

Project name

Avalon House Refurb Green Proposed Blinds 2021 (All PV to NB)

As designed

Date: Fri May 24 09:41:56 2024

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.25

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.25

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 940.34The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	4.65
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	4.6
Target primary energy rate (TPER), kWh _{PE} /m ² annum	50.43
Building primary energy rate (BPER), kWh _{PE} /m ² annum	50.12
Do the building's emission and primary energy rates exceed the targets?	BER =< TER BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U _a -Limit	U _a -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	0.12	0.12	TP000013:Surf[1]
Floors	0.18	0.1	0.1	TP000013:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.1	0.1	L0000001:Surf[0]
Windows** and roof windows	1.6	1	1	TP000007:Surf[2]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors [^]	1.6	1.6	1.6	TP000015:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

[^] For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	3

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- 03_GF01_FCU_ASHP_GF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.62	3.76	0	1.6	0.8
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

2- 04_Rad_Elec_MV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.3	-	0.75
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

3- 06_Rad_Elec_NV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.3	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

4- 01_AHU_ASHP_DV_Internal Offices_UF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.62	3.76	0	1.6	0.8
Standard value	2.5*	4.5**	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					
** Standard shown is for air-cooled chillers >=400 kW. For chillers <400 kW, limiting SEER is 4.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

5- 02_TH_ASHP_Perimeter Offices_UF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.62	3.76	0	1.6	0.8
Standard value	2.5*	4.5**	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					
** Standard shown is for air-cooled chillers >=400 kW. For chillers <400 kW, limiting SEER is 4.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.62	6	-	-	0.8
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

"No HWS in project, or hot water is provided by HVAC system"

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]										HR efficiency	
	A	B	C	D	E	F	G	H	I	Zone	Standard	
	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
L00-Building Management	-	-	-	-	-	-	-	0.2	-	-	N/A	
L00-Water Plant	-	-	-	1.6	-	-	-	-	-	-	N/A	
L00-Lift Lobby	-	-	-	-	-	-	-	0.2	-	-	N/A	
L00-LV Switch	-	-	-	1.6	-	-	-	-	-	-	N/A	
L00-Office 2	-	-	-	-	-	-	-	0.2	-	-	N/A	
L00-Reception	-	-	-	-	-	-	-	0.2	-	-	N/A	
L00-WC	-	-	-	1.6	-	-	-	-	-	-	N/A	
L01-Acc WC	-	-	-	1.6	-	-	-	-	-	-	N/A	
L01-Lift Lobby	-	-	-	-	-	-	-	0.2	-	-	N/A	
L01-WC	-	-	-	1.6	-	-	-	-	-	-	N/A	
L01-WC Lobby 1	-	-	-	1.6	-	-	-	-	-	-	N/A	
L01-WC Lobby 2	-	-	-	1.6	-	-	-	-	-	-	N/A	
L02-Acc WC	-	-	-	1.6	-	-	-	-	-	-	N/A	
L02-Lift Lobby	-	-	-	-	-	-	-	0.2	-	-	N/A	
L02-Office PER3	-	-	-	-	-	-	-	0.2	-	-	N/A	
L02-Office PER4	-	-	-	-	-	-	-	0.2	-	-	N/A	
L02-WC	-	-	-	1.6	-	-	-	-	-	-	N/A	
L02-WC Lobby 1	-	-	-	1.6	-	-	-	-	-	-	N/A	
L02-WC Lobby 2	-	-	-	1.6	-	-	-	-	-	-	N/A	
L00-Substation	-	-	-	1.6	-	-	-	-	-	-	N/A	
L01-Office PER2	-	-	-	-	-	-	-	0.2	-	-	N/A	
L01-Office PER1	-	-	-	-	-	-	-	0.2	-	-	N/A	

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
L02-Office PER2	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L02-Office PER1	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L02-Office PER5	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L00-Acc Shower	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-Cleaners	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-WC Lobby 1	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-Changing 1	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-Showers 1	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-Showers 2	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-Changing 2	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-Comms	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-AHU	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-Cycle Store	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L00-Office 1	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L01-Office PER4	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L01-Office PER4	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L01-Office PER3	-	-	-	-	-	-	-	0.2	-	-	-	N/A

General lighting and display lighting		General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
Standard value	95	80	0.3	
L00-Building Management	304	-	-	
L00-Water Plant	120	-	-	
L00-Lift Lobby	120	-	-	
L00-LV Switch	120	-	-	
L00-Office 2	139	-	-	
L00-Reception	120	120	1.125	
L00-Stairs 01	120	-	-	
L00-Stairs 02	120	-	-	
L00-Stairs 03	120	-	-	
L00-WC	120	-	-	
L01-Acc WC	120	-	-	
L01-Lift Lobby	120	-	-	
L01-Stairs 01	120	-	-	
L01-Stairs 02	120	-	-	
L01-Stairs 03	120	-	-	
L01-WC	120	-	-	
L01-WC Lobby 1	120	-	-	
L01-WC Lobby 2	120	-	-	
L02-Acc WC	120	-	-	
L02-Lift Lobby	120	-	-	
L02-Office CORE 2	134	-	-	
L02-Office PER3	139	-	-	

