025

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

3	1	0	3	2	0	2	3

日 dd 月 mm 年 yyyy

Building (Energy Efficiency) Regulation

Form OTTV 4

Summary of OTTV of Building Envelope

Sheet No. D P-1 BD Ref 2/ 4073 / 14

Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon

Total Envelope Heat Gain

Facade Orientation	Gross Area From Form OTTV 3	Gross Heat Gain from Form OTTV3
a. SW Elevation	26	164.07
b. SE Elevation	65	2618.78
c. Internal partition wall	82.5	370.96
Subtotal	173.5 (E)	3153.81 (G)
Ceiling SLab		
a. Ceiling Slab b. -	51.359	391.76
Subtotal	51.359(F)	391.76 (H)

*Walls OTTV $= \frac{G}{E} = \frac{3153.81}{173.5}\ W/m^2 = 18.17\ W/m^2$

*Ceiling Slab OTTV $= \frac{H}{} = \frac{391.76}{51.359}\ W/m^2 = 7.62\ W/m^2$

*OTTV $= \frac{G+H}{E+F} = \frac{3545.57}{224.859}\ W/m^2 = 15.76\ W/m^2$

*Delete as appropriate

Building (Energy Efficiency) Regulation
Form OTTV 3
Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C P-1 BD Ref 2/ 4073 / 14
Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon
Façade Orientation facing SW (Adjoining Building Wall)

Opaque *Walls / ~~Roofs~~

Code No.	Description	*A_w/~~A_r~~	U	α	$^{TD}_{EQ}$	Sum
	200mm concrete-2/F 900mm concrete-2/F	21 5	4.76 1.88	0.57 0.57	2.72 1.7	154.97 9.1
	Subtotals	26	(A)		Heat Gain	164.07 (C)

Fenestration

Code No.	Description	*Af_w/~~Af_r~~	SC	ESM	SF	Sum
	2/F	NIL	-	-	-	-
	Subtotals	NIL	(B)		Heat Gain	- (D)

Gross Heat Gain (C+D) 164.07 W

Gross Area (A+B) 26 m^2

OTTV = $\frac{C+D}{A+B}$ = 6.3 W/m^2

*Delete as appropriate

Building (Energy Efficiency) Regulation
Form OTTV 3
Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C P-2 BD Ref 2/ 4073 / 14
Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon
Façade Orientation facing SE

Opaque *Walls / ~~Roofs~~

Code No.	Description	*A_w/~~A_r~~	U	α	$^{TD}_{EQ}$	Sum
	2/F	45	2.31	0.57	4.3	254.78
	Subtotals	45	(A)		Heat Gain	254.78 (C)

Fenestration

Code No.	Description	*Af_w/~~Af_r~~	SC	ESM	SF	Sum
	2/F	20	0.6	-	197	2364
	Subtotals	30	(B)		Heat Gain	2364 (D)

Gross Heat Gain (C+D) 2618.78 W

Gross Area (A+B) 65 m^2

OTTV = $\frac{C+D}{A+B}$ = 40.28 W/m^2

*Delete as appropriate

Building (Energy Efficiency) Regulation
Form OTTV 3
Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C P-3 BD Ref 2/4073/14
Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon
Façade Orientation facing Internal Partition Wall

Opaque *Walls / ~~Roofs~~

Code No.	Description	*A_w/~~A_r~~	U	α	$^{TD}_{EQ}$	Sum
	100mm-2/F	60	3.4	0.57	2.72	316.28
	500mm-2/F	22.5	2.08	0.57	2.05	54.68
	Subtotals	82.5	(A)		Heat Gain	370.96 (C)

Fenestration

Code No.	Description	*Af_w/~~Af_r~~	SC	ESM	SF	Sum
	2/F	NIL	-	-	-	-
	Subtotals	NIL	(B)		Heat Gain	- (D)

Gross Heat Gain (C+D) 370.96 W

Gross Area (A+B) 82.5 m^2

OTTV = $\frac{C+D}{A+B}$ = 4.49 W/m^2

*Delete as appropriate

Building (Energy Efficiency) Regulation

Form OTTV 3

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C P-4 BD Ref 2/ 4073 / 14

Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon

Façade Orientation facing -

Ceiling Slab

Code No.	Description	*A_w/~~A_r~~	U	α	$^{TD}_{EQ}$	Sum
	Ceiling Slab-2/F	51.359	4.92	0.57	2.72	391.76
	Subtotals	51.359	(A)		Heat Gain	391.76 (C)

Fenestration

Code No.	Description	*Af_w/~~Af_r~~	SC	ESM	SF	Sum
	2/F	NIL	-	-	-	-
	Subtotals	NIL	(B)		Heat Gain	- (D)

Gross Heat Gain (C+D) 391.76 W

Gross Area (A+B) 51.359 m^2

OTTV = $\frac{C+D}{A+B}$ = 7.62 W/m^2

*Delete as appropriate

Building (Energy Efficiency) Regulation
Form OTTV 2
Window / Rooflight Schedule

Sheet No. B P-1 BD Ref 2/ 4073 / 14
Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon
Physical data on *window/~~rooflight~~
Façade Orientation facing SE Solar Factor (SF) is 197

Window/Rooflight Code No.	*F_1/~~RL_T~~
Location of *Window/~~Rooflight~~	2/F
Glazing type	Double glazing (type 3)
Thickness m	10mm+1.52PVB+10mm
Shading Coefficient (SC)	0.6
Type of shading device	-
External shading Multiplier (ESM)	-
Area of glazing m^2	30

*Delete as appropriate

Building (Energy Efficiency) Regulation
Form OTTV 2
~~Window~~ / Rooflight Schedule

Sheet No. B P-2 BD Ref 2/ 4073 / 14
Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon
Physical data on *~~window~~/rooflight
Façade Orientation facing Roof Solar Factor (SF) is 264

Window/Rooflight Code No.	*F_1/RL_1	*F_2/RL_2	*F_3/RL_3	*F_4/RL_4
Location of *Window/ ~~Rooflight~~	2/F			
Glazing type	NIL			
Thickness m	-			
Shading Coefficient (SC)	-			
Type of shading device	-			
External shading Multiplier (ESM)	-			
Area of glazing m^2	-			

*Delete as appropriate

Building (Energy Efficiency) Regulation

Form OTTV 1

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

Sheet No. A P-1 BD Ref 2/ 4073 / 14

Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon

Physical data of Opaque *wall (Adjoining Building Wall)

Façade Orientation facing SW Solar Factor (SF) is 202

*Wall/Roof Code No.	*W_1/R_2	*W_2/R_3
Location of Wall/~~Roof~~	2/F	2/F
External Finish Material		
Conductivity W/m℃		
Density kg/m^3		
Thickness m		
Absorptivity (α)		
Intermediate component		
Conductivity W/ m℃	2.16	2.16
Density kg/m^3	2400	2400
Thickness m	0.20	0.9
Intermediate component		
Conductivity W/m℃		
Density kg/m^3		
Thickness m		
Intermediate component		
Conductivity W/m℃		
Density kg/m^3		
Thickness m		
Intermediate component		
Conductivity W/m℃		
Density kg/m^3		
Thickness m		
Internal Finish Material		
Conductivity W/m℃		
Density kg/m^3		
Thickness m		
Absorptivity (α)	Ri=0.12	Ri=0.12
"U" value of composite *Wall/~~Roof~~	4.76	1.88
Area of *Wall/~~Roof~~ m^2	4.2 x 5 = 21	1 x 5 = 5
Density of composite *Wall/~~Roof~~ kg/m^2	360	2160
Equivalent temperature difference ($^{TD}_{EQ}$)	2.72	1.7

*Delete as appropriate

Building (Energy Efficiency) Regulation

Form OTTV 1

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

Sheet No. A P-2 BD Ref 2/ 4073 / 14

Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon

Physical data of Opaque *wall

Façade Orientation facing SE Solar Factor (SF) is 197

*Wall/Roof Code No.	*W_1/~~R_1~~
Location of Wall/~~Roof~~	2/F
External Finish Material	
Conductivity W/m℃	0.72
Density kg/m^3	18.6
Thickness m	0.01
Absorptivity (α)	0.57
Intermediate component	Concrete
Conductivity W/ m℃	2.16
Density kg/m^3	2400
Thickness m	0.15
Intermediate component	
Conductivity W/m℃	
Density kg/m^3	
Thickness m	
Intermediate component	
Conductivity W/m℃	
Density kg/m^3	
Thickness m	
Intermediate component	
Conductivity W/m℃	
Density kg/m^3	
Thickness m	
Internal Finish Material	
Conductivity W/m℃	
Density kg/m^3	
Thickness m	
Absorptivity (α)	Ro=0.044 Ri=0.12
"U" value of composite *Wall/~~Roof~~	2.31
Area of *Wall/~~Roof~~ m^2	(15 x 5) +(10 x 3) = 45
Density of composite *Wall/~~Roof~~ kg/m^2	378.6
Equivalent temperature difference ($^{TD}_{EQ}$)	4.30

*Delete as appropriate

Building (Energy Efficiency) Regulation

Form OTTV 1

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

Sheet No. A P-3 BD Ref 2/ 4073 / 14

Building address Proposed Re-Development IN K.I.L. 1687 S.AS.S.2 at 45 Pau Chung Street, Kowloon

Physical data of Opaque *Ceiling slab.