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
L02-Office PER4		136	-	-
L02-Stairs 01		120	-	-
L02-Stairs 02		120	-	-
L02-Stairs 03		120	-	-
L02-WC		120	-	-
L02-WC Lobby 1		120	-	-
L02-WC Lobby 2		120	-	-
L00-Substation		120	-	-
L01-Office PER2		139	-	-
L01-Office PER1		135	-	-
L02-Office PER2		138	-	-
L02-Office PER1		135	-	-
L02-Office PER5		136	-	-
L02-Office CORE 1		135	-	-
L00-Acc Shower		120	-	-
L00-Cleaners		120	-	-
L00-WC Lobby 1		120	-	-
L00-Changing 1		120	-	-
L00-Showers 1		120	-	-
L00-Showers 2		120	-	-
L00-Changing 2		120	-	-
L00-Comms		120	-	-
L00-AHU		120	-	-
L00-Cycle Store		120	-	-
L00-Office 1		137	-	-
L01-Office PER4		135	-	-
L01-Office CORE		133	-	-
L01-Office PER4		132	-	-
L01-Office PER3		136	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L00-Building Management	N/A	N/A
L00-Lift Lobby	NO (-75.4%)	YES
L00-Office 2	NO (-92.9%)	YES
L00-Reception	NO (-86.1%)	YES
L01-Lift Lobby	N/A	N/A
L02-Lift Lobby	N/A	N/A
L02-Office CORE 2	N/A	N/A
L02-Office PER3	NO (-86.7%)	YES
L02-Office PER4	NO (-92.1%)	YES
L01-Office PER2	NO (-86.7%)	YES
L01-Office PER1	NO (-93.1%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L02-Office PER2	NO (-81.1%)	YES
L02-Office PER1	NO (-90.3%)	YES
L02-Office PER5	NO (-87.1%)	YES
L02-Office CORE 1	N/A	N/A
L00-Comms	N/A	N/A
L00-Cycle Store	N/A	N/A
L00-Office 1	NO (-94.4%)	YES
L01-Office PER4	NO (-94.9%)	YES
L01-Office CORE	N/A	N/A
L01-Office PER4	N/A	N/A
L01-Office PER3	NO (-91.7%)	YES

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	2821	2821
External area [m ²]	3075.9	3075.9
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	887.19	1355.61
Average U-value [W/m ² K]	0.29	0.44
Alpha value* [%]	24.82	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area Building Type

	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	4.18	3.75
Cooling	3.52	3.75
Auxiliary	7.84	7.75
Lighting	6.7	11.12
Hot water	11.71	10.57
Equipment*	46.66	46.66
TOTAL**	33.95	36.94

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	2.79
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>2.79</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	65.33	90.7
Primary energy [kWh _{PE} /m ²]	50.12	50.43
Total emissions [kg/m ²]	4.6	4.65

HVAC Systems Performance

System Type	Heat dem MJ/m ²	Cool dem MJ/m ²	Heat con kWh/m ²	Cool con kWh/m ²	Aux con kWh/m ²	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Fan coil systems, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	27.9	45.8	2.3	4.2	6.9	3.34	3.01	3.62	3.76
Notional	25	69.7	2.5	4.2	8.8	2.78	4.63	----	----
[ST] Constant volume system (variable fresh air rate), [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	16.5	51.2	1.1	5.8	19.1	4.24	2.45	3.62	3.76
Notional	11.4	91.3	1.1	5.5	8.9	2.78	4.63	----	----
[ST] Fan coil systems, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	29.2	42.1	2.4	3.9	7	3.34	3.01	3.62	3.76
Notional	25.4	76.8	2.5	4.6	10	2.78	4.63	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	93.4	0	30.8	0	0	0.84	0	1	0
Notional	140.9	0	27.7	0	0	1.41	0	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	17.4	0	5.7	0	3.4	0.84	0	1	0
Notional	15.1	0	3	0	0.7	1.41	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	0	0	0	0	0	3.55	4.48	3.62	6
Notional	0	0	0	0	0	2.78	4.63	----	----

Key to terms

Heat dem [MJ/m ²]	= Heating energy demand
Cool dem [MJ/m ²]	= Cooling energy demand
Heat con [kWh/m ²]	= Heating energy consumption
Cool con [kWh/m ²]	= Cooling energy consumption
Aux con [kWh/m ²]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type