Façade Orientation facing - Solar Factor (SF) is -

*Wall/Roof Code No.	*S_1
Location of Wall/Roof	2/F
External Finish Material	Cement Sand
Conductivity W/m℃	0.72
Density kg/m^3	18.6
Thickness m	0.01
Absorptivity (α)	0.57
Intermediate component	Concrete
Conductivity W/ m℃	2.16
Density kg/m^3	2400
Thickness m	0.15
Intermediate component	
Conductivity W/m℃	
Density kg/m^3	
Thickness m	
Intermediate component	
Conductivity W/m℃	
Density kg/m^3	
Thickness m	
Intermediate component	
Conductivity W/m℃	
Density kg/m^3	
Thickness m	
Internal Finish Material	
Conductivity W/m℃	
Density kg/m^3	
Thickness m	
Absorptivity (α)	-
"U" value of composite *Slab	4.92
Area of *Slab m^2	51.359
Density of composite *Slab kg/m^2	378.6
Equivalent temperature difference ($^{TD}_{EQ}$)	2.72

*Delete as appropriate

"U" Value Calculation

1) Facing SW – 200mm adjoining building wall

Composition	Resistance ($m^2℃/w$)	Weight (kg/m^2)
200mm concrete	$\frac{0.2}{2.16} = 0.09$	0.2 x 2400 =480
Internal Surface film	Ri = 0.12	-
total	0.21	480

$$\upsilon = \frac{1}{0.21} = 4.76 w/m^2℃$$

2) Facing SW – 900mm adjoining building wall

Composition	Resistance ($m^2℃/w$)	Weight (kg/m^2)
900mm concrete	$\frac{0.9}{2.16} = 0.41$	0.9 x 2400 =2160
Internal Surface film	Ri = 0.12	-
total	0.53	2160

$$\upsilon = \frac{1}{0.53} = 1.88 w/m^2℃$$

3) Facing SE-150mm concrete wall

Composition	Resistance ($m^2℃/w$)	Weight (kg/m^2)
External surface film	Ro = 0.044	-
10mm Cement Sand	$\frac{0.15}{0.72} = 0.208$	0.01 x 1860 =18.6
150mm concrete	$\frac{0.15}{2.16} = 0.06$	0.15 x 2400 =360
Internal Surface film	Ri = 0.162	-
total	0.432	378.6

$$\upsilon = \frac{1}{0.432} = 2.31 w/m^2℃$$

4) 100mm concrete internal partition wall

Composition	Resistance ($m^2°C/w$)	Weight (kg/m^2)
Outer surface film	Ro = 0.12	-
10mm Cement Sand tile	0.01 / 0.72 = 0.014	0.01 x 1860 =18.6
100mm concrete	0.1 / 2.16 = 0.04	0.1 x 2400 =240
Inter Surface film	Ri = 0.12	-
total	0.294	258.6

$$\upsilon = \frac{1}{0.294} = 3.40 w/m^2°C$$

5) 200mm concrete internal partition wall

Composition	Resistance ($m^2°C/w$)	Weight (kg/m^2)
Outer surface film	Ro = 0.12	-
10mm Cement Sand tile	0.01 / 0.72 = 0.014	0.01 x 1860 =18.6
500mm concrete	0.5 / 2.16 = 0.23	0.5 x 2400 =1200
Inter Surface film	Ri = 0.12	-
total	0.48	1218.6

$$\upsilon = \frac{1}{0.48} = 2.08 w/m^2°C$$

6) 150mm concrete ceiling slab

Composition	Resistance ($m^2°C/w$)	Weight (kg/m^2)
100mm screeding	0.01 / 0.72 = 0.014	0.01 x 1860 =18.6
150mm concrete	0.15 / 2.16 = 0.069	0.15 x 2400 =360
Surface film	Ri = 0.12	-
total	0. 203	378.6

$$\upsilon = \frac{1}{0.203} = 4.92 w/m^2°C$